THE

CAUSES, SYMPTOMS, DIAGNOSIS, PATHOLOGY,
AND TREATMENT

OF

CHRONIC DISEASES,

BY

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PREFACE.

THE present work has been prepared in accordance with the request of numerous practitioners who, when students, attended the author's lectures upon the Treatment of Chronic Diseases, in the lecture hall of the Eclectic Medical Institute of Cincinnati. In it, the author has endeavored to present the various subjects treated upon, in such a manner, that the student as well as the practitioner may become fully posted as regards the causes, symptoms, diagnosis, pathology, and most successful treatment of Chronic Diseases up to the present period. In the present work the term "Chronic Diseases" includes those maladies, functional or organic, whether of long standing or not, in which no active inflammatory symptoms are present.

Nothwithstanding the great prevalence of chronic maladies, and the frequency with which physicians are called upon to treat them, it is surprising that but few works have been published upon the subject, and those of a meager and unsatisfactory character; indeed, there is no single work extant that the author knows of, in any language, that is wholly devoted to the consideration of this class of diseases,—the material has existed, but it has been in loose and scattered portions. The difficulty of understanding, and well understanding these diseases, the inefficiency of the treatment heretofore commonly pursued by medical men, and the apparent aversion generally manifested by them relative to attending patients laboring under such maladies, an aversion based, probably, upon their unsuccess in the treatment thereof, and upon the want of confidence in their remedies so frequently displayed by such patients, may, perhaps, be among the principal causes why this class of diseases has been so sparsely touched upon by medical writers. Indeed, so slight has been the attention bestowed upon the treatment of chronic maladies by practitioners generally, that it has been by no means a matter of infrequency for a patient so afflicted not only to have been unsuccessfully treated by a number of physicians, consecutively consulted, but also to have received as many names for his malady as there were practitioners consulted.

Another reason why medical men, as a general rule, have been so indifferent

to the treatment of chronic diseases is, undoubtedly, because there has been no text work, no work of authority wholly devoted to this subject, which they could readily obtain; and to have procured all the monographs, journals' books, etc., in which this subject is referred to and discussed, would require an outlay of several hundreds of dollars. The present volume is designed to fill up this hiatus in the literature of that medical school to which the author has the honor of belonging. And although not free from imperfections, it is hoped that its errors and omissions will not be of such a character as to lessen its usefulness in a *practical point of view*, and that they will be indulgently looked upon by the profession.

In Parts I and II, the matters treated upon are presented in a somewhat popular style, with the hope that it may prove serviceable to extra-professional persons who may have an opportunity of perusing said Parts. The author is fully aware that in these, as well as in other parts of the work, he has presented heterodoxical, or mere hypothetical views relative to certain points,—but these are his own views at the present time, and he gives them for what they are worth,—it remains for a future more thorough knowledge, as well as accurate investigations and experience, based upon such enlarged and more perfect knowledge, to determine their correctness or falsity.

In Part III, devoted to Chronic Diseases, he has treated upon them in the order of the several systems of the human body, (excluding the so-called specialties of the Eye, Ear, and Prostate Gland, the maladies of which organs are considered under separate heads in Part IV), as being the more satisfactory method of arrangement for the medical man, and he has endeavored to render the description, etc., of each disease as clear, as full, and as complete as possible, consistent with the limits of the work. Those diseases to which the female sex alone is liable, have not been treated upon in the present work, they will be found in the author's work on Diseases of Women, and it would be a mere repetition to reproduce them here.

But, in practice, it must not be expected to encounter single diseases alone, nor to find single organs only affected; experience has taught us that chronic diseases not only exist as simple lesions, but also that they are very frequently complicated in various ways. In this work these complications have not been treated upon further than by referring to the probability and possibility of their presence when describing the simple lesions of only one organ or part; to do more than this, successfully, would require numerous volumes. The general principles of treatment for each disease and each diseased organ are all that can be satisfactorily given in a work like the present, and with these every medical man should be conversant; the important art for him to

learn subsequently, is to modify these principles and adapt them to the ever-changing symptoms of both single and associated maladies. It is in successfully doing this that the physician displays his judgment, his skill, and his well-grounded knowledge in the several departments of his profession.

The Tables prepared by the author for Part V, will, it is hoped, prove useful to the chronist as well as to the general practitioner, and also to those engaged in microscopic investigations in which the French weights and measures, now legalized by our United States Congress, are frequently employed.—The Index is arranged in accordance with the general disposition of the subjects treated upon, and will be found full and complete.—It is proper to state here, that where the names of compounds are given throughout the work, and not the formula, the latter will be found in the author's American Dispensatory.—As to the doses of medicines, although frequently specified, they will require to be varied according to individual susceptibilities, influences, constitutions and circumstances; the careful practitioner will, in all cases, be guided by these several conditions in his administration of them, and never by any exclusive or arbitrary rules.

The aim of the author has been not so much to present a wholly original work, as one of *practical utility* to the great mass of practitioners, its material being derived from every reliable source; and although a very large amount of original matter is contained in its pages, together with new and original methods of treatment, as well as several valuable remedial preparations which he now makes known for the first time, and also the several Tables in the latter part of the work, yet he desires it to be distinctly understood that no originality is claimed for the work, which must be regarded simply as a compilation.—The principal portion of the treatment named under the respective diseases, is such as the author has found successful in his own practice, and which he has been in the habit of pursuing for many years past.

Much valuable material, especially relating to the *history* and *description* of diseases, as well as their *pathology*, has been selected from various eminent European writers, especially from the English, French and German, and which is thus brought before the profession of this country in an American form, and which it might have been difficult for our practitioners to otherwise obtain except at considerable outlay. The author does not, therefore, hesitate to acknowledge himself under very great indebtedness to the labors of others, whose names have in several instances been omitted in the text, and whose language is frequently given in full, preferring it to any abridgements thereof, or transpositions of his own. Especially is he under great obligations to Prof. Brown-Sequard, and the other eminent medical writers, who have so

kindly permitted him to freely make use of their publications. Truly great minds are ever magnanimous; they possess no unhealthy prejudices, nor discourtesy toward those who honestly differ from them in opinion,—the welfare of the human family and the spread of truth alone actuates them.

The following is a list of the principal authors referred to above, whose writings have been selected and compiled from, more especially in the *history*, *description*, and *pathology* of the various maladies treated upon, in the present work, and to several of whom I am under the greatest indebtedness for an abundance of most valuable and highly practical matter:—Adams, Alibert, Althaus, Anderson, Andral, Aran, Baillie, Barclay, Barlow, Basham, Bassereau, Bateman, Bayle, Bazin, Beale, Becquerel, Bell, Bellingham, Bence-Jones, Bennett, Beraud, Biett, Billard, Bird, Bowman, Bright, Brinton, Brodie, Brown-Sequard, Budd, Busk, Caudmont, Cazenave, Chambers, Christison, Civiale, Cooper, A. Cooper, Copeland, Cruveilhier, Czermak, Davies, Desmarres, R. Dick, Dickinson, Dixon, Dobell, Donders, Duchenne, C. H. Ehrmann, Erichsen, Fischer, Fourcault, Fournier, Frerichs, Fuller, Garrod, Gibb, Giraud-Teulon, Von Græfe, Graves, Green, Habershon, Hardy, Hassall, Hasse, Haygarth, Hebra, Henle, Hogg, Hope, Horion, Hunt, Hunter, Jenner, Johnson, Jones, Knapp, von der Kolk, Kramer, Laennec, Latham, Laurence, Lawrence, Laycock, Leared, Lees, Lehman, H. Lobb, Louis, Leroy (d'Etiolles), Mackenzie, E. Martin, Mercier, Neubauer, Neucourt, Oppler, Ormerod, Paget, Parks, Pavy, Perls, Prout, Quain, Racle, Radcliffe, Rayer, Rees, Reynolds, B. W. Richardson, Roberts, Robin and Verdeil, Rokistansky, Romberg, Rosenstein, Ryland, H. H. Salter, Seegen, Sieveking, Simon, Skae, Skoda, Smith, E. Smith, Startin, Stokes, Tanner, Thomas, H. Thompson, T. Thompson, Thudicum, Todd, Toynbee, Triquet, von Troltsch, Trousseau, Velpeau, Vidal, Vogel, W. F. Wade, Walshe, Watson, Wecker, Wells, Wildo, S. Wilks, Willan, Willis, Wilson, Winslow, Zalesky, etc.

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INTRODUCTORY REMARKS.

HYGIENE.*

Previous to entering upon a description of the medicinal treatment which I have found to be the most successful in palliating or curing chronic diseases, it may be proper to refer to the principal Hygienic measures which should always be associated with such treatment. Because, however valuable a medicine may be in effecting a removal of disease, it is a well-known fact, that its beneficial influences are rendered more prompt and permanent when its employment is associated with proper hygienic measures; and also, that in a great number of cases, a neglect of these measures is certain to be accompanied with a diminution, or entire want of efficacy of the therapeutical treatment. Indeed, how frequently do we meet with persons laboring under some form of chronic disease, who, having lost all confidence in physic and physicians, are, nevertheless, enabled to palliate their worst symptoms, and even attain and enjoy an apparent state of health, by rigidly observing certain hygienic rules? And, from an experience and observation of thirty odd years, I can now conscientiously say, that although there are many maladies in which medicines and medicinal treatment can not be dispensed with, yet I am fully convinced that nearly, if not quite, one-half of the sicknesses which come under the care of medical men, could and ought to be cured solely

* Hereafter, when, in the description of the treatment of the various chronic diseases referred to in this work, "*attention to the skin, the bowels, the kidneys, diet, etc.,*" is advised, it is intended that in these matters the physician be guided by the remarks upon these several points to be found under their appropriate heads in this Hygienic department of the work. An attention to the skin includes bathing once or twice every week, and the use of the spirit vapor bath, every one, two, or three weeks, as the strength and condition of the patient will permit.

by a recourse to hygiene, and the absolute avoidance of any of the articles of the Materia Medica. And it is, undoubtedly, to this fact, that certain schools or systems of medicine of the present day, in which but little if any medicine is prescribed, while the utmost attention is bestowed upon the hygienic department of patients, owe much of their success in the treatment of disease, and their consequent great popularity.

Physicians, therefore, who desire to treat chronic diseases successfully, must pay especial attention to the hygiene of their patients, adapting it to their diseases, their temperaments, their susceptibilities, ages, vital force, and other circumstances connected with them; each one according to his or her conditions, and success will crown the efforts of the medical man, in proportion to the skill and judgment manifested in the proper arrangement and adaptation of hygienic measures to each individual case.

"In all ages and among all nations, civilized, as well as those in a state of nature, the first and prominent desire of man has been to prolong his existence; and even at the present day, notwithstanding the eagerness and perseverance with which wealth and ephemeral pleasures are sought, the preservation of health and life occupies a conspicuous situation in the hearts of men. Health is of the first importance to the human family; what treasures can indemnify us for its loss? What is the nature of that life which is passed in pain and suffering? of what use can a diseased man be to his fellow-creatures, to his wife, to his children, to himself? What services can he render to his country? What undertakings can he attempt? The insensibility of the coffin is preferable to the bed of pain upon which so many unfortunate victims to human infirmities languish.—Nothing, then, is preferable to health, but to preserve it, or to recover it, we must observe nature; we must recognize that our ills are almost always our own work, and it will then be more easy for us to avoid them. To be enabled to do this we must understand ourselves thoroughly, must investigate our points of contact with everything surrounding us, calculate the effects of food and drink, the influence of the air we breathe, and of the several conditions of heat, cold, dryness, moisture, purity and impurity, and carefully observe all the relations of physical and moral objects, of the secretions and excretions, of labor and rest, of pains and pleasures, of tranquillity of mind, and of the passions which too often agitate it. The practice of this science is Hygiene, a wise and prudent government of life, which should be the constant object of men's thoughts, of the serious study of the learned, as it is essentially preservative. Hygiene is an import-

ant part of practical philosophy; without an attention to its precepts the duration of life is abridged. But we must not confound it with curative medicine, which, engaged in restoring health, seldom considers whether the means it employs are fatiguing to the organism, or whether the secret springs it calls into action will not soon succumb to the extreme tension which it imparts to them. On the contrary, hygiene, always a faithful companion of nature, seeks merely to assist her progress by encouraging her steps. It is aware that a small amount of force, may, as well as a complete exhaustion, precipitate the course of life; its practice, being certain and without danger, ought then to take the preference over curative medicine, which, at the most, gives us over to a kind of chance.

"The first author of hygienic science was Hippocrates; four centuries after him came Celsus, who only gave a better arrangement to the materials left by this great master. Galen, the Arabs, the school of Salernus, and the learned of the middle ages, have only repeated Hippocrates, with the addition of many subtleties to his simplicity of means.

"If it be possible, patients should choose, not the most popular physician, but the one who has the greatest success in curing disease, and who is philanthropic. It too often happens that the most popular physician has gained his popularity by intrigue and management, and not by professional success and merit,—while the skilful physician is hardly known. It is a lamentable fact, that the essential qualities of the greater part of physicians, at the present day, consist in great boastings, in ready replies, in minds ready to bend to all manner of persons, in making outside displays, in flattering all tastes, opinions, and passions, in making every effort to usurp all places and to supplant those who have honorably occupied them for a long time. Cabals and intrigues are the methods by which so many competitors triumph in securing patients."—A physician should never be selected for his popularity, his style of dress, nor his style of living, for the chances frequently are that by so doing we court death. Let his success, and that alone, be the cause of having him at our bedside. Yet there are many shallow-brains in society who do not hesitate to assert that they would rather die in the hands of a popular, fashionable physician, than live under the treatment of one less popular and less fashionable.

No special rules of hygiene can be laid down for all to follow; general rules only can be given, and the application of these, their modifications, combinations, degrees, etc., will necessarily vary according to the sex, age, profession, temperament, circumstances

of life, country, national customs, society, and other conditions belonging to each individual, and which it is the duty of the physician to understand. The prolongation of life and the state of health are proportioned to the moderation of the acts and passions of man; temperance, cleanliness, frequent exercise, sobriety, gayety, respiration of pure air, exposure to sunlight, traveling, frequent visits to the country, abstinence from spirituous liquors, moderation in labor, diet, pleasure, and rest; peace of mind, avoidance of strong sudden passions, especially anger, and a reserve in the use of internal medicines, are among the means of health and longevity.—"How many persons are there who suffer from wounded vanity, from disappointed ambition, from false expectations, from loss of property, from a tarnished reputation, etc.? Wounded vanity killed Racine, made Pope morose, Virgil hypochondriacal, Hogarth insane, and Swift imbecile; it assassinated Winckelman and Fourcroy. The passions are at once the motive of our actions and the scourge of life; while moderation is that of strength and wisdom."

Man is not an isolated point in space, nor a being independent of everything around him; we must study him in the localities he inhabits; in the fluids which surround him; in his profession; in his social position; in the friends whom he frequents, and in the habits which he forms and which, each day, impart to him a new existence.

Each age has conditions and distinctions which are inherent to it; in passing through them man changes his proportions, not only in his stature, but also in the mutual relations of the organic systems, in the development of organs and viscera, in the importance and activity of their functions, in the character and the abundance of the products resulting from them; consequently, these changes occur in all that which constitutes the indications by which we may judge of the difference of temperaments.

TEMPERAMENTS.—Each individual possesses a constitution or certain physical conditions peculiar to himself; these have been classified into what are called TEMPERAMENTS. Although we may find many persons whose constitutions bear, as it were, a family resemblance, yet, it is seldom the case that two individuals are found possessing identical temperaments.

Every medical man should be well versed in the study of the temperaments, as it will not only aid him in understanding the influence of external causes in the formation and progress of diseases, but will assist him in his endeavors to modify this influence and to preserve or restore that equilibrium between organic move-

ments which constitutes the condition of health. The temperament, of itself, indicates a state of disproportion between the solids and fluids, a want of equilibrium between organs charged with the most important functions of life; and, by a very simple deduction, it results that persons having a well-marked temperament are predisposed to maladies, the development of which is more rare and proceeds more slowly among others who have not the same organization.

Various classifications of the temperaments have been made by physiologists at different eras; that of Dr. Thomas, of Paris, and Dr. Caldwell, of America, is undoubtedly more philosophical than any of the others, being based entirely upon the solids, or the development of certain organs, as the brain or cranium, chest or thorax, abdomen, and muscles. According to Prof. J. R. Buchanan, this classification embraces the following: "1. The CEPHALIC temperament, characterized by a predominant development of the brain, is a temperament of mild character, in which animal impulse is overruled by the higher sentiments and human faculties. This temperament in perfection is tranquil, intellectual, moderately excitable, and never violent. Unless combined with a liberal share of the muscular temperament, it manifests a tendency to tuberculous disease, and general debility. The disorders peculiar to it are not very violent in their character, but are quite liable to assume a typhoid aspect. Hence, blood-letting, and profuse evacuations are especially objectionable, as there is not the necessary vital force to recover from prostration.

"2. The MUSCULAR temperament, characterized by large limbs and powerful muscles, is a temperament of great vital force and endurance; scarcely ever attacked by tuberculous or scrofulous diseases, but quite liable to rheumatism and inflammatory fevers, with but little tendency to sink into the typhoid state.

"3. The ABDOMINAL temperament is characterized by general inefficiency and relaxation, and constitutes the lowest grade of humanity.

"4. The THORACIC temperament, indicated by a large thorax, including a large development of lungs and heart, is the most harmonious and active of these temperaments, indicating, as it does, active circulation and aeration of the blood, thereby producing general activity of mind and body. This temperament presents active phenomena in disease, responding readily to medicines, especially to stimulants, and is frequently defective in the functions of the abdominal viscera, the appetite and evacuations being moderate. The tendency is to excessive activity.

"Of these temperaments, the purely *Cephalic* is adapted to the life of a sedentary student, but unfit for vigorous action. The *Cephalo-thoracic*, a compound of the Cephalic and Thoracic, is adapted both to study and to action, but especially to oratory and to social intercourse. Combined with a sufficient amount of the *Muscular*, it produces the best temperament for greatness, adapting its possessor to the noblest achievements, and is also favorable to physical health and harmony.

"The pure *Thoracic* temperament produces active and brilliant qualities, but requires a sufficient amount of the *Cephalic*, to give wisdom and calmness, and a sufficient amount of the *Muscular*, to furnish the necessary strength and vital stamina.

"The *Muscular* temperament alone, produces an athletic form and animal coarseness suitable to the prize-fighter, or the mercenary soldier, but unfit for any elevated or refined existence. The proper use of the Muscular temperament is to combine with the higher temperaments, and give them the necessary physical power and vitality.

"The *Thoracico-muscular* temperament possesses the highest degree of activity and force which the human constitution can manifest.—The *Musculo-cephalic* temperament is one of great power and intelligence, and endurance, but moderately excitable, resembling very nearly what has been called the *Bilious*.—The *Musculo-abdominal* temperament is coarse, sluggish, and powerful when roused. The character is gross, sensual, passionate, and unrefined. It corresponds with the inferior specimens of what is called the *Sanguine-lymphatic*.—The *Cephalo-abdominal* temperament is characteristic of infancy, as the brain and abdomen are then relatively large, while the chest and muscles are small. As we advance in life, the Cephalo-abdominal temperament diminishes, and the Thoracico-muscular increases, the chest and muscles of the adult being much more largely developed in proportion, than those of the infant, while the abdominal organs are relatively much smaller. The liver, especially, diminishes in proportional development, and a torpid hepatic condition frequently occurs. The temperament of woman is intermediate between that of the adult man and that of the infant, having proportionably more than man of the Cephalo-abdominal in comparison with the Thoracic and Muscular."

The old classification of the temperaments, based upon the supposed properties of the fluids of the body, as, of the blood, the bile, the nervous fluid, and the lymph, is, however, more generally recognized among medical men than the preceding one; and, although not perfect nor entirely correct, as it bears considerable

analogy to the foregoing one, just glanced at, I will briefly refer to it. According to this classification, we have the following:

1. The SANGUINE TEMPERAMENT, in some respects resembles the Thoracic; it is recognized by vigorous physical development, active circulation, passions, and appetites, with a moderate degree of perseverance, intensity, and depth of character, and a complexion generally somewhat florid, and requires for its manifestation a good share of the *basilar organs*. It must be remembered, however, that a plethoric abundance of blood does not produce the characteristics of this temperament.

Vital motion is determined by the intimate and reciprocal action of the Sanguine and Nervous temperaments; nearly all authors have considered the fundamental type resulting from this combination as the most favorable physical condition for health and happiness,—but the descriptions, which they have embellished, have not always agreed with the realities of experience, and are only agreeable fictions. Health results from the equilibrium which must exist between the organic solids and fluids, and the predominance of the sanguine system, of itself indicates a tendency to the destruction of this equilibrium. It will suffice to trace the history of diseases, to become convinced that an abundance of blood is one of the organic conditions the most prejudicial to health. Hippocrates remarked, that the highest degree of athletic force bordered upon disease; this truth is especially applicable to the eminently sanguine constitution.

However, in childhood, this organic disposition announces strength, and coincides with the development of all the organs. It is hardly observed until near the period of puberty, when it increases as age advances, and at the fortieth or fiftieth year it attains its maximum of development, after which period it gradually decreases. In old age, the organic predominances cease or diminish, the sexes even lose a part of their attributes, and resemble each other in the uniformity of their tastes, the indifference of their desires, and the tardiness of their motions as well as of their sensations.

The physical and moral characters which many modern physicians have attributed to the sanguine temperament, following the example of the ancients, are, in part, those of childhood. One author says: "The ancients observed that men of middling stature and plumpness, with well-proportioned limbs, bright eyes, brown hair, a soft and pliant skin, a quick and undulating pulse, free movements, bold and determined, but without violence, enjoy a similar freedom, and a similar liberty in the internal operations of

their minds; that their affections, like their physiognomy, being amiable and cheerful, render them men of pleasure and agreeable companions." Further on, he adds, "Their moral maladies, their passions, their vexations, are not deeply seated; their passions are strong, instantaneous, sometimes impetuous, but are soon calmed and extinguished. . . . . They are fitted for mental labors; but whatever requires great fortitude, deep thought, much care, and perseverance, will not suit them; they are entirely incapable of them."

Such is the agreeable, but somewhat imaginary description, which has been given of the sanguine temperament; we may observe that it mingles some traits peculiar to a predominance of the vascular system, with the general attributes of childhood and with acts which ought to belong to a happy organization of the brain. In this manner authors copy from each other, allowing their imagination to have free scope instead of studying nature.

A person of sanguine temperament may be of great height, medium, or small, have brown hair, eyebrows of a black or any other color; he may be stout, lean, or have a medium plumpness; all these external characters are deceitful. The man whose constitution is not accidentally sanguine has a large chest, the complexion naturally florid, and the veins prominent, especially when he is not very corpulent; the movements of the heart are energetic, the pulse is almost always strong and developed; he is, at times, subject to hemorrhages, to giddiness, to heaviness of the head, and has frequent need of depletion by purgatives, sudorifics, etc. These are the characters of this temperament. But we find other persons whose constitution is weak, complexion pale, with but small development of the chest, blood-vessels, and muscles, who present, nevertheless, at greater or less intervals, symptoms of plethora, of hemorrhages, of congestions, etc., which require the same remedial means. These morbid dispositions must not be confounded with the characters which distinguish the constitution of sanguine persons in a normal state; for, with these, the lungs and the blood-vessels are not only well developed, but the fluid circulating in them is thick, coagulable, rich in fibrine, and especially in globules. A similar organization is a manifestation of strength.

But it must be recollected that the external appearances attributed to the sanguine often conceal the radical weakness of the lymphatic temperament. A florid complexion, dark and sparkling eyes, a soft and pliant skin, light-colored, brown or black hair, may be met with in a debilitated and anemic constitution. These external signs are then deceitful, and the most serious results may

follow untimely depletions among young persons possessing a like constitution.

A predominance of the sanguine temperament is often presented under the external forms attributed to the bilious and adipose temperaments of the ancients. Such men have a pale or yellowish complexion, large chest, strong and well-developed pulse, with evident plethoric tendencies; they readily support depletion, exercise, and physical labor. The prominence of the sub-cutaneous veins, the development of the muscles and of the nervous system, the abrupt forms of the osseous system, characterize this organic disposition, which has received the name of *bilious*, or *bilious-sanguine*.

The vascular system requires a remarkable preponderance over other organs, in adult age especially; in this age we more frequently meet with symptoms of plethora or fullness of blood. Observation has shown us that many very sanguine and very robust men can not pass beyond the middle age, and also that apoplexies and sudden deaths increase in frequency between the fortieth and fiftieth years. We must then, at this period of life, by a proper hygienical course, by active exercise, by attentions to the skin, bowels, and kidneys, diminish these fatal tendencies of nature.

To give an exact idea of the sanguine temperament, and to profitably observe its various phenomena and effects, it is not enough that we study it in its generic and abstract characters; we must study it in the particular cases, and in its several varieties. These varieties are very multiplied. If we refer them to the eventual modifications which certain systems of organs, or certain viscera, in particular, are capable of producing upon the effects of the sanguine predominance, we will observe that the lymphatic, nervous, and muscular systems, the liver, digestive apparatus, etc., by their secondary predominance, may alone modify the purely sanguine temperament, giving, as a consequence, varieties which may be called sanguine-lymphatic, sanguine-nervous, sanguine-muscular, sanguine-bilious, etc. Among these varieties, some are natural and some are acquired; the germ of some exists within us from birth; they become developed within us by virtue of an innate disposition, the nature of which is unknown, and independently of the circumstances surrounding us. Others, on the contrary, are purely accidental, being the result of deep-seated indispositions impressed upon one or several of our organs, or systems of organs, by the long-continued influence of the action of certain events to which we are exposed, as climate, regimen, exercises, passions, diseases, etc.

2. The BILIOUS TEMPERAMENT somewhat resembles the Musculo-

cephalic. It is attributed to a predominance of bile and large liver, but this is not strictly correct. This temperament is indicated by firmer fiber, and more rugged outlines, with greater hardihood, perseverance, and moral strength of character, than is present in the sanguine; it is due to the *upper occipital region.* It is evident that the special function of the liver, the only one which physiology is supposed to have positively verified, is relative to the secretions. There may undoubtedly exist an unknown relation between the yellow color of the skin, the latent activity of the liver, and the considerable energy of the nervous system, without our attributing to the former, phenomena which are evidently due to the action of the brain. It is, after all, to the functions of this organ that we must attribute the manifestation of intellectual faculties and moral qualities. In the animal series their development is strictly subordinate to that of the different parts of the brain, and not because of the size of the liver and the quantity of bile which it secretes. Persons said to have a bilious temperament are lively, fiery, quick, and impetuous in their movements; have absolute and exclusive affections, an unalterable will, and a remarkable development of intellectual faculties and moral qualities. The bilious man has a dark, brownish or yellowish complexion, firm, vigorous muscles, black hair, a hairy body, a thick beard, black, prominent, and bright eyes, elastic, hard, and quick pulse, and a severe and expressive physiognomy; he is impetuous, irascible, generous, ambitious, indefatigable in labor, but by paroxysms rather than with steadiness, is an insatiable eater, more from necessity of nutriment than from a fondness for the table, is domineering, brave, even to a contempt for life, jealous, though inconstant, and has an excessive energy of vitality. This temperament frequently predominates among men of talent, and is generally met with in combination with one or more of the other temperaments, which modify its effects according to their degree of development.

The diseases more common to this temperament are bilious fevers, diseases of the liver, spleen, stomach, and kidneys, unhealthy action of the skin and bowels, etc. A vegetable diet, proper use of acids, warm baths, injections, cheerful society, well-regulated sleep, etc., will tend to modify, or even prevent the symptoms to which the bilious temperament is liable.

3. The NERVOUS TEMPERAMENT somewhat resembles the Cephalo-thoracic. It is recognized by delicacy of fiber and complexion, ready intelligence, quick, excitable emotions and passions, with but moderate intensity and violence; there is a development of the

frontal and lateral regions of the head, which produces a quick, intelligent, sensitive, excitable, and rather unreliable character.

The nervous system is the motive power of the organs, and the regulator of their functions; it is the internal man, the true animal, concealed beneath organized envelops; without its action life is extinct, and the other organs form only inert masses. This system presents three principal divisions. The first is devoted to the functions of the life of relation, or animal life; the second, to those of organic, or internal life; and the third, to the life of the species. But this latter part of the sensory and motor system forms, by its predominance or activity, a particular temperament, which has been called the *erotic* or *genital*.

From a neglect of these divisions, the characters of the nervous temperament have not, heretofore, been traced with precision; a development of physical sensibility, or a considerable activity of that part of the exciter system designed for sensation, has, generally, been considered the indication of this temperament. But we may likewise apply the same designation to the energy of the apparatus of voluntary motion, in a word, to physical strength, when it is not accompanied with much development of the muscles. Women and children, particularly, present the first shade of the nervous temperament, as well as many inhabitants of southern countries; men, especially those who have been classed among the bilious, are distinguished by that energy indicating a preponderance of the nerves of motion over those of sensibility. However, these two shades may be blended, and form the true type of the nervous temperament.

It is important to remark that persons who present all the attributes of this temperament do not always have excitable viscera; indeed, we frequently meet with those of this character, who may take large doses of excitant remedies with impunity, and without causing any remarkable disturbance in the digestive functions; with these, organic irritation merely develops some nervous phenomena, but can not determine fever or inflammation. On the contrary, we find a lively excitability among individuals presenting the external characters of lymphatics; irritation of organs readily causes a derangement of their functions, and a well-marked febrile action. We may say then, in these cases, that the sensibility acts in the manner of a fluid, the complement of which is determined; it is the more abundant in certain canals, as it gradually diminishes in others. This view is not only a comparison, but it indicates a physiological fact.

The true nervous temperament, then, results from the develop-

ment or considerable activity of the nervous system of the life of relation; the two very distinct shades which it presents may be combined, or may exist separately among many persons. The development or the predominance of the apparatus of motion is characterized by an extreme energy of the motive power; it gives to men who are endowed with it the faculty of devoting themselves to all bodily exercises, and to continuous physical labors. If they are not so strong as athletes, they are more pliable, more active, and can more readily resist the fatigues of war. Courage is very often a gift bestowed upon them by nature; they will also be frequently endowed with a lively imagination and vehement passions. Sometimes they will be presented to us with the external characters of the sanguine temperament; at other times they will be seen with black hair, an expressive physiognomy, and a slightly-yellowish color of the skin, attributes belonging to the so-called bilious temperament; again, some may be met with having the deceptive forms of lymphatics, etc.

A predominance of the nervous apparatus of sensation is more especially observed in great cities and among civilized nations. Cultivation of the fine arts and literature unceasingly tends to excite this apparatus, and with it physical and moral sensibility. In this relation, who does not know the effects of music, of spectacles, of political commotions, of an existence constantly agitated by the passions? But woman is the most sensitive being; her education tends to increase the dispositions of nature; rest, intellectual labor, solitude, the reading of works which exalt the imagination, augment the mobility of the nervous system. From thence, those outbreaks of moral life, those nervous affections, so frequent in great cities,—those derangements of intellect and the calamities resulting from them. An exquisite sensibility is, then, the most prominent feature among nervous persons, whatever may be the forms they present. The villager devoted to physical labors has not this agitated life; she does not experience the same emotions, the same voluptuousness, the same mortifications, nor the same sufferings; her sensibility is exhausted, or at least considerably diminished by exercise and work. Indolence, solitude, a life of contemplation, have absolutely opposite effects.

A remarkable development of intellect and activity of the passions distinguishes many men whose general constitution is that of the sanguine, bilious, or lymphatic. A feeble body often encloses the most distinguished intellect; but the physical force is not always in opposition to the most noble and elevated faculties; and facts prove that these sublime faculties are due to the cerebral

organization. Man is necessarily an imperfect being; and it is seldom that all the nervous centers enjoy equal activity, or that he possesses this strong and harmonic organization, this activity of all the faculties, this power of all the movements; he ordinarily presents only partial predominances, which any one may study, and of which the physician, in the course of his observations, should carefully take note.

4. The LYMPHATIC TEMPERAMENT is produced by the development of the *frontal half of the head generally*, excepting the regions appropriated to the Nervous temperament. There are two forms of the Lymphatic temperament; the higher Lymphatic, due to development of the regions lying above, *between the frontal and occipital organs*, producing general calmness and contentment, and corresponding with the Cephalic; and the lower Lymphatic, due to development of the *anterior portion of the middle lobe of the brain*, producing indolence and languor, and corresponding with the abdominal. The Lymphatic temperament, therefore, in the aggregate may be considered equivalent to the Cephalo-abdominal.

This temperament may be united with the preceding, forming numerous intermediary shades. The lymphatic complexion is, however, especially characterized by serous plethora or polylymphia; it is particularly met with in marshy countries, along shores which are covered with water during a portion of each year, in countries containing immense forests, or in which the putrefaction of vegetable substances is favored by the habitual moisture of the soil. The aqueous vapor with which the air is saturated permeates within organized bodies, and occasions a general relaxation of the tissues. Paleness of the face, whiteness, softness, and inelasticity of the skin, very round forms, plumpness or corpulence, uniform habits, slowness of motion, want of liveliness in the sensations, moderate passions, inaptitude to support painful labors and long privations, are among the principal moral and physical characters of individuals and nations who live in countries where a constant moisture is present. A similar disposition is often the origin of the most serious affections; they are developed when this cause exerts its influence with great intensity, when deleterious effluvia add their action to that of the moisture. Under these circumstances, there appears to exist a tendency to dropsy and dissolution of the solids, and the blood is loaded with a great quantity of water or serosity. The enfeebled constitution presents a precocious deterioration and a premature old age. Scorbutus, visceral engorgements, the most obstinate autumnal fevers, the most serious putrid fevers, caries and loss of the teeth,

show that the surrounding causes have deeply altered the vital fluids and the constitution of man. Hippocrates has described the inhabitants on the shores of Phasis with that exactness which characterized this great observer. We observe that they take on lymphatic forms; they are of high stature, overloaded with plumpness; their articulations and their blood-vessels seem lost in an unhealthy fat; their whole body is pale, or rather the color of their skin somewhat resembles that of persons who have jaundice; the air which they respire being impure, hazy, and very moist, they have a harsh voice; finally, they are remarkable for the slowness of their movements, and for an almost absolute want of activity.

The surrounding causes of the lymphatic complexion, the external forms, and the special morbid changes which characterize it, differ, as we may see from the attributes of what has been termed the Cellular temperament; we can not confound these two organic dispositions in their most marked shades. The first is observed in the most unhealthy places, where there is constant moisture of the atmosphere, kept up by ponds and marshes, which promptly deteriorate the constitution of the inhabitants and singularly abridge their term of life. We can only free ourselves from the destructive influences of these morbid locations by abandoning them, and dwelling in mountains or upon elevated table-lands. In these unhealthy countries referred to, animals become fatter, less active and vigorous, than in dry and elevated places; and vegetables are often developed with rapidity, acquiring large dimensions, their tissues imbibing a very large quantity of moisture. Everything announces the deep-seated influence of the localities and the surrounding causes upon the constitution of living beings.

The scrofulous constitution, which appears to be only an augmentation of the lymphatic and cellular predominances, is often the result of the etiolation of the skin, of a prolonged sojourn in dark and moist habitations. In this morbid disposition the lymph and albumen prevail over the fibrin and blood globules. Badly-elaborated juices slowly circulate in the vessels, and have a tendency to continue in them. The attributes of this constitution differ according to the age and sex. With many young persons the features of the face are delicate, and the rosy hue of the cheeks agreeably contrasts with the remarkable whiteness of the skin. The large, prominent, and watery eyes give an extreme softness to the countenance; their color varies according to climate—blue predominating in the North, and black among the

lymphatics of warm countries. To the charms of beauty is often added endowments of the heart and mind, an exquisite sensibility, an unalterable patience, and a surprising resignation.

But the lymphatic constitution does not always present such attractive forms nor such valuable qualities. Frequently, among those who possess its principal characters, we observe the organ of intellect but little developed, and the nervous system in a languishing condition. The face is full and seems puffed up; the eye is inexpressive; the sides of the nose, the lips, and especially the upper one, are swollen; the extreme softness of the flesh, the clumsiness and doughiness of the limbs, and the dryness of the skin, frequently wrinkled or scaly, all indicate inactivity of the perspiration. The physical as well as the moral functions are only imperfectly carried on. At times, this want of activity begets apathy; and children are sometimes met with deprived of all sensibility. Forced marches, continued physical labor, the fatigues of war, are not suited to lymphatics; they soon become emaciated, requiring an abundance of nourishing animal diet to restore strength. Young soldiers of delicate and lymphatic constitutions rapidly succumb to fatigue and privations; they become emaciated, livid, limbs slim, body lank, and soon die in the hospitals. Such instances show how indispensable it is to know how to proportion the duration of the exercises, the march, and the corporeal labor to the physical force, the vital resistance, and the temperament.

The vital resistance is in direct ratio with the development and energy of the nervous system. It is moderate with the sanguine, still feebler with the lymphatic and the cellular; but it is very preponderating among those who, by a happy alliance, have the nervous and muscular forces united. The sanguine temperament does not produce prodigies, but its progress is regular, perhaps a little too monotonous. Lively and impetuous passions belong to the sanguine; peace and quiet to the lymphatic. The sanguine can command; the lymphatic can only obey.

Now, according to these considerations, it is easy to be convinced that the muscular or athletic organization is only an augmentation of the sanguine temperament. The hardened tissues or the bones, which distinguish lean men of high stature, has a great affinity with the cellular, the external attributes of which often conceal the energy of nervous subjects. Giants, for instance, who present the most prominent type of the sclerous condition (hardening of the tissues), can not be classed among lymphatics. In fact, with the first, gelatin and phosphate of lime predominate,

while with the latter, albumen and water are in excess in the organism. In these two conditions, weakness and want of resisting power are evidently produced by aneuria and anemia; in other words, by a predominance of the principles which receive vital action from those elements which alone can communicate it, the nervous and sanguine.

Tonics, strengthening measures, excitants, are proper for the lymphatic temperament, when in excess; it requires attentions to the skin, active perspirations, exercise regularly taken, a frequent but moderate use of wine and drinks which impart tonicity to the muscular fiber. Our aim should be to direct all our efforts so as to advance it toward the sanguine temperament. The varieties which the lymphatic temperament may present, relatively to its proportions with the other systems of the body, are one of the circumstances which exert an influence upon the physical and moral physiognomy of man. The lymphatic system is one of the parts the most liable to disease, and the diseases of which have a most profound and marked influence upon the general state of nutrition. We know that the greater part of cachectics have diseases of this system: coryza, ozœna, aphtha, scrofula, tabes mesenterica, leucorrhea, dropsies, etc., are more frequent among lymphatics. All their maladies are of slight intensity, progress slowly, and are resolved with difficulty. This temperament is more common to children and females.

5. CELLULAR TEMPERAMENT. — The areolar or cellular tissue incloses the fatty tissue, and may be considered as the original or fundamental element of the organs. It forms the matrix or mass which surrounds the viscera, the peculiar envelops of the muscles, nerves, and blood-vessels, and gives a more or less thick layer beneath the skin, of which it forms the mucous body; by acquiring more density, it also constitutes serous membranes, and likewise forms the spongy substance of the villosities of mucous membranes.—However, this tissue, with the exception of absorption and exhalation, performs only a passive part in the economy; when it predominates, and the nervous and sanguine systems are feebly developed, the constitution of the person then acquires a very remarkable character for feebleness and inertia. This organic disposition differs from the lymphatic constitution, although these two states may be united by intermediate shades; but in the first the tissues are dry, so to speak, while in the second they have imbibed water or serous fluid. The one is especially observed in the country, in healthy locations, among individuals who exhaust themselves by corporeal labors, by profuse perspirations, and who

can not repair their losses by a substantial nourishment; the other, on the contrary, is met with in moist climates, among men who live in marshy places, in the midst of an atmosphere loaded with vapors or saturated with humidity.

When I commenced to study, in society, the external forms and the tendencies which organic predominances reveal, I was struck with the moral and physical inertia of some lean persons, of a medium height, sometimes small, yellowish complexion, black or any other colored hair, brown eyes, and slim limbs. I saw the principal attributes of the bilious temperament of the ancients, with the intellectual and moral dispositions of the lymphatics; their diseases being distinguished by a remarkable tardiness of organic movements and morbid sympathies. Profuse depletion promptly exhausted these individuals, and, as with lymphatics, the clot formed by the blood was not very distinct.—Debilitating causes, bad food, privation of light and open air, excessive labors, cause a predominance of the organic, by debilitating the nervous, system, and exhausting the sanguine. This organic disposition may be hereditary or acquired, and is especially noticed among villagers and poor artisans, weavers, tailors, shoemakers, students, prisoners, and miners.

The whiteness, slightly yellowish, of the skin, the smallness of stature, the slenderness of the limbs, the habitual calm of the passions, the feeble development of the sanguine system, are indications of this temperament, which is frequently seen among those who work in sandstone.

The above classification of the temperaments may prove useful to the physician; for, in having an exact knowledge of the organization of man considered in its relations with external agents, we may demonstrate that these agents must determine upon it different effects, according to the original or acquired predominances which may exist. Thus, very lively physical or moral impressions excite a great perturbation in the sensitive system, and we may then observe various nervous symptoms developed, as well as diseases of opposite characters. Chronic inflammations and organic lesions are often presented to the physician along with the symptoms of the original affections. The sanguine, under the same influences, are more inclined to active inflammations, congestions, and active hemorrhages. As to passive hemorrhages, and diseases common to deep-seated debility, they are more frequent among subjects whose blood is watery and impoverished by the diminution of its globules and its fibrine. Lymphatics are often affected with chronic engorgements, dropsies, scrofula, leucocythemia, and

tuberculous affections. The latter may, undoubtedly, be developed among persons having other organic predominances, but they are infinitely more common among lymphatics predisposed to scrofula. A simple contusion often suffices to arrest the sluggish course of the lymph or of the albumen in the lymphatic vessels and in the ganglions. Persons of a lymphatic constitution, who fall upon or bruise the knee, the hip, or the elbow, are more apt to have white swellings or synovitis; they may also have lateral or angular curvature of the spine from a blow on the back, or consumption from a prolonged pulmonary catarrh.

The external forms of man are variable, and assume infinite shades; the fundamental types are rarely presented, in nature, with all the attributes which distinguishes them in our artificial classifications. Many persons remain out of these classifications, and have no temperament, in the vicious acceptation given to this word; for, with them, no apparatus or system of organs appears to have any remarkable predominance. Hence, an accurate study of the temperaments and their numerous combinations is an important matter for the physician.

"If the physical constitution always corresponded to our natural character and tendencies, the development of the brain would be, in all cases, a true indication of the temperament; but, as our modes of life and circumstances are often widely different from our natural inclinations and capacities, it is necessary to look to the general appearance and constitution, as well as to the cerebral development."

Man can not, as a general rule, change the character of his temperament; it is a predisposition born with him, and which time alone may modify. But he may correct it when in excess, and prevent its ravages, by adopting the hygienic course which experience has ascertained to be the best. He may modify his temperament, and even, to some extent, produce, in some instances, a new or mixed temperament, by a change of education, habits, diet, exercise, etc. According to the tendency of certain faculties, we may dispose man, as far as his original constitution will permit, and within the limits of his special temperament, to undergo modifications the most favorable to his preservation and happiness.

All inclinations, all errors, all crimes, and all virtues, are not invariably the fruits of education, habits, or examples, nor always subordinate to positions and circumstances. And every man ought, therefore, to thoroughly study his own temperament.

GENERAL REMARKS ON HYGIENE.

Experience attests that man ought to live one hundred and thirty or one hundred and forty years. Instances of such longevity are rare, it is true; but, with the aid of science, they may become more and more frequent, and that which has been the exception may become the rule. The learned Hufeland declares that there is no impropriety in saying that the life of man ought to continue for two centuries, and which opinion is in perfect accordance with the relation which exists between the duration of growth and that of life. We know that an animal lives seven or eight times as long as is required for it to attain its full growth; now man arrives at his growth in twenty years, and being superior to animals, the duration of his life ought, at least, to extend to two hundred years.

It is less the perfection of a machine than the use one makes of it that determines its destruction or duration. Many delicate and feeble women reach an advanced age, while many young men, in the plenitude of their strength, fall under the attacks of disease.

What is it, then, that occasions death before man has lived one-fourth of his allotted period? It is his ignorance of, or inattention to, the laws of nature. Acrid and burning substances, as pepper, cloves, vanilla, mustard, vinegar, strong herbs, tea, coffee, and fermented and aromatic drinks, are freely made use of as common articles of diet; and an advanced civilization has made them objects of the first necessity; it has multiplied them and combined them in numerous ways to provoke appetite and to excite sensuality. Nay, physicians not only tolerate them, but even have advised them. Not only is the use of alimentary excitants abused, but strong alcoholic drinks are used nearly as freely and as common as water; the hair is excited and injured by oils and washes, the eyes by paints, the skin by cosmetics; we are purged; we are bled; we turn night into day; we transform love into pleasure; and we employ all means of living fast, of weakening the moral energy and of destroying health.

Some pass their nights in the ball-room, or at play, in confined places, or where the atmosphere is highly vitiated by dust, by the combustion of lamps, as well as by the emanations from a more or less diseased assembly. Others, carried away by their passions, exhaust themselves and destroy their intellect by other excesses; a third party pass most of their time at the table, making a god of their stomach, which they surcharge even to apoplexy; while a

fourth enfeeble themselves by sleep, inaction, prolonged warm baths, wearing flannel in summer, etc.; some give themselves up to anger, envy, hatred, jealousy; others enervate themselves by the use of tobacco, and other articles destructive of nervous force; each one acts against his own welfare, by placing himself in open opposition to his health, and employing the most capable means of consuming his already short and sorrowful life.

Although the city has many advantages over the country, as the greater readiness of procuring the necessary agents and means for the sick, as well as the ability of procuring articles not to be had in the country, yet, were it possible for us to view, simultaneously and collectively, all the miasms, all the putrid emanations, all the corruptions of air, water, and food, all the diseases and contagions, all the sources of suffering, all the antagonisms, all the rivalry of interests and ambitions, all the egotisms, all the hypocrisies, all the agitations, and all that renders life so feverish, so wretched, and so short, in great cities, on the one hand; and on the other, the pure air, favorable sky, healthy nature, peace and contentment of the country, there are very few persons who would consent to live in the former twenty-four hours.

Nature, always true to herself, promptly warns us of the danger of injurious habits, by the disagreeable impressions we experience upon commencing them. Who is able to pass the first night at a ball without being extremely fatigued, or feeling a troublesome torpor? Who can accustom himself to snuff, chew, or smoke tobacco, to use strong drinks, to eat pepper and mustard, without first suffering more or less indisposition? Who can drink for the first time, and with pleasure, a cup of tea or coffee without sugar? Where is the robust man of the country who will be able to comply with the usages of city life without becoming sick? It is, then, only the instinct of imitation, the habit contracted in youth, or the necessity of yielding to fashion, which has led us to use these hurtful means; true, habit terminates by becoming a necessity—we then find pleasure in their use, we employ them in excess, and a host of diseases and infirmities soon overtake us as a punishment for these infractions of the laws of health.

The ancients were ignorant of the use of the greater part of these means which blast and destroy the energy of both soul and body; they were not acquainted with tea, coffee, tobacco, nor any of the excitants of the nervous system; their only fermented drink was wine, which they always mixed with considerable water; thus their diseases were few and simple, and their manners and physical constitutions were better than ours.

We are far from desiring a return to these days of patriarchal simplicity, or to this Pythagorean diet so opposite to our present condition, our manners, and our climate; the complicated organization of man requires a variety of nourishing and restorative aliments. An incomplete diet only sustains a part of the organs, and if it be prolonged, other organs will be injured. But will our meats be less savory when their natural qualities have not been destroyed by aromatics? Will our digestion be less effective, when it is the work of nature instead of that of excitants? Will our existence be less agreeable, when we disengage ourselves from everything that may injure or shorten it? If we do not experience those tumultuous pleasures, those insensate joys, those consuming passions, which torment the multitude, we will no longer have their low spirits, their griefs, anguish, distates for life, nor the diseases which consume them. On the contrary, we will possess vigor, health; we will experience pure pleasures, noble emotions, elevation of soul, power of mind, friendship, and devotion; qualities which were so common with the ancients, but are so rare with us. Life is a treasure in our hands; it depends upon ourselves to preserve it, or to quickly consume it. A long life, exempt from infirmities, is generally the price of a simple and natural course of regimen.

The mind, also, has its necessities, and the more it is cultivated the greater and more numerous become these necessities. Thus, assemblies, diversions, recreations, the fine arts, music, everything which responds to our legitimate aspirations without injury to the tranquil mind or to the health, is not prohibited; Hygiene, like morality, only condemns errors and excesses.

We can not shun death, but it is easy to extend the bounds of life. It is better to prevent disease than to cure it. We should love life without fearing death. To fear death is never to enjoy life, but to be always dying; it is more frightful to be unceasingly anticipating it than to receive it. All somber and melancholy ideas and thoughts are inimical to health and longevity.

Man is a two-fold being, moral and physical; he is so well constituted that harmony reigns between his two existences. A derangement of one almost always effects that of the other. Like the course of the year, man has his four seasons. In his spring-time there is superabundance, and in his winter there is privation; in the one he commences, and is not perfect; in the other he is completed, and is in penury; and in both he requires the same management and watchfulness. In both of the extremities of life man is weak and unsteady. Old men should receive the same

cares as children; we can not be too lavish with our attentions to the old age of him who was all profusion to our infancy. Shower upon him comforts and diversions, for old age has especial need of them, and has, also, more than infancy, the remembrance of them. Woman sustains and guides the first steps of man, and at the close of his career, we still find the tender and delicate cares of woman.

The destinies of each sex are the consequences of their physical constitution. These differences between men and women, as regards health, indicate upon what principles the direction of their physical, intellectual and moral education should be based.

Woman, being in general weaker than man, ought to guard herself more closely, for excesses will prove more fatal to her. The whiteness and softness of her complexion, and the beauty of her form, are due to the relaxation of her cellular tissue, which relaxation should impress upon her how much she has to fear from the influence of the seasons, variations of atmosphere, etc.

Nature, in imposing upon females the great and painful functions of maternity, seems to have desired to free young women from the fatigue of abstract things, of severe studies, of serious occupations which exercise the memory only at the expense of the judgment. Their instruction should not commence until at the eighth year, and should continue to twenty; then the education of teachers should cease, and that of the world commence. The violence to which the former make nature submit is never but imperfectly recovered from. Few talented women embellish the days of their husbands and children.

Among children, growth is the exclusive aim of nature; the organs of nutrition and of the digestive apparatus should occupy our attention—we may almost always augment the action of glands and lymphatic vessels by tonics. The cradle-life of the infant claims all our solicitude; mothers should carefully govern their conduct toward them, because upon their cares and attentions will depend the future existence of the being to whom they have given life. The constitutional differences of infants are less apparent the first months of their existence; the lymphatic system generally predominates over all the other vascular systems, and this predominance is especially marked in the cellular tissue; the amount of fluids are also in greater relative proportion than the solids. Let them breathe a pure air; do not confine them in tight swaddling clothes, which so painfully compress their delicate limbs. Be not too anxious to procure a too hasty development of their organs, for it will produce the same effect upon them as the sap produces on flowers, which, blooming before their time, are ephemeral,

colorless, and inodorous. Children have no past, no future; but happier than adults, they enjoy the present. They should be carefully kept from premature studies and too sedentary occupations; we should not endeavor to hasten the development of their intellectual faculties, but rather fear to make prodigies of them; for the phenomenon of ten years is almost always a man of mediocrity at twenty, and a stupid being at forty. The first study is to *make sure of their existence;* the first occupation *to strengthen their physical force.* Health is an absolute necessity; Latin, Greek, arithmetic, music, drawing, etc., are only relative necessities. A little less Latin, Greek, etc., but a great deal more health. We should not, then, consider as mere accessories the hygienic cares necessary to preserve health and longevity; for we must know that physical education influences the mental, and too prolonged labor or study, useless severities, revolting punishments, tend to humiliate and injure the mental advance of children. Interrogate those young pupils whose rapid instruction has not cost them a single tear, and one will be astonished to see in them, united to nobleness of mind, to excellent qualities of heart, a vigor of body and development of intellectual faculties. The whole secret consists in exciting the mind by strengthening their temperament by means of moderate exercise and agreeable recreations. But if a rigid discipline be pursued, paralyzing their development through fear and terror; if their adolescence be crushed with severities, constantly revived, we will soon see the roses fade from their cheeks, and sprightliness yield to sullen stupidity. If we desire to perpetuate in them good health, free mind, uniformly agreeable temper, and a happy nature, we must never forget the influence of hygiene upon their physical and moral education.

DIET.

The continual action of the composition and decomposition which constitutes nutrition is observed in the economy from birth to death; living bodies unceasingly experience material losses by the exercise of the functions; respiration replaces the air and heat which are disengaged; digestion repairs the losses of water and solid matters by means of animal and vegetable substances. But that this double and indispensable action may be effected, man and superior animals require a varied diet, without which they become feeble, waste away and die. Gelatin, albumen, fibrin, white bread, taken alone, for a given time, are not sufficient to overcome weakness of the organs nor to sustain vital action. Tiedemann and Gmelin having endeavored to nourish geese with sugar, gum,

and starch, along with water and pure quartzy sand, these birds gradually weakened and soon died. The goose that had been fed upon the gum died upon the sixteenth day; that which had taken sugar, on the twenty-second, and that which had taken starch, on the twenty-sixth. Another, fed with a substance containing a large quantity of azote, and a sufficient amount of white of egg, expired at the end of forty-six days. Magendie submitted two dogs; the one to sugar and distilled water, and the other to a very white bread of a superior quality, containing considerable fecula and gluten, a well azotised substance, and they both died; while other dogs who ate exclusively soldier-bread, preserved their health and strength. This last article is distinguished from other bread by the bran it contains, and ought consequently to be preferred for soldiers and persons who are deprived of meats and other nourishing articles which constitute the variety necessary to life. A diet of sugar and water alone will not sustain life for any great length of time.

Animal substances are more nutritive than the tissues of vegetables; they contain, in a small volume, a greater number of elements fit to repair the incessant losses of the system, and leave a less quantity of unhealthy residuum. And as vegetable substances require to undergo a longer elaboration than animal, we find that, for this purpose, the digestive canal of herbivorous animals is much longer than that of carnivorous. Preference is generally given to the flesh of herbivorous animals, although that of the carnivorous is said to be fully as pleasant and nutritious. It is stated that the flesh of the cat is not inferior to that of the rabbit; in Africa the meat from a lion is much sought after, and that of the wolf is as savory as that of the deer. After the mammifers, come birds and fish.

Animal food varies in its reparative influences according to the kind, age, and part of the animal, the brain being more tender and nutritious, and more easy of digestion than the muscles, etc.

The more azote, albumen, and fecula, vegetable substances contain, the more nutritive are they; and among these we must comprise the cereal grains, leguminous plants, and the seeds of some bulbous plants. The soups made from these roots and grains may be usefully associated to strengthen exhausted subjects. Gum, sugar, starch, fat oils, have not the same virtues as the products of the cereals; containing no azote, they are not sufficient to support life.

Vegetable diet is not so favorable to weak persons as animal, especially to lymphatics, and those laboring under rickets, scrof-

ula, phthisis, and chronic morbid conditions of the albumen or albuminous tissues. The tribes of India who live upon milk and vegetables, and who follow a peaceable and unemployed life are more frequently attacked with leprosy than the Sicks, who, living in the same climate, make use of pork and lead an active life. Meats, then, ought to form the basis of diet for persons subject to the above named diseases, for they cause the fibrin and blood globules to predominate over the water, lymph, and albumen of the system. We can not introduce too much fibrin into the economy of these persons, nor enough of the elements proper to change the condition of the blood; and for this reason, the roasted meats of adult animals are preferable. It must be recollected that I am here considering the especial benefit only of the *physical system* when under morbid conditions—conditions which are frequently the result of an improper employment of the very diet I am now advising.

The quantity, quality, and manner of taking diet is a most important item in the treatment of chronic diseases, being, in a major part of them, of more essential service to the invalid than even his medicine. With regard to the quantity, enough should be eaten to barely satisfy the appetite, when nothing contraindicates; beyond this, is highly improper, even for those in health. As a general rule, in these diseases, all fat and greasy kinds of food, all acids, and whatever acidifies upon the stomach, must invariably be avoided, not only because they will prove injurious to the stomach, but also because they are apt to interfere with the medicines administered, preventing their remedial action. Tea, coffee, hot drinks, and liquors must not be used, except under certain circumstances and conditions to be determined by the physician; and among persons who are subject to a white coat on the tongue, to flatulency, or acid stomach, *milk* must be prohibited; though it may be proper to state that with some persons having the above symptoms, milk, milk and water, milk and lime-water, and cream, will be found quite digestive and nutritious. It is very difficult to particularize all the articles of food and drink that may be used, as many of those which are perfectly proper and quite healthful with one class of persons, would produce much derangement and injury with others. As a general rule, patients should eat moderately of *nourishing food, which is easy of digestion, and sits well upon the stomach, without causing distress, burning, heaviness, acidity, flatulency, or constipation, and which can not decompose the medicines administered, nor neutralize their sanative effects;* and in certain diseases where it would be improper to irritate or inflame diseased organs, everything must be avoided that tends to derange the stomach and

wels, to overtax the digestive powers, or to over excite the circulation.

The physician must attend to certain symptoms while regulating the diet of his patient; thus, a weak and irritable condition of the stomach may prevent the patient from employing a strengthening alimentation,—in this case, the debility may be overcome by a proper use of light wine taken with the meal, or by the use of certain bitter tonics for an hour or so previous to and following each meal; if there is great irritability of the stomach, it must be lessened by mucilages, anodynes, and counter-irritants to the epigastrium; if great acidity is present, lime-water may be taken with the meal, or some alkaline solution, bearing in mind, however, that a long continued use of alkalies contributes to debilitate the coats of the stomach, and that the acidity, being the result of weakness, is only temporarily allayed by articles of this class—a permanent removal of it must be effected by tonics, etc.; flatulency may be removed by the use of ginger, etc., combined with the food; and constipation, by the use of bran bread, corn-meal, figs, stewed fruits, etc., where there is no contraindication to their employment. Should a morbid increase of appetite be present, gentle nauseants will frequently remove it, especially when given just before each meal.

During a meal, little or no fluid of any kind should be drank, as it distends the stomach, dilutes the gastric juice, impairing its digestive solvency, and thereby increasing the tendency to disease. And when we take drink during or shortly after a meal, it should not be too cold nor too hot, but moderately warm; because heat being necessary to digestion, the cold beverage arrests the digestive process, causing the food to remain undigested in the stomach, often for several hours, thus producing dyspepsia, obstructions, etc.; and if the drink be too hot, the stomach will be too much stimulated, from which, when reaction takes place, results debility and impaired action of the organs of digestion.

It is important that, for at least half an hour previous to a meal, and also after a meal, all physical and mental excitement be avoided; the patient should refrain from all bodily and mental exercise, as, labor, running, protracted speaking or singing, serious or active study or thought, sexual cohabitation, etc.; even walking should be avoided as much as possible at such times. The patient should compose his system, and thus prepare his stomach for the meal, and which state of quiet should continue for at least half an hour after finishing the meal. This course will cause the stomach to digest the food properly, prevent disease, impart strength and

nourishment, and entirely obviate dyspeptic constipation. Great care must be taken not to eat during, or immediately after any great excitement or depression of the mind, particularly, *anger*, *grief*, *great fear*, etc.; such passions should also be avoided as much as possible after a meal; many a person disposed to apoplexy, or other forms of disease, has brought on a fatal attack by eating immediately after some intense excitement of the mind, and even by becoming angry after a very temperate meal. Cheerfulness and mirth, however, are always proper at a meal, and a patient may feel as happy as he pleases, and also laugh considerably both during his meal and for a short time subsequently. Pleasant tales, agreeable conversation, anecdotes, etc., are always proper at the meal-table, from which everything of a sad, gloomy, melancholy, unpleasant nature should be prohibited. This kind of conversation also prevents us from eating too rapidly, and thereby from overloading the stomach.

Food must always be well and finely masticated before it is swallowed—the finer the better; and the act of chewing or masticating, instead of being rapid, as is too much the case, should be performed with care and moderation, *taking ample time* to perfect its mastication, thereby inviting a flow of saliva to the mouth, which, by mixing with the food, assists the digestive process in effectually digesting it, and also prevents us from putting into the stomach more food than is really required for health. Three meals a day ought to be taken, at from four and a-half to five hours apart, say at seven or eight A. M., at twelve or one P. M., and at five or six P. M. The breakfast should generally be moderate, the dinner sufficiently hearty, and the supper light; and no food whatever must be eaten between meals, neither should any be taken for at least three hours before bedtime. When there is no appetite, do not eat: it is much better to pass one, two, or even twelve meals, than to injure the stomach, and consequently the whole system, by forcing food into it when it is neither craved nor relished. However, when the want of appetite is a condition that will prove injurious to the patient, by adding to the debility already present, a small amount of food in a solid or fluid form, may be administered at suitable intervals, every one or two hours, with three or four stimulating and nutritious injections daily.—There may also be some exceptions to the rule above, relating to food between meals, which must be determined by the physician, who may, in these exceptional cases, allow the patient soups or other light articles of diet at proper intervals between the regular meals.

Below I give a list of proper and improper food for patients

with chronic diseases; the improper food they must on no account use, except by permission of their physician, who must carefully consider the nature of the article about to be allowed, as well as its effects upon each individual. The food given as proper must, nevertheless, be employed with judgment, avoiding all in the list which causes headache, confusion of intellect, nervous derangements, acid stomach, flatulency and disagreeable eructations, weight or heaviness at the stomach, excites internal heat, gives rise to constipation, increases the symptoms of disease, or which disagrees in any manner whatever. Patients ought not to habituate themselves to a low diet, nor to an insufficient amount of food; though such a course may occasionally become necessary, but, fortunately, in very rare and extreme cases. They should eat heartily of every article of food which agrees with them, until they begin to feel satisfied, when they should cease, and in all instances, being especially careful to chew their food well and slowly before swallowing it.

This last measure, as well as regularity in the periods for eating, is an important consideration in the treatment of chronic diseases. Order in meals, both as to time and quantity, is the foundation of dietetic regimen; be careful not to change it. Disease is not only a result of debility, but tends to augment it, and strength and nourishment are to be derived only from the food we take.

List of Food proper for Chronic Patients.

Calf's Head.
Calf's-foot Jelly.
*Lamb.
Marrow.
Mutton.
Tender Beef.
Tender Corned Beef.
Tender Ham, not old.
Tender smoked Beef.
Tender Tongue.
*Veal.
Venison, tender.
Hare.
Rabbit.
Squirrel.
Chickens.
Chicken Pie.
Ortolan.
Partridge.
Pheasant.
Pigeon.
Prairie Hen.
Quail.
Snipe.
Teal.
Thrush.
Wild Duck.
Wild Turkey.
Woodcock.
Eggs.
Fresh Fish.
Frogs.
Oysters—roasted or stewed.
*Turtle.
*Crabs.
*Lobsters,
Shrimp.
*Muscles.
Snails.
Asparagus.
Barley.
Baked Apples.
Beans.
*Blackberries.
Boiled Rice.
*Buckwheat.
Carrots.
*Chocolate.
Cocoa.
Cooked Cabbage, without Vinegar.
Cooked Onions.
Corn Bread.
Dates.
Figs.
Ginger, small quantity.
Hasty Pudding and Molasses.
*Honey.
Indian Pudding.
*Lettuce.
*Mead.
*Muskmelons.
Parsley.
Parsnips.
*Peaches.
Peas.
Potatoes.
Pumpkin.
Pumpkin Pies.
*Raspberries.
Rice Pudding.
Sago.
Salt, in small quantity.
Spinage.
*Spruce Beer.
*Strawberries.
Toast Bread.
*Tomatoes.
*Turnips.
Unbolted Wheat Bread.
*Watermelons.
Wheat Bread.
*Whortleberries.
And as little Spices and *fresh* Butter as can be conveniently used.

Whatever disagrees must not be used. Although the articles marked with an asterisk (*) sometimes agree with patients, they should be used with care.

List of Food improper in Chronic Diseases.

Any Fat.	*Sardines.	Dumplings.	Radishes.
Fat part of Meats.	Pickled Tunny.	Garlics.	Raisins.
Fat Pork.	Buttermilk.	*Grapes.	Raw Leeks.
Sausages.	*Cream.	Horseradish.	Raw Onions.
Tough Meats.	*Milk.	Lemonade.	Sage.
Tough Salt Meats.	Soured Milk.	Mushrooms.	Shallot.
Tough Smok'd Meats.	*Cheese.	Mustard.	Sour-krout.
Tripe.	*Apples.	Nasturtium.	Summer Savory.
*Soups.	Capers.	*Oranges.	Tarts.
*Broths.	Cider.	Pears.	Thyme.
Goose.	Cloves.	Pepper.	Truffles.
Duck.	Cranberries.	Pickles.	Vanilla.
Clams.	Cucumbers.	Preserves.	Vinegar.
Salt Fish.	*Custards.	*Prunes.	Water Cresses.
Smoked Fish.			

Nuts of all kinds; all green and hard fruits, also all fruits not named above, whether cooked or not. All high-seasoned food or dressing; cold or warm uncooked cabbage; all excesses in tea, coffee, and gravies; hot bread, cakes, fritters, etc.; and all kinds of fermented, vinous, or spirituous liquors must be avoided, except when the circumstances or condition of the patient will justify the practitioner in allowing them. The articles marked with an asterisk (*) occasionally agree with patients, in which case they may be permitted.

Of all animal meats, *beef* is the most fitted to our stomach, to the maintenance of our health, to the development of our strength. It is a very juicy meat, assimilates thoroughly with our system, and we can always eat of it without having a dislike for it. No other meat, however savory it may be, can, like beef, be used as a daily article of diet without causing a disrelish for it, and a disturbance in the digestive functions. The fat part of the meat should be avoided by patients, who should use the most juicy and tender of the lean parts. Boiled or roasted beef is the best; tender beefsteaks are also digestible and nutritious. When dried or smoked, the tender and juicy parts only should be eaten, and the meat must not be too old.

Mutton, boiled, comes next to beef, being fully as digestible and nourishing, but more apt to cause a disrelish by constant use.

Veal and *lamb* should only be eaten by those whose digestive organs are in a healthy condition, and in the form of a roast; the

flesh of these animals is too young, and has not acquired the maturity and the degree of animalization necessary to our alimentation.

Pork does not readily digest, and is not fit for any one to eat. *Ham*, recent and tender, when boiled, may be occasionally eaten with benefit. The great trouble with pork is that the animals are always more or less diseased, and diseased meat of any kind should never be eaten.

Salted and *smoked meats* are more difficult of digestion and less nutritious than when fresh; they should be avoided by patients, unless their digestive organs are in excellent condition. They should be thoroughly boiled before partaking of them.

The *game* or wild animals named above, also present savory, nourishing, easily digestible, and healthy articles of meat.

Barn-yard *fowls*, not too young nor too fat, may be eaten with benefit, with the exception of the goose and duck. *Game*, or birds living free, are healthier than domesticated birds. Fowls which are fattened in cages should not be eaten by the sick, as their meat is apt to be diseased.

Fishes, especially salt-water fishes, furnish a very excellent food; those whose flesh is compact, unctuous, and abounding in oil, are of difficult digestion; the patient should prefer those whose flesh can be easily separated, as the carp, salmon, shad, cod, bass, porgy, pike, trout, perch, plaice, flounder, mackerel, herring, whiting, turbot, sole, smelt, mullet, etc. They should be boiled, and eaten without butter, jellies, acid fruits, or high seasoning. *Salted* and *smoked fish* are of difficult digestion, and should not be eaten by patients under any circumstances whatever.

Turtle, cooked plainly, is nutritious and digestible; so are *oysters*, either raw or but slightly cooked. *Crabs*, *lobsters*, and *muscles*, being less digestible, will frequently be found to disagree, and even to produce various unpleasant symptoms. Grated old English cheese, freely eaten, will, it is said, remove the bad effects arising from the use of crabs and lobsters. The meat in the claws is the only part which should be partaken of by patients with whom it agrees. *Frogs* are a very delicate, nutritious and digestible meat, very much resembling tender chicken.

Broths or *soups* are sometimes used when the condition of the stomach will not permit any more solid food; they should be prepared as plainly as possible, avoiding all high seasoning. Unless they are absolutely required, it is always better to do without them.

Soft-boiled eggs agree with most persons; they are tolerably easy

of digestion, and quite nourishing. Eggs are injurious when boiled hard and eaten; so are fried eggs, as well as all fried cakes, pies, omelettes, etc., of which they form one of the component parts.

The moderate use of *pure table salt* upon fresh meats and vegetables, or dissolved in the drinks, is very essential for the preservation of health and continuance of life; salt imparts soda to the bile, hydrochloric acid to the gastric juice, thereby giving health and power to the digestive organs, and it also modifies the elementary or chemical composition of the impoverished blood globules; it is, therefore, of especial value among those who are lymphatic, or are laboring under phthisis, scrofula, tubercula, etc.,—among such, bread and fresh meats with salt, as well as oysters, eggs, and other articles containing similar principles are always indicated.

Vegetables are eaten along with animal substances to vary our food, satisfy our appetites and tastes, and to balance the too nutritive action of the animal diet. *Wheat*, formed into bread, is a very common and well-known nourishing article of diet, and is more restorative and more easy of digestion than either rye or barley. *Rice* may be said to stand next to wheat as an article of diet; then *oats*, *Indian corn*, *potato*, *vermicelli*, *maccaroni*, etc.; but articles which are apt to be adulterated we must be very careful about, as sago, arrowroot, tapioca, etc. Boiled *beans*, *green peas*, and soups of these legumes are frequently of benefit. *Artichoke*, *salsify*, *cauliflower*, *pumpkin*, *turnip*, *beet*, *carrot*, *asparagus*, *spinage*, *sorrel*, *chicory*, *lettuce*, etc., frequently agree with patients; but they should be used with salt, and without oil or vinegar, and be eaten with meats or fish. All strong, aromatic, spicy or stimulating vegetables should be avoided as much as possible; most generally they will be found to disagree. *Melons* and *watermelons* are hurtful to those laboring under affections of the digestive organs; when permitted, they should be partaken of sparingly. *Strawberries*, *raspberries*, *blackberries*, and *whortleberries* are particularly refreshing when they agree; the first and last will be found beneficial in certain affections of the kidneys and bladder. All ripe fruits may be allowed when they do not interfere with the action of medicines, nor cause any disagreeable symptoms. They may be used either crude or cooked, as best agrees with the patient, and prove valuable by keeping the bowels regular, as well as by the acid and potash they impart to the system. Many dried fruits effect the same object, as figs, prunes, etc.

It must be recollected that there are many articles of food

which, although harmless to the healthy person, are extremely deleterious to those laboring under disease. The physician should be thoroughly versed upon these matters, in order that he may understand how to prescribe for his patients with judgment and accuracy. A more extensive reference to them, and to other points connected with Hygiene, will be found in the Introductory Remarks of my popular work, the *American Physician*, together with a statement of the several constituent principles entering into the composition of the various substances used as articles of diet. *Pereira on Diet* will likewise be found a highly useful work for the practitioner.

The profession of a man is always a constitutive part of his hygienic condition. The professions engender habits and place man under conditions which make part of his existence. Each profession should follow a particular regimen; a solid, nutritious diet to the hard-working man; a light and less substantial one to those of sedentary habits. Also a greater quantity of nourishing diet to young folks than to persons of middle age, and especially to old folks, as digestion is more active while the body is increasing in growth.—If laboring men knew how much more preferable were their appetites provoked by labor, the tonicity of their stomachs, the functions of which nothing can derange, and the happy habit of frugality they have acquired,—to the impaired and vitiated tastes of the rich and voluptuous, they would never desire to sit at their tables. These persons, who are supposed to be so happy, envy laboring men their appetites and their healthy digestive faculties. It is not among millionaires and men of the world that we find persons who have lived a hundred years; it is among sober, laborious, and continent men. Whoever seeks the pleasures of the table and of sensualities finds only satiety and disease. The less we season our food, the more healthy will it be; the less we seek to vary it, that is, by the addition of spices, high-seasonings, modes of cooking, etc., the less we will eat, the less we will impose upon the stomach, and the better will the food be digested; and a good digestion of proper food gives healthy chyle; the healthy chyle makes pure blood, from which results good health; weaknesses, losses of appetite, headaches, bad dreams, and indigestions, all now disappear, and a better order of things ensues. Bread, milk, some leguminous plants, with fruits, and pure water, and an occasional addition of fish or meat to the meal, say once in every week or two, will be found fully sufficient for plethoric persons, and those disposed to congestions and inflammations. How many robust men have employed only this diet, and thereby pro-

longed their lives! With those who have a more active stomach, but a weak body from a defect of assimilation, a more animalized diet will be required. With others again, a combination of meats and vegetables, temperately employed, say during one or two meals each day, will be required, especially among active laboring men. Mankind eat too much; dinner kills one-half the inhabitants of large cities, and the supper destroys the rest. We see these portly citizens, these slaves of good cheer and wine, these florid and full faces, and we think they have the appearance of health. But they are likewise indicative of the approach of disease; of gout, of derangements in the digestive organs, or of the respiratory organs, of commencing congestions, of menacing apoplexy, the inevitable punishment of intemperance. How many opulent men, given to good cheer, have taken a nap after a hearty meal from which they have never awakened! If imprudence in diet affects healthy persons in this manner, how highly important is it that the diseased should adopt a more natural and temperate method! Food and drink of bad quality, as well as intemperance in eating and drinking, are most fruitful sources of disease and death. Our food should be plain and simple, but varied, not living exclusively on one article, for both the stomach and the system are better satisfied with variety than with sameness.

Every time that the stomach experiences a sensation of fullness, that the mouth is clammy, that the bile flows sluggishly, that the head aches or becomes dizzy, that palpitation of the heart is present, or that hypochondria attacks suddenly, remember that the more the stomach is kept empty, or is only partially filled, the less subject to disease will be the person.

In cases of children, and adults with delicate stomachs, and in instances where the treatment will require many months, or even years, to effect a cure of disease, medicines may be combined with the daily food with very happy results. Thus, many of the preparations of iron, cimicifugin, leptandrin, podophyllin, etc, may be mixed with the bread and cakes; while chocolate may be sweetened with one of the various alterative syrups instead of sugar, and may even have certain tinctures or infusions added to it; being careful in all these instances that the articles added are compatible with the elements of the food, and the conditions of heat, cold, etc., which may be present, in order that decomposition may not ensue, or new and undesirable compounds be formed,—the quantity of medicines added to the food for this purpose should never be so great as to materially affect its taste. By such a course as

this, I have obtained most wonderful and unexpected salutary results in a great many diseases,—the patients not being aware that they were taking any medicine.

DRINKS.

The best, the most salutary fluid presented to us by nature for quenching thirst and supplying the demands of the system for more fluid, is *water;* it is found everywhere, costs little, and is of infinite value. It is the sole drink of non-civilized nations, and the examples of strength and vigor among these nations, as well as the generally prolonged life, free from disease, of abstemious persons, ought, it seems to me, to open the eyes of those who believe tea, coffee, wine, etc., indispensable to life. To civilization alone is due the multiplicity of infusions, fermented, and alcoholic fluids, invented to afford momentary relief to a languid organism, and to satisfy our desires for excitement and sensuality. Tea and coffee are useful, relatively. As to their moral effects, either of these drinks may be substituted for vinous liquids without exciting the same inconveniences upon the organs. Many people use tea and coffee to favor the digestive functions; tea excites in an especial manner, and its effects are experienced for several hours after the meal. The stimulating property of coffee is well known, and its aromatic infusion taken in moderation, a short time after a meal, develops the activity of the digestive system, and gives an increased energy to the mind, which favors all its operations. Nevertheless, pure fresh water is suited to all ages and all constitutions; it aids digestion, improves the appetite, and is conducive to health and longevity. Sweetened dishes and sugared water should be avoided as much as possible in most chronic affections.

Distillation appears to be the most unlucky present that chemistry has given to the human family. *Stimulating drinks*, instead of appeasing thirst, increase it; instead of augmenting strength, they exhaust it; even their moderate use causes irritation and weakness, while their excess degrades and consumes reason. More persons die prematurely from alcoholic drinks than from all diseases combined. How many young and robust men are carried off by even their moderate use—while, on the contrary, how many men owe to the use of water a lusty and healthy old age! Michael Kiavelkis, of the government of Vilna, never drank anything but water, had been married to several wives, and at the advanced age of one hundred and thirty-seven years left thirty-two children, several of whom, having followed a similar regimen, have attained nearly or quite a hundred years. M. de la Quersonier, of Paris,

led a life of temperance, drinking nothing but water, for sixty years, and reached the extreme age of one hundred and forty years.

Persons not in health, and old men, may, however, make moderate use of *wine*, mixed with water, as a mild stimulating tonic; it may also be used by patients who have been accustomed to the use of brandy and stronger drinks. It is also proper, as a medicine, for lymphatic persons, and those laboring under scrofula, phthisis, tuberculous affections, etc., with whom the moderate use of even stronger drinks often proves advantageous. As a general rule, all wines and liquors should be prohibited among patients of sanguine, bilious, and nervous temperaments. *Beer*, *ale*, and *porter* are of occasional service among persons much debilitated by Chronic disease; but the danger is that when once allowed as a medicine, patients will use them beyond the bounds of moderation. *Toast-water*, *rice-water*, *barley-water*, slightly sweetened and flavored with a little sherry wine, or with the juice of those ripe fruits known to agree, will generally be found much superior as a stimulant and tonic to any of the ordinary malt liquors. Malt liquors are especially injurious in most diseases of the kidneys, bladder, and urinary organs, also in all chronic diseases of the mucous tissues. *Spruce beer* and *mead* may be temperately used by patients when they do not disagree; however, they are of no practical advantage in a therapeutical point of view.

There is one thing which must especially be noticed in the treatment of chronic disease, which is, that, where patients have been habituated to the daily use of vinous, alcoholic, or other liquors, they must never be abruptly deprived of them, but be allowed a reasonable quantity during treatment. The sudden withdrawal of such drinks from patients accustomed to their use, will, according to the character of the disease, either aggravate it, or give rise to serious symptoms. Too much care can not be had in this respect.

Cider, *perry*, *lemonade*, *sour wines*, and other sour drinks, however palatable and refreshing they may prove at the time of taking them, are apt, from their own acidity, or from the acidity they develop in the stomach, to neutralize the action of medicines, and are consequently improper drinks in chronic disease, especially where there is a tendency to acid stomach and flatulency. If permitted to be used at all, it must only be after a careful investigation, by the physician, of all the circumstances and conditions of the patient, and of the effects of such agents during a reconnoitring trial of them. *Soda-water*, *mineral water*, *syrupy drinks*, *infusions*,

decoctions, and other drinks not referred to in this place, are subject to this same general rule.

Tea and *coffee* are active stimulants, and although of extensive use by both sick and well, the habitual daily employment of them is highly pernicious, especially when used in excess and of great strength. Although patients will do better without them, yet there may be instances in which the physician may safely allow them to be used at meals, in moderation and quite weak. Persons who are endeavoring to break off the use of alcoholic drinks may certainly be permitted the use of tea and coffee. Tea and coffee lessen the amount of matters excreted from the tissues in their process of decomposition, as manifested by the diminution of the amount of urine and fæces passed, and, therefore, may prove beneficial by retarding the too rapid disintegration of the albuminous tissues of the system. Infusions of many of our simple or bitter herbs will often answer a much better purpose than either tea or coffee, as mild stimulants, when compatible with the medicines prescribed for the patients. *Chocolate* may be used wherever it agrees with patients, but a weak infusion of *cocoa* is preferable.

As a general rule, then, water is the best beverage for patients laboring under chronic disease. "Drink water," said the celebrated Dubois to the young persons who consulted him, "*Drink water, I tell you.*" Dumoulin, the medical Dubois of his time, wrote, previous to his death, "*I leave two great physicians behind me,—diet and water.*" But other drinks, of a refrigerating, tonic, or stimulating character, may be employed in certain cases, and always more with a view to their beneficial therapeutical effects, than to any desire or necessity for them as beverages. Drinks which determine to the skin, and do not disagree in other respects, by producing gentle perspiration often prevent disease, which is very frequently the result of suppressed perspiration.

Patients who have been accustomed to the daily use of liquors, are very apt to fail if their usual stimulus is too suddenly removed from them; in such cases the physician will find it beneficial to allow a certain amount of liquor to his patients daily, the quantity and quality of which he should carefully prescribe or permit, according to the circumstances attending each invalid, being careful not to allow enough to overexcite the circulation.

TOBACCO.

An energetic poison, tobacco has, nevertheless, become one of the most imperious wants of our enfeebled and obtuse epoch. We

snuff, we smoke, and we even chew this acrid and corrosive substance, which weakens the brain and nervous system, and which injures the powers of digestion by destroying the tone of the stomach and biliary organs. Like the Orientals, who stupidly seek, in opium and haschisch, for visions and hallucinations, we foolishly expect to revive our spirits and to forget our miseries under the effects of liquor and tobacco; and even those who strenuously discountenance the use of liquor are perfectly intemperate with tobacco. An oppressive torpor, weakness or loss of intellect, softening of the brain, paralysis, nervous debility, dyspepsia, diseases of the liver and kidneys, and gravel, are affections which are by no means uncommon consequences of an excessive employment of this weed, the poisonous element of which is the nicotine contained in it. Independently of these maladies, it is a filthy practice to use it at all, as manifested by the uncleanly noses, the foul handkerchiefs, the soiled clothing, the filthy and spotted floors and walls of the bedroom, sitting room, and other places, where tobacco consumers expectorate, the discolored teeth, and the detestably fetid breath. And there is hardly to be found a person engaged either in chewing, smoking, or snuffing tobacco, who does not frequently experience warnings against its use, in the form of faintness, nausea, giddiness, extreme dryness of the throat and fauces, nervous tremblings, and more or less sickening debility, with prostration of the vital powers, and feelings of fear, disquietude, and apprehensiveness. Many of which effects, it is proper to remark, may be overcome by large draughts of cold water.

It is a remarkable fact, which all physicians of much experience will corroborate, that, in the treatment of chronic diseases, those who are addicted to the use of tobacco in any form, are, as a general rule, found to be much more difficult of cure than those who do not use it; their nervous systems respond more feebly and slowly to the action of remedial agents, and which is due to the tobacco which has blunted and paralyzed the extreme susceptibility of their nerves to both external and internal influences. A patient under treatment should give up the use of tobacco, or else his physician should assume no positive responsibility in his case, further than to do the best he can for him; by stopping its employment the patient will be astonished at the rapidity of his cure and at the more active salutary influences of remedial agents upon his system. In some cases the suspension of its use may be effected at once; in others, it will require to be gradual; thus snuffers and smokers may stop at once; but old chewers should

gradually lessen their *cuds*, and at the same time acquire the habit of chewing chamomile flowers, boneset leaves, or the inner bark of wild hickory—the latter being the best tonic to restore the tone of the stomach, without interfering with any other theraputical treatment that may be instituted.

AIR.

Air is still more indispensable to health and life than food; we eat only two or three times a day, but we respire incessantly day and night. The air sustains life by its double action upon the lungs and upon the skin. In the act of respiration, hematosis or sanguification is produced, by which the black blood is transformed into red; if the air be pure, the blood absorbs a full amount of oxygen, is revivified and perfected; if the air be impure, the blood is impoverished according to the deficiency of oxygen and the character of the impurities. In its action upon the skin, the air maintains perspiration, and favors the elimination of the superfluous elements which must be rejected from the economy. This last function is the complement of the first. The one can only be effected by the incessant introduction of air into the lungs; the other is only perfectly executed when the waves of air, upon coming in contact with the skin, successively removes the fluid which it exhales.

The action of the air is, then, an indispensable condition to the maintenance of these two conditions. But although the lungs possess a ventilating apparatus, and although the action of inspiration and expiration is sufficient to introduce air into the extreme bronchial ramifications, ventilation of the skin can only be carried on by the impulsion which the air receives on the outside. Hence, when men or animals are inclosed in dwellings, they are deprived of this cause of impulsion, the skin then becomes inactive, and perspiration is diminished unless muscular exercise is called into play to re-establish the equilibrium.

By a kind of intuition common to every body, many physicians, both among the ancients and moderns, have foreseen and pointed out the twofold and beneficial influence of muscular action and of the atmosphere in motion; but they have not fully comprehended all its value; they have not laid down principles nor deduced consequences. Nevertheless, a host of observers, under the relation of hygiene, have made known in an empirical manner the necessity for exposing man to the open air, and the danger of a sedentary life. Children should be allowed plenty of air, and, even in winter, should be accustomed to expose themselves bareheaded to

the wind and to the sun. True, this will darken the skin of girls, but it will preserve their health and strength; they will become less susceptible to atmospheric impressions, and will have less to fear from scrofula, consumption, tuberculous, rheumatic, and other diseases. When they reach that period of their existence in which, according to the custom of society, they ought to enjoy the precious advantages of youth and beauty, the remaining in their dwellings will soon impart delicacy and brilliancy to their complexion; they will then reap, even to their last days, the fruits of the salutary liberty and of the energetic education of their childhood.

From the cradle, in the first year of existence, we must gradually accustom infants, with much discretion and prudence, to the influence of external agents; their linen ought to be frequently renewed; light clothing, porous and of sufficient warmth, should preserve the fragile creatures from cold and moisture; but, if we do not desire to render them susceptible to the least cold, to the slightest changes of air, and dispose them to croup, to looseness, to cutaneous affections, in fact, to a host of diseases, we must not soften and weaken their skin by exposing them to a too elevated temperature, nor excite a profuse moisture by means of thick coverings. Not only is it necessary and useful to carefully expose them, according to their strength, to the light and open air, but, whenever the heat of their apartments will permit, it will prove a good plan to remove all their clothing, and allow them to kick and move about, at will, in their original nudity. As soon as their strength and age will permit, they should be frequently taken, in seasonable weather, upon high hills, near woods, and in meadows, and be there allowed to carry on their sports, their racings and rompings, and their games.

As the years roll on, the habits change; and in our desire to make scholars, we forget to make men. But with more care and wisdom in our methods of education, we may easily reconcile the all-powerful advantage of health with the precious development of the intellect. For instance, what is there to hinder teachers and professors from giving to their students, during promenades in the country in fine weather, the principal ideas of which they ought to be masters? In climates of mild temperature, why can not these lessons be carried on under tents, or at least in places accessible to the sun and open air? Why do we not apply ourselves to the purification of the air, and of keeping it in motion, in our dwellings, our schools, our colleges, our churches, etc., by means of a natural or artificial ventilator, which may be substituted for

the action of atmospheric currents upon the skin? Indeed, such apparatus should exist in all establishments, of whatever character, where air becomes vitiated by the gathering of a number of persons, where deleterious miasmas are evolved, and where, either from poverty or legal punishment, man is doomed to inaction and dampness. In hospitals and other establishments in which ventilation is obtained, the functions of the skin are carried on more healthily; convalescents more rapidly recover strength; wounds assume a better aspect and heal more rapidly; lying-in women are less exposed to dangerous consequences; and scrofula, consumption, and other chronic diseases are more rarely met with.

We should seek, then, to secure for patients, as well as for those in health, a pure and perfectly oxygenized atmosphere; aerate their dwellings, and do not stop the chinks of doors and windows with wads or listing; in the warm nights of summer have their windows open, unless they live in objectionable locations, and, even then, the free night air, as impure as it may be, will be preferable to the confined and more highly contaminated air of the bedroom; and, whenever the weather and temperature will permit, advise them to sleep in places, and under conditions, where they may constantly breathe a fresh supply of air. Guard them, however, as much as possible, from foul and pestilential air, as well as from dampness.—Patients residing in unhealthy districts should never be allowed to go out to exercise in the early morning air until the atmosphere has been purified and vitalized by the sun's rays, and they should retire within doors about an hour before sunset.

They should shun all crowds or assemblies where the atmosphere is vitiated, and rendered unfit for respiration, by the dust, the combustion of lamps, and the poisonous emanations from the skin in perspiring, and from the lungs in breathing. They should keep no flowers nor perfumes in their sleeping apartments, for strong odors asphyxiate. Give air to their bedrooms, and do not encumber them with lodgers. Even in summer, sleep in rooms with chimneys or ventilators, by means of which the air may circulate with greater force and freedom. Prefer a southern apartment, with high ceilings, and avoid as much as possible a northern aspect and dampness. Where the sun does not penetrate, the physician enters. An abundant source of heat and life, the sun is eminently the plastic power; it repairs, it reconstitutes the enfeebled being; it arrests disease; it favors remedial treatment; it produces wonderful cures. If possible, inhabit, as a matter of preference, the neighborhood of gardens and trees; for plants, by

absorbing deleterious gases, are the most useful purifiers which the kindness of nature has given to man.

As a general rule, a country residence, with daily exercise, and an abundant and healthy diet, is more conducive to health and long life than any other; but we should be careful to avoid low and moist lodgings, among putrid manure, or near ponds of stagnant water, or collections of decomposing vegetable matter. How many unhealthily located villages are there, situated in the neighborhood of marshes which exhale death, or in the midst of forests of high trees which prevent a free circulation of air! How many communities are there who have for a constant drink only a salty, brackish, soapy, limestone, or other impure water!

Although mortality is not so great among those laborers who can supply their wants by constant employment, it is frightful among artisans who are out of work, and among their families. One-fifteenth of these persons die annually, and two-thirds of their children never reach the age of two years. Inhabiting low and damp houses, illy ventilated, deprived of sufficient light, situated in narrow and filthy streets in the center of large cities, burdened with cares and fatigues, badly nourished, undergoing all the inconveniences of uncleanliness, and often abusing spirituous liquors to drown all thoughts of their grievous condition, they not only occasion disease among themselves, but also give existence to numerous sickly children, who are suckled by unhealthy nurses, and are abandoned to themselves as soon as possible.

Pure air gives health to the lungs, richness to the blood, full development to the organs, and health and strength to the system; a vitiated air diseases the lungs, impoverishes the blood, debilitates the organs, and causes debility, sickness, and premature death. Sea air is generally purer and sharper than inland atmosphere, and is especially serviceable to scrofulous and lymphatic patients, and to those whose diseases are due to the influence of unhealthy vapors.

CLOTHING.

Clothing is not only an object of luxury, of coquetry, of fashion, of social distinction, and required to conceal nakedness, but is an object of the highest necessity in a hygienic point of view. In this respect it guards the body against the influence of atmospheric changes, maintains it at a proper temperature, and preserves the skin from injurious contact with external objects, as insects which prey upon the blood, poisonous vegetables, etc. General rules only can be given relative to clothing. Cleanliness

of person and of dress are important items in the treatment of disease; slovenliness is to the body what vice is to the mind,—in this relation, there is an astonishing connection between the physical and the mental.

No more clothing should be worn than is necessary to keep the body comfortably warm, being careful to regulate the amount according to the increase or decrease of temperature. Too much clothing injures the functions of the skin, on account of the excessive heat and perspiration it occasions, and which will ultimately give rise to disease of some of the internal organs. While too little clothing exposes the system to the influences of cold and sudden changes of temperature, likewise terminating in disease. Patients should be more particular in this respect than healthy persons. It is not the cold which we must fear, but a sudden or unexpected cooling of the skin, or suppression of perspiration. Complicated inflammations of the organs of the chest, as, pneumonia, pleurisy, fatal arteritis, have frequently resulted after a ball, from the skin, covered with perspiration, becoming suddenly exposed to a cold air. Sometimes, phthisis is revealed; but when this is the case, we may rest assured that tubercles previously existed in the lungs. In healthy villages, or localities exempt from dampness, dancing does not produce similar results among the country parties who, after having amused themselves with this agreeable exercise, frequently take long nocturnal promenades in the fields and woods without experiencing any bad results.

The thickness and character of the clothing should vary according to age, climate, and season. When the atmospheric heat is considerable and uniform, cotton and linen should be worn, being careful to have the clothes of sufficient amplitude to permit a free circulation of air through them. But in countries where the changes of temperature are frequent, where cold and moist winds suddenly succeed to an oppressive heat, it is indispensable to wear woolen clothing, which, being bad conductors of heat, present a barrier between our own heat and that from without. In these cases, the clothes should fit more tightly than in the previous instance, to prevent the free passage of a cold or damp air. The Romans and Spaniards most generally wore a mantle when they feared these atmospheric disturbances. The Russians, and especially the inhabitants of St. Petersburg, during the days of their burning and fugitive summers, never go out without carrying with them their paletot or their *bekech;* and strangers, used to other climates, who omit this precaution, believing they can safely dispense with it, often fall victims to their imprudence. A diarrhea,

a dysentery, an intermittent fever, etc., convinces them, when too late, of their error. We may despise the counsels of one man, but we must never disregard that which an entire nation has adopted; then, take the mantle in Spain, and the paletot in Russia, for the proverb is true that says "draughts of air kill more than cannon balls."

Persons laboring under chronic rheumatic affections, neuralgia, chronic catarrh, or who are disposed to tubercles, and also delicate children who are readily susceptible to the influence of cold and dampness, ought to wear flannel next the skin. But in the age of vigor, and in salubrious climates, it is a dernier resource; we must then only employ it when all other means which may strengthen the skin and render it less susceptible, have been unsuccessfully tried. Flannel should also be worn where hot days are succeeded by cool nights, and in damp and changeable climates.

Clothing should never be so tight as to compress or interfere with the motions of any part of the body. The cravat, the collar, stocks, gaiters, and bands, should be as loose as possible. Tight corsets, though they may not produce tubercles, will undoubtedly favor their formation. Yet sometimes they may be serviceable among persons disposed to assume vicious attitudes; but such ought to prefer the small corset to the large one, which protects and supports the breasts without causing them to become smaller, and which maintains the trunk in its natural straightness, without interfering with the free action of the lungs and heart. Undue compression upon any part interferes with the functions of that part, and disease is certain to be the result, sooner or later.

Head-dresses, hats, etc., should be sufficiently large, light, and with deep rims or borders in summer, in order to protect the eyes from the rays of the sun, being careful, however, to allow the head to experience the influence of atmospheric contact as much as possible, either by orifices in the hat, or by keeping the head uncovered whenever the circumstances will permit. Be sure to keep the head cool.—Shoes should be pliable and elastic, light and thin in warm weather, thick and warm in winter, and thick and impermeable in damp weather. The feet should be kept warm and as dry as possible; and patients should wear woolen socks or stockings during cold and damp seasons; especially those whose feet perspire freely.

EXERCISE.

Exercise, regularly and properly taken, is one of the most efficient resources against the formation of chronic diseases; it neu-

tralizes the sad effect of intellectual excitements, and strengthens the resisting power of man to the action of injurious external causes; it impresses a salutary movement upon the circulation from within outward; it augments the animal heat, and develops and strengthens the muscles and organs; it imparts to the body greater suppleness, agility, force, and elegance, and to life more energy, tenacity, and duration.

On the contrary, inaction, idleness, excessive rest, diminish vital heat, enfeeble organic movements, paralyze the brain, heart, muscles, and the whole organism, causing them to fall into a painful inertia, a dangerous debility.

Exercise increases power, perfects the faculties, forms, and health; idleness and inaction debilitates, and brings affliction and degeneration. With the first, respiration is rendered easy, the cheeks become more ruddy, the body more agile, the mind more vigorous and joyful; with the latter, follow paleness, bloating, oppression, lowness of spirits, melancholy, and a fatal disorganization. Persons who exercise, who are constantly exposed to the influence of light, and of the open air, are much less subject to chlorosis and anemic conditions, to nervous overexcitations, to organic derangements, scrofula, consumption, etc., than those who dwell in cities, exercise but little, and are mostly within doors. Physical development is much more indispensable to health and life than intellectual, because health is the first of all blessings, and life the most precious of all gifts.

Living in large cities, as well as spectacles of vices and passions, sadden the mind. A country life and a taste for gardens contribute much to prolong our existence. A pure air, simple and frugal nourishment, exercise of the body, order in all its actions, and an attention to the works of nature, give to the mind tranquillity, serenity, and gayety. Man was not created to meditate unceasingly, but to work and act. Idleness fatigues him, or drives him into vices; inaction sickens him. Between the brain and the stomach there is an intimate sympathy; if the head becomes too strongly occupied, digestion becomes laborious and painful; how many are there who can not devote themselves to even the most superficial study after their meals? Woe, then, to those who wish to exist only by thinking, who sacrifice everything to labors of the mind,—they run after glory, and wear out their bodies, lose their healths, and extinguish their mental powers, without attaining it. Music, songs, spectacles, cheerful society, plays, and the pleasures of consolation, rest and relieve the brain. When the morning is devoted to mental labor,

give, at least, the rest of the day to agreeable exercise and entertainments.

To be beneficial to patients, exercise should be pursued with regularity and moderation, should be taken as much as possible in the open air, and should always be pursued, not as a task, but as a matter of recreation, surrounding it with all associations calculated to give rise to cheerfulness and pleasing excitement. A patient, when advised to exercise, may reply that "he or she has plenty of it in the daily labor he or she pursues," that "his business gives him plenty of it," or, that "she has plenty of exercise in attending to her domestic duties." But, the physician must recollect that this is not what I mean by exercise, especially in its application to those under medical treatment; these are daily tasks, labors, and often hard labor at that. Exercise is of a different character; it must have no reference to business, labors, nor to household occupations,—but only to health, and for this purpose it must be associated with everything calculated to produce agreeable mental excitement freed from the cares of life,—and unless this be done, but little benefit can be expected from it. The kind of exercise I refer to, will frequently cure apparently obstinate diseases, of long standing, without the aid of a particle of medicine. The nature of the exercise advised to patients must be adapted to their disease, their strength, and their circumstances. With some, riding in vehicles, or on horseback, sailing, cultivation of gardens, etc., will answer; while others will require a more active kind, as running, jumping, lifting, swimming, rowing a boat, etc. Carefully conducting the exercises according to the more recent standard works on Hygiene.

Dancing, with accompanying music, is a very excellent exercise to excite the nervous system, and, by the gayety it inspires, to increase the action of all the organs, to augment the rapidity of the circulation and the frequency of respiration, to cause the blood to determine to the capillary system of the skin, increase the animal heat, and give rise to free perspiration. Dancing, often repeated, gives to the body an easy and agreeable carriage, causing it to move with more grace and freedom; the shoulders become thrown backward; the lower limbs gain in strength and suppleness; their muscular masses assume more energetic and rounded forms; and the circulation in these limbs becomes more active and natural. But, in order that beneficial results may be derived from dancing, it must be stripped of its mischievous concomitants. Thus, this exercise should be carried on in the day-time, in well-ventilated halls in cold weather, and in the open air during warm seasons, and should never be carried to excess. But, when pursued during the hours which

should be devoted to sleep, with all the accompaniments calculated to intoxicate and give energy to the passions, dancing fails to be of hygienic utility, and in its moral influence, often triumphs over the most chaste education and the most salutary precepts. But, an abuse in the application of a principle, is not sufficient to destroy its value.

Frictions upon the surface of the body, together with shampooing, will be found a most efficacious measure in all chronic diseases, and especially among lymphatics, sedentary persons, and those laboring under rheumatism, paralysis, dyspepsia, liver diseases, consumption, numbness of limbs, constipation, prolapsus uteri, etc. Frictions remove all impurities from the skin, determine the blood to the cutaneous capillary vessels, improve nervous and muscular power, impart energy to the brain and nervous system, as well as to the digestive apparatus, and increase the resisting power of the system to morbid influences. Shampooing is a still more powerful passive exercise, producing all the beneficial results of friction, together with a decidedly more powerful salutary effect upon the deeper seated parts. Shampooing must be performed by a second party, while friction may, according to circumstances, be performed either by the patient himself, or by his assistant.

In nearly all situations of life, exercise taken sufficiently to provoke a gentle perspiration, with frictions repeated daily, and continued each time until the skin reddens and has a gentle glow of heat, and the use of clothing which facilitates moderate sweating, will be found to produce the most happy results. How many engorgements and visceral derangements have yielded to continued exercise, to the oft-repeated jolts of horse riding, to active sports, or to feats of strength! Man should frequently change his place. Frederick the Great remarked: "When I consider the physical constitution of man, I am induced to believe that nature made us for the state of postilions, rather than for that of scholars."

Singing and laughing during the exercise are of remarkable efficacy in giving tone and power to the lungs, and through these organs to the whole system. Every patient should daily practice these in a moderate degree, so as not to fatigue the organs nor irritate the vocal apparatus; and if he can neither sing nor laugh, he should at least attempt them, and do as well as he can. Shouting aloud, and hallooing, especially in the open country or sea air, are also of great utility in many cases. Of course, the extent to which these vocal exercises may be carried in conjunction with the corporeal, must be judged of by the physician in each particular case.

Swimming in sea water gives more energy to the constitution,

more pliability to the limbs, and greater firmness to the flesh, and is of immense utility as an auxiliary in the treatment of nearly all chronic diseases. However, in certain organizations, especially feeble ones, prolonged cold bathing will give rise to derangements, and we should carefully limit the duration of, or entirely prohibit, bathing, among those who on entering the water, experience an intense chilling, with paleness of the face and extremities and involuntary trembling. But if, on the contrary, after the first impression, the skin reddens, the strength increases, the respiration becomes more free, and the appetite improves, we may unhesitatingly advise its continuance. A promenade along the borders of a river, in the country, or on elevated places, after the swimming, is always necessary, and will, from the act of walking, the influence of the light, and the inhalation of pure air, powerfully favor a reaction, without which cold baths are apt to be more hurtful than salutary.

Traveling is of great value to those patients whose means in life will permit it, especially with those laboring under scrofula, gastralgia, chronic irritations of the stomach, hypochondria, melancholy, mania, chlorosis, and other anemic conditions. The change of air, scenery, and excitements, the mental and physical activity effected thereby, the forgetfulness, as it were, of one's self, and one's afflictions, produce very beneficial results. For the anemic, all these circumstances may be met with at some popular chalybeate springs.

Sea voyages are of much service. Sailors generally enjoy a robust health, although they pass frequently from warm climates into those of intense cold, and are exposed to all the vicissitudes of the weather. Tuberculous patients and those laboring under the *early stages* of consumption, will derive great benefit from sea voyages; instances of permanent cures therefrom are by no means rare. But, in order to derive the full benefits of travel by sea, patients should as much as possible adapt themselves to the duties and fare of the seaman; a mere journey across the sea, without muscular exercise, and with a diet consisting of delicacies, will be of little avail to the invalid.

Sailing on rivers is likewise beneficial; in rowing a light boat, the muscles of the superior extremities and of the chest, are developed; a pure atmosphere, and in motion, is respired, the undulations of which being incessantly renewed and brought into contact with the skin, excite the depuratory functions of this membrane to a normal action.

Visiting the springs, or employing mineral waters, is undoubtedly of great value to patients with chronic disease. But the difficulty is, that the physician too frequently recommends them when the disease is incurable. When medicine is powerless, the physicians

having employed all their resources, the mineral waters are recommended, and the patient has then no chances of cure. If used at all, it should be in the early stage of disease.

But, however beneficial mineral waters may be, their improper use will only aggravate disease which might be modified by a proper employment of them. The use or application of any spring waters exacts knowledge, judgment, and prudence; not only must the proper kind of water be selected and prescribed, according to the character of the disease, and the constituents of the water, but the physician must also take into account the age, the sex, the temperament, and the degree of the strength of his patient, as well as the more or less advanced stage of the disease, and its complications. It is much better for patients not to make use of mineral spring waters, than to use them unadvisedly, and without system or design. Those physicians residing in the neighborhood of medicinal springs, who have more particularly devoted their attention to the virtues of their springs, are the proper ones for patients to consult with relative to their individual cases, that is, as to the suitableness of the water to their disease, the manner of using it, and the auxiliary measures to be attended to while taking it. The medical attendant of the patient should always counsel with the physician at the springs, as long as his patient remains there, without necessarily yielding up his patient entirely to the latter physician's charge.

Persons afflicted with chronic disease of any kind, must at all times assume a perfectly straight condition of the body, with the shoulders thrown back, the small of the back curved inward, and head erect. This must be attended to whether sitting, standing, walking, writing, reading, sewing, etc., and pressure of the chest or stomach against a desk or counter must be avoided, as well as sitting with the body doubled forward. By not attending to this posture, the stomach is pressed against the diaphragm, the capacity of the chest is consequently contracted, and the passage of the blood through the heart impeded, giving rise to short or difficult breathing, palpitation, disease of heart and lungs, pains in the small of the back, female difficulties, dyspeptic symptoms, and often sudden death, particularly after meals in persons laboring under affections of the heart. Many diseases are either caused, or rendered worse, by the lazy, stooping, bent-over posture, which is unnatural and unhealthy.

SLEEP.

Rest is an imperious necessity for all animated beings, and especially for persons laboring under disease. Rest must not only be had at various intervals during the waking hours of patients

throughout the day, but likewise by a sufficient amount of sleep during the hours alloted for this purpose through the night. During sleep there is a temporary cessation of the functions of the brain and of the nervous system of the life of relation, while, at the same time, the material losses which these organs have experienced in the previous waking state are restored. The duration of this passive condition of the organs should always be proportioned to their state of activity. If the sleep is not sufficiently prolonged, if the rest is not complete, the powers of man are weakened, his body becomes exhausted and lean; the organic molecules which he has lost through the day are not replaced by new ones; his skin becomes wrinkled, the freshness of early life disappears, and, with him as with animals, a premature old age is the inevitable result. Such is the law of nature.

But this law is modified according to climate, sex, and temperament. Very exacting in the inter-tropical regions, the need for sleep is much less than in those of the North, where motion becomes a necessity. Although it may not be possible to assign a precise limit to its duration, we know, however, that this is much more considerable as we approach nearer the period of birth. For the infant who is exposed to an incessant agitation, it is indispensable that it sleeps not only through the night, but also during certain hours of the day. The periodicity of sleep can not be explained by the exhaustion of the nervous influx, for the enfeebled old man sleeps much less than the infant with all its turbulence, or the man with all his vigor. Persons who eat a great deal and who use stimulating drinks, frequently experience an invincible tendency to sleep; this may be removed by a return to habits of temperance, or at least we may diminish the faulty tendency and the danger of cerebral congestions to which it disposes. We see that there are intimate relations existing between the wonderful mechanism of the brain, and those of the stomach which digests and of the muscles which contracts. The same principle animates them; but the two opposite poles of the nervous prolongation, the brain and the generative organs, are subject to the law of intermittence of action; while, by an admirable foresight of nature, the heart and the other organs of vegetative existence, which receive the nervous influx of the central parts of the same prolongation, are not subject to the same law. Their motion commences and ceases with life.

The normal duration of sleep is from six to eight hours; it may extend even to ten hours for young children as well as for weakly persons,—being sensibly abridged among strong and sanguine men, or among excitable individuals, troubled with a nervous disposition,

the effects of which are neutralized only by exercise and labor. It is by devoting, one's self to these in a regular manner, by lessening the time given to repose, that we may hope to combat with any success that obesity which is the source of serious inconveniences, that sanguine condition which disposes to congestions, and that lymphatic plethora which leads to tuberculous diseases.

Sleep is not a function peculiar to the brain. Among reptiles the entire nervous system deeply experiences the influences of the periodical changes of the seasons; during hybernation, the functions of the life of relation are entirely suspended, and those of the internal life present only feeble and irregular movements. With man during sleep, digestion, respiration, and circulation are diminished. In this state he has a tendency to become cold, and congelation attacks him more readily than during the waking state. His faculty of producing caloric diminishes in the natural or normal sleep; but this refrigeration can only be carried on within certain limits, beyond which the sleeper awakens to fall into the abnormal or morbid sleep which may become fatal.

The subtraction of oxygen and caloric result, therefore, in determining sleep before death ensues. It may also result from asphyxia by drowning, from apoplexy, and from determination of blood to the head. Plethora is often announced by an invincible tendency to sleep.

Sleep, this rest of nature, this apparent nothingness, in which life is reanimated, in which all the functions are improved, as digestion, respiration, circulation, etc.—sleep, this repairer of our exhausted forces, must be regulated with the greatest care. If it be too prolonged, it weakens, it stupefies the body and mind; if too short, it does not sufficiently restore, and internal and febrile excitations soon destroy health. Unpleasant dreams announce a laborious digestion, an irritability or weakness of the nervous system, muscular fatigue, a greater or less determination to the brain, excitement of the brain, etc. Consequently, the person should eat less, drink fresh water freely, keep the bowels regular, avoid excess in everything, sleep on a moderately hard bed with the head slightly elevated, and with the body properly but not too warmly covered.

To retire to bed at an early hour, sleep seven or eight hours, and rise early in the morning, should be the rule of all persons desirous of preserving their health. However, this rule will not apply to all persons who are diseased, for with many, we will observe that after having awakened in the morning feeling no restoration from the night's rest, a sleep of one or two hours afterward will impart to them a feeling of strength and invigoration, which they would not

have experienced had they arisen upon their first awakening in the morning. Physicians should especially bear this in mind. The same rule will also be found to apply frequently to persons who are devoted to study or great mental exercise.

In our large cities where everything is inverted, the silence of the night is invaded, the bed is sought at the hour when one should be rising, and the sleep during the day gives a feverish repose, which no longer sustains nor invigorates the forces of the system, but which permits the organs to become impaired and disposed to the most serious symptoms.

The patient should carefully avoid these prolonged night sittings, for, as a general rule, the sleep of the first part of the night is the most agreeable, the most reparative; it is also the most powerful means of modifying, invigorating, and preserving life. The blood is refreshed, the brain is recruited, physical sufferings are extinguished, mental troubles are removed, the organism is relieved, and hope returns to the heart, under the influence of sleep in accordance with nature and the laws of health.

A large bedroom, well ventilated, if it be possible; a bed without curtains, and not soft but rather hard; a temperature rather cool instead of warm, so as to always have a respirable and vivifying atmosphere; covers according to their need; the head elevated; no clothing capable of obstructing the circulation; the stomach empty; the bladder and intestines evacuated; and the mind at peace; and the sleep will be that which it should be, the restorer of our forces, the moderator of life, and the guardian of health. In some diseases, a departure from a few of these rules may prove useful, as, in affections of the air-passages, where a warm air may be of more advantage than a cool one; but such cases are the exceptions to the general rule, and should not be permitted by the physician until he is fully satisfied of their necessity and propriety. Children, as a general rule, should never be allowed to sleep with persons somewhat advanced in years, and more especially if these are laboring under any form of disease. That injury to the health of a child who is permitted to sleep with an aged person is an almost invariable result, is well known to medical men. I have frequently treated children laboring under some anomalous disease which resisted all the remedial means employed to remove it, and, after having ascertained that they were in the habit of sleeping in the same bed with an older person, have had the satisfaction of seeing the affection gradually disappear, and without any employment of medicines, by causing them to sleep alone, or with some young companion.

I will make this one observation here, that when patients are subject to unpleasant dreams, and these gradually become changed, under therapeutical treatment, to pleasant ones, and especially if followed by a sense of refreshment upon arising, the physician may rest assured that his course toward the patient is the correct one.

BATHING.

In order that the capillary nerves and blood-vessels of the skin may be preserved in a healthy condition, it is highly essential that the whole surface of the body be bathed, at regular intervals, with some simple preparation which will remove the oily substance secreted by the sebaceous glands, as well as the perspiration discharged by the sweat glands, both of which concrete upon the surface of the skin, and within its numerous ducts, eventually occasioning some disease of the skin, unless they be removed by the bathing referred to above. Nor is this all; the sympathetic relations between the skin and the various internal organs are much greater than between those of any other organs of the body; so that in proportion to the derangement of the cutaneous functions will there be more or less derangement of these internal organs. When the skin is in a normal state, and performs its functions healthily, it removes an immense amount of effete matter from the system, and this excretory process may be carried so far as to frequently relieve the action of internal excretory organs when these are torpid or in a diseased condition, as, by causing increased perspiration, at various but regular periods; and, it must be recollected that, in the purest perspiration, there is a large amount of urea. But other influences are also effected upon the system by the application of cold or warm water to the surface of the body, according to the mode of application; thus, a tonic effect is caused by slight douches of cold or warm water upon certain parts, by which tone is given to both nerves and muscles; sedation may be produced by the continued application of cold water upon a part; stimulation, if hot water be used; relaxation, if the water be warm, etc. And these results may be so managed as to exert a beneficial influence upon internal organs which have lost some of their integrity. Hence, in the treatment of chronic diseases, an attention to the condition of the skin becomes a very important auxiliary therapeutical measure.

The various means employed for the purpose of maintaining a healthy state of the skin, and of aiding in the restoration of internal organs to a normal condition, are, bathings with soap and

water, bathings with an alkaline solution, cold, hot, or shower baths, and vapor baths.

For ordinary purposes of health and cleanliness, the whole body should be sponged with cool water, every morning, upon getting out of bed; the water should be applied quickly over the whole surface of the body and limbs, drying immediately with a coarse but moderately soft towel, and applying gentle friction with it at the same time, so as to cause a pleasurable glow. If this be not accomplished quickly, the evaporation of the water from the skin will cause a chill which may terminate in a severe and even fatal cold. As soon as the body is thoroughly dried, the person should at once cover himself, by dressing or otherwise, and either take a brisk walk in the open air, or some other kind of exercise to favor reaction. By the subtraction of caloric from the surface of the body, cold water at first chills; but to this primitive effect a contrary one soon follows; the organism, aroused by the cold water and the exercise, displays a powerful reaction of heat and life, from the center to the periphery. The skin reddens, the internal organs are relieved, the external circulation becomes more energetic and the respiration more free and lively. There is produced an operation of revivification, and of external stimulation, very favorable to the treatment and to the resolution of some chronic diseases. The system responds better to the influence of cool water in the morning, after a night's rest, than at any other time.

But this method alone will not invariably keep the skin in a normal condition; consequently the whole surface must be thoroughly washed with soap and soft water, using either brown or yellow soap, Castile soap, or petroline soap. This regular bathing of the whole body should, as a general rule, be practised once a week in winter, and twice a week in summer. Oftener than this will produce too great an activity of the cutaneous functions, the evil results of which will be more especially felt in advanced age, the skin becoming harsh, dry, and very sensitive to external impressions, as well as being liable to some cutaneous disease. And if the skin loses its condition of healthy activity, the unhappy effects upon internal organs can very readily be seen.

Bathing with an *alkaline solution*, is more generally preferred for patients, than bathing with soap and water, because of its more readily uniting with the concrete oily matter discharged from the sebaceous glands, and more thoroughly cleansing the skin; but however valuable it may be in deranged or diseased conditions of this tegument, its constant use as a substitute for soap and water, in a state of health, would ultimately impair the cutaneous functions,

unless it were used much weaker than usually prescribed for patients. The alkaline solution is made either by adding about two drachms of Sal Soda or Saleratus to a quart of soft water; or by making a weak ley of hot water and hard wood ashes. If it be required to stimulate the skin, so that reaction may be more readily aroused, some alcohol or whisky may be added.

The frequency of these bathings, and also of the other baths hereafter referred to, as well as the temperature of the water employed, is, among patients laboring under disease, a matter of no small importance. It must be regulated by the physician, who will be governed by the character of the disease, the sensitiveness of the person to heat or cold, the condition of the skin, the strength, habits, and surrounding circumstances, as well as the reactive power of the system.

Cold bathing has a sedative or depressing influence upon the system, reducing the action of the heart and arteries according to the condition of the person; the advantages to be derived from it are due, not to the depression it causes, but to the subsequent reaction which ensues. Hence, whenever the temperature of the water is so cold that a chilly sensation continues for some minutes after its application, reaction coming on slowly instead of speedily, it is too cold for use, and will prove deleterious if persisted in. A warmer fluid must be used, whose sedative effect is not so powerful as to prevent a speedy reaction. For this reason, we recommend our patients to use cool, (60° to 75° F.); tepid, (85° to 90° F.); or warm water, (90° to 100° F.); instead of cold.

Local applications of cold water, in the form of lotion, bath, sponging, douche, or affusion, have, however, proved very efficacious in the treatment of external hemorrhages, burns, scalds, sprains, indolent ulcers, superficial cutaneous irritations, recent wounds, fractures, blows or bruises with infiltration of blood, ecchymoses, inflammations of the generative organs, strangulated hernia, hemorrhoids, chilblains, relaxation and paralysis of the eyelids, prolapsus of the rectum, leucorrhea and other discharges from the female generative organs, chronic ophthalmia with laxity of the vessels, etc. Continued irrigations have often succeeded in arresting the development of inflammation in complicated fractures. The same method, aided by a cold bath for the lower half of the body, has frequently been efficacious in cancerous irritation of the womb. I would remark here, however, that in cases where there is tension and considerable inflammation of the tissues, when the edges of ulcers are hard and callous, and also in wounds from fire-arms, tepid water should be employed in preference to cold.

Local tepid baths are also better for impressible persons, for those who are subject to constant perspiration which it would prove dangerous to suppress, in eruptive fevers, in complicated inflammations with irritation of the lungs, in cutaneous diseases, syphilis, nephritis, and also in cases where the body is exhausted by hard labor or a long walk. A douche of cold or tepid water has been frequently employed, with benefit, in apoplexy, affections of the head, determinations of blood to external parts, chronic external inflammations, muscular debility, impotency, etc.; and, when applied to the spinal column, has proved of great advantage in exhaustion, effected by excess of masturbation and abuse of sensual pleasures.

The *shower bath*, of either cold or warm water, is sometimes employed in the treatment of chronic disease, and with very excellent results; but it is not so generally useful as the other means of applying water, already referred to. A cold shower-bath should be avoided in cases where some internal organ is diseased, and with plethoric persons, as well as with those who are feeble and nervous. In these instances a tepid or warm shower-bath is preferable, if used at all.

Bathing, by immersing the whole body in water, is divided into sea-water baths, cold baths, and warm baths. The beneficial results obtained from *bathing in sea water* may be attributed not only to the stimulating influence of the water, but also to the vivifying action of the sea air, the influence of the light and sun, the mechanical, and perhaps electrical, motion of the waves, the promenades on the shore, and with children, their playing on the downs. But, in order that these immersions may produce truly salutary effects, certain rules must be observed: 1st. The bath should be taken in the forenoon, either before breakfast, or two or three hours afterward; no bath of any kind should ever be taken when the stomach is full, or is occupied in digesting food. 2d. A moderate degree of exercise should be taken before entering the water, but not sufficient to cause exhaustion, fatigue, weakness, or a too profuse perspiration. 3d. The clothing being removed, the person must immediately plunge the whole body into the water, and should remain in it until the bathing is finished. 4th. Three or four minutes is a sufficient length of time for the first bathings; but the time may be gradually increased to ten or fifteen minutes, provided there are no contra-indications. 5th. But one bath should be taken daily; in some cases, of very feeble or delicate persons, every second or third day will be often enough at the commencement. 6th. Immediately upon leaving the bath the person should thoroughly dry his body, or, if too weak, have an assistant do it; then dress without delay,

and afterward take a short walk or some other gentle exercise. 7th. If reaction does not readily come on, some mild stimulant may be given to facilitate it, and at the next bathing the patient must not remain in the water so long a time as before; or it may be necessary to suspend the bathings for a time.

After plunging into the sea, the body should be kept as much as possible in a horizontal position, that it may be subject to the action of the waves, which will give a favorable impulsion to it; then return to the shore, dry with care, dress, and promenade. Under the influence of these baths, the indications of improvement will soon manifest themselves; the vivified skin loses its paleness and softness,—it becomes more or less red; the capillary vessels are developed,—a richer blood having restorative principles circulates in them. The morbid embonpoint gradually disappears; the muscles become more prominent; the character acquires a greater degree of gayety, the will becomes more energetic, and the mind more active. When these important modifications occur in the system, we may then order two baths daily.

Sea bathing is very serviceable as an auxiliary for young persons whose organic texture is soft, constitution weakly, and whose organs are slowly developed at the period of puberty. It is also useful in many cases where menstruation does not readily manifest itself; in relaxation of the ligaments of the womb; in leucorrhea, and even in sterility, females have occasionally become fruitful by its employment. It has likewise been successfully prescribed in chlorosis, in which malady, if the debility will not permit the use of entire baths, sitz baths of sea water, in which the lower half of the person is immersed, may be substituted, and their influence be seconded by moderate exercise in the open air; in convulsive, hysterical, and epileptic affections, as well as in other nervous diseases in which atony predominates over irritation,—in which cases sea water may be employed in baths, affusions, or douches; in hypochondria, melancholy, and mania, in which these different modes of application have been equally successful; in chorea, diseases of the skin, eruptions of various kinds, indolent and scorbutic ulcers, gastric cough, and affections of the stomach which accompany an increased acid secretion; in impotency, exhaustion from abuse of sensual pleasures or excess of masturbation, chronic fever and agues, obstinate catarrhs, mucous discharges from the vagina or rectum, pituitous cough, etc. Bathing in sea water has likewise been found especially beneficial in scrofula, and diseases of a scrofulous character, rickets, chronic affections of the liver, spleen, and stomach, glandular obstructions, non-malignant tumors, derangement of the kid-

neys, leprosy, jaundice, some kinds of debility, etc. Its effects usually appear more promptly among children than among adults. Internally, sea water acts as an excitant and resolvent, and aids materially in the resolution of engorgements of the lymphatic system. Children may take it in spoonful doses, and adults by tumblerfuls. In doses of a quart or more it has a purgative effect.

Sea bathing should not be prescribed in acute affections of the nervous centers, of the brain and spinal marrow, plethora, tendency to congestion, febrile action and inflammation, especially inflammation of internal organs, in certain cutaneous diseases, hemorrhage from the lungs, and consumption; the sharp air of the sea rather accelerates than retards the progress of phthisis.

Bathing in cold soft water requires an attention to the same rules as named above for sea-water baths: but its effects are less stimulating. When the body is in motion while immersed in cold water, as in swimming, the results are much more beneficial than when, as in an ordinary bathing tub, the body remains immovable. It has been thoroughly demonstrated by experiments that the cold bath is debilitating, and that the subtraction of the caloric which it occasions, may, in this respect, be likened to the results of bleeding; it is only when we limit its duration, and employ it consecutively, that it acquires an opposite action. The physiological effects of the cold bath should be well understood by the physician. They are: 1st. Constriction of the tissue of the skin; 2d. Slowness of the capillary circulation at the periphery; 3d. Diminution of temperature; 4th. The more or less complete arrest of perspiration. But, when reaction comes on, we see the tissues dilate and regain their natural color, the circulation becomes more active, the heat more considerable, and the perspiration more abundant.

Cold baths act differently upon persons who use them, according to their temperament, age, and even certain organic conditions which are not dependent upon strength nor debility. With many the desired reaction comes on promptly; with others, the reaction comes on slowly, is imperfect, or is insignificant. The parts immersed in the bath remain cold for a long time, and heat, to any extent, is only manifested after the skin has been excited by frictions, exercise, and warm clothing. The reaction, then, is not due to the cold bath, but to a vital movement effected naturally or by artificial means.

We can not lay down any invariable rules for the use of baths; there are some persons who can bear cold much better than any other baths. But the contrary happens more frequently, and those constitutions which, without being feeble, react with difficulty

against cold, should not employ baths at a low temperature, lest fatal congestions be the result. If the physician should prescribe them, he must always order them to be followed or accompanied by energetic frictions, or exercises which will recall the heat and perspiration to the surface. And even notwithstanding these salutary precautions, the untimely suppression of the perspiration very frequently gives rise to boils and to deposits beneath the skin, which the followers of hydropathy, not knowing their origin, have termed *crises*.—As a general thing, cold baths are of much less value in chronic disease than warm; for cold water is rather a preservative than a curative means, indispensably requiring for its auxiliaries, exercise, free air, and light. Reduced to itself, its circle is limited, its mission sterile, its effects accidental and often serious.

A *warm bath* occasions agreeable and refreshing sensations, softens and relaxes the skin, causing a more free and easy circulation of the blood in the capillary vessels, as well as permitting a more thorough removal of impurities from the surface of the body; it tranquillizes the nervous system, lessens increased action of the heart and arteries, invigorates all the internal organs, equalizes capillary circulation, and improves respiration. It is of great utility in many chronic diseases, in spasmodic affections of the bowels, convulsions of children, gravel, hernia, rheumatic and neuralgic affections, and in many cutaneous diseases. It is of especial benefit to children, nervous and delicate persons, the aged, and those with whom the vital powers are feeble. The duration of a warm bath should be from five to twenty or thirty minutes, according to its effects upon the system. The idea that persons taking warm baths are liable to contract colds, and require stimulants to prevent it, is an erroneous one; warm baths are not more apt to be followed by colds than cold ones.

Baths may frequently be rendered more efficacious for certain diseases, by dissolving in the water composing them some medicinal agent which, from its absorption or local action upon the surface, will produce healthful influences. Such are called *Medicated Baths*, of which there are several kinds. Thus, four ounces of sulphuret of potassium, and one ounce of diluted sulphuric acid, added to thirty gallons of water, forms a *Sulphur Bath*, useful in many cutaneous diseases, rheumatic affections, hepatic disease, secondary syphilis etc.

A very excellent *Sulphuretted Bath* may be prepared as follows: take of Sulphuret of Potassium or Sodium, three ounces; Carbonate of Soda, two drachms; Chloride of Sodium, two drachms; Sulphate of Soda, one ounce; distilled water, one pint. Mix, and when the

several salts are dissolved, pour it into twenty gallons of water at 98° or 100° F.

A *Nitro-Muriatic Acid Bath*, very useful in diseases of the liver and spleen, constipation, syphilitic eruptions, etc., is made by adding to thirty gallons of water, at 90° F., from thirty to forty fluid-ounces of a mixture of three parts, by measure, of hydrochloric acid and two of nitric acid; it should be used only in a wooden bathing tub.

An *Iodine Bath*, employed in scrofulous affections, cutaneous diseases, and tuberculous maladies generally, is composed of Iodide of Potassium, one drachm and a half to six drachms and a half; Iodine, forty-five grains to three drachms and a quarter; water, ten fluid-ounces. Dissolve, and add to a bath containing sixty gallons of water. The milder strength is for children and weakly adults.

Various other Medicated Baths, as Aromatic, Iodide of Iron, Sulphuretted, etc., have been highly recommended; but they usually require considerable apparatus and attention, and are too expensive for practitioners in ordinary practice, and hence are rarely employed, except in hospitals, or by those who make their use a speciality. However, although they may and do prove beneficial in the removal of many of the diseases for which they are used, their employment may, in the majority of chronic diseases, be dispensed with, the remedial measures hereafter described being, as a general rule, found much superior to them in efficacy and permanency of cure.

I must, however, make an especial exception here, for in the treatment of secondary and tertiary syphilitic affections, I have derived immense benefit from the Sulphur and Iodine bath combined.

Electric Baths have been much employed of late years; the vital forces are said to be increased by the electro-positive bath, and diminished by the electro-negative. In giving an electro-positive bath, the electricity accumulated upon the glass plate must be collected, while the negative electricity, acquired by the cushions or rubbers from the friction, must be disposed of as rapidly as it is liberated; to effect which a metallic chain must be attached to the cushions between which the glass plate or cylinder is turned, and then be made to communicate with the ground. The patient being seated upon an insulating stool, is requested to hold the prime conductor of the electrical machine in his hands, and the machine is then put in motion. The whole surface of the patient's body becomes charged with positive electricity, while the air surrounding it is rendered negative. A bath of this kind should be used for

about three hours each day; it is useful in conditions of the skin and mucous membranes where there is deficient action. In giving an electro-negative bath, the negative electricity accumulated upon the cushions must be collected, while the positive electricity acquired by the glass plate or cylinder must be passed off as rapidly as it is liberated; to effect which, a metallic chain must be made to form a communication between the glass plate and the ground. In this bath the cushions should be insulated by means of glass supports. A bath of this kind is said to have a debilitating effect, reducing the pulse, and has been used in erysipelas, headaches, neuralgia, and all chronic inflammations.

The *Galvanic Bath* has been found useful as a stimulus in paralysis, in scrofulous affections of the joints, etc., in the muscular atrophy of children, in rheumatism, and indeed in all diseases where there is pain or a want of tone. "The bath itself may be of any form or material; if, however, it is of unpainted metal, it must have a sheet put in so as to line it, that the body of the patient do not touch the metal. It should be filled with the necessary amount of water, of a suitable temperature, into which may be placed any salt or drug which may be deemed necessary, as bay salt, acetic acid, etc.—A Pulvermacher chain, made expressly for the bath, of sixty elements, excited in the usual way, by being drawn through pure vinegar, should be hung up by the hook at the positive pole, to the wall, by means of a piece of string, of such a length as to allow the negative or white pole to enter the water, but not any part of the chain; the chain should also be free, and not touch the bath, sheet, wall, etc., except where mentioned; by the means of a wire attached to the hook at the positive pole, a conductor, containing a moistened sponge, can be placed upon any portion of the patient (who has been placed in the water); a current now passes into the body at the positive conductor, issuing out at every pore into the water. Of course there are many ways of availing one's self of the galvanic bath; the whole body may be inserted, or merely the hand. There is no shock experienced except upon first placing the conductor upon the patient, then a slight tremor pervades the system, after which nothing is experienced.—A genial glow soon appears, and an exhilaration of spirits, the secretions freed, and tone sooner or later, according to the case, is the result. The galvanic bath may be resorted to at any time when a person may not feel in his usual health, during an epidemic for instance, when the electrical state of the atmosphere is not in its usual state." *H. Lobb.*

There are other methods of using the galvanic bath, but the above

is the most convenient and easiest of application, as well as the cheapest.

The *Spirit Vapor Bath*, or *Hot Air Bath*, is another method of acting upon the skin, and through this upon internal organs. It exerts a most powerful, yet beneficial influence upon the whole system, aiding very materially our endeavors to throw off disease. This bath is valuable in nearly all chronic diseases, in which it may be used once or twice a week, or once a fortnight, according to indications or the strength of the patient. Where it can be done, it is always preferable to bathe the patient with an alkaline wash before taking the vapor bath; and three or five hours after the perspiration caused by it has subsided, with a mixture of three gills of water, one gill of alcohol, and half a table-spoonful of salt.

The advantages to be derived from this method of producing perspiration are very great, and it is not followed with any of those injurious consequences which often attend the internal administration of a sudorific. It is to be given as follows: The patient is undressed, ready for getting into bed, having removed the shirt and underclothing worn through the day, and put on a night-shirt or other clothing to be worn only while sweating, and during the night, if the bath is taken at bed-time. He is then seated on a high Windsor, or wooden-bottomed chair, or instead thereof, a bench or board may be placed on a common open-bottomed chair, care being taken that the bottom is so covered that the flame will not burn him; after seating himself, a large blanket or coverlid is thrown around him from behind, covering the back part of his head and body, as well as the chair, and another must be passed around him in front, which last is to be pinned at the neck, loosely, so that he can raise it and cover his face, or remove it down from his face from time to time, as occasion requires, during the operation of the bath. The blankets must reach down to the floor, and cover each other at the sides, so as to retain the vapor and prevent it from passing off.

This having been done, a saucer, or tin vessel, into which is put one or two table-spoonfuls of whisky, brandy, spirits, alcohol, or any liquor that will burn, is then placed upon the floor, directly under the center of the bottom of the chair, raising a part of the blanket from behind to place it there; then light a piece of paper, apply the flame to the liquor, and as soon as it kindles let down the part of the blanket which has been raised, and allow the liquor to burn till it is consumed, watching it from time to time to see that the blankets are not burned; as soon as consumed, put more liquor into the saucer, about as much as before, and again set it on fire—being careful to put no liquor into the saucer while the flame exists, as there

would be danger of setting fire to the blanket, and producing injury to the patient. Continue this until the patient sweats or perspires freely, which, in a majority of cases, will be in five or ten minutes.

If during the operation the patient feels faint or thirsty, cold water must be sprinkled or dashed in his face, or he may drink one or two swallows of it—and in some cases the head may be bathed with cold water.

As soon as free perspiration is produced, wrap the blankets around him, place him in bed, and cover him up warm, giving him about a pint of either good store tea, ginger, or some herb tea to drink, as warm as he can take it. After two or three hours, remove the covering, piece by piece, at intervals of twenty or twenty-five minutes between each, that he may gradually cease perspiring.

There is no danger of taking cold after this spirit vapor bath, if the patient uses ordinary precaution; and if his disease will allow, he can attend to his business on the next day the same as usual. In fact, the whole is a very easy, safe, agreeable, and beneficial operation, much more so than a mere reading of the above explanation would lead one to suppose.

Patients will sometimes be met with in whom it will be almost impossible to produce even a slight moisture of the surface, much less visible perspiration. The skin of such persons is generally dry and harsh, frequently scaly, imparting an unpleasant sensation to the touch. In most instances, the skin may be restored to its original normal condition by adopting the following course: 1st. Anoint the whole surface of the body and limbs with olive oil every night upon retiring to bed. 2d. Every morning wash the whole surface of the body and limbs with a warm, weak alkaline solution, employing considerable friction while drying. 3d. Every two weeks administer a spirit vapor bath. A perseverance in this course, for a few months, will accomplish the desired result.

LIGHT.

Whatever others may consider light and heat to be, I am firmly of the opinion that they are the results of action of the electrical rays or emanations of one body upon those of another. Thus, the galvanic or electrical rays of the sun acting upon the electrical atmosphere, as well as upon the magnetic substance of our earth, give rise to both light and heat. When one surface of a planet is not directly exposed to the solar electrical rays, or to the rays emanating from some other body or bodies, darkness and cold exists, and continues until those rays act upon it. And the denser the body or its atmosphere, the greater will be the degree of light or

heat produced, in proportion to the galvanic power of the rays influencing it.

Light, heat, and electricity under its various modifications termed magnetism, galvanism, etc., exert an exciting influence upon our several organs, and sustain their functions through the agency of the nervous system. In consequence of the atmospheric air or oxygen absorbed in respiration, both man and the superior animals develop a great amount of caloric; under the same influence certain kinds of fish transmit true electrical currents, and several insects produce light.

Generally, the effects of light are the more remarkable as the organized beings upon which it acts are of a more inferior order. The expansive and vivifying impression of this agent gives vitality to plants in the spring, through which they become adorned with handsome verdure, develop their leaves, and expand their flowers. This fecundity is lessened or destroyed if the plants be placed under cover, so as to deprive them of the action of light, as may be seen in forests where the larger trees cause the smaller ones to perish or become dwarfish by depriving them of light. The dwarfish trees become deformed and stunted in growth; their fruits are scanty, abortive, tasteless, and without beauty. This is not due to the absence of the atmospheric oxygen, but to a deficiency of light. For how constantly do we observe plants exposed to the air, but deprived of the benefit of the solar rays, lose their strength, their properties, and their growth?

Inferior animals are subjected to the same laws, and in severe weather a large number of animated beings perish for want of light, or rather for the want of the caloric produced by electrical action. It must be borne in mind that these two agents, light and heat, blend their action in certain cases, while in others the action of each is isolated and distinct. The action of caloric is purely exciting, while that of light contributes more particularly to the organization, or to the regular development of the organs. Experiments have demonstrated that, in this relation, light has an influence independent of heat. M. Edwards, sen., having placed some frogs' eggs in vessels filled with water, one of which was deprived of light by covering it with black paper, and then having exposed the vessels to an equal temperature, observed that the eggs in the transparent vessel successively developed themselves under the influence of the sun's rays, while those in the darkened vessel were rendered abortive.

Light may be considered as imparting a vital stimulus to the organized world, promoting the development of organs, and the

nutritive processes of plants; the green color of vegetables is due to its action. The light during morning appears to exert a much better influence upon organized beings than that of the latter part of the day. The younger the persons the more need have they of exposure to the light; those nations who sleep in tents and exercise in the open air from childhood, are usually of high stature, with great muscular strength, and much regularity and beauty of form.

An absence of light disposes to inactivity, somnolency, smallness in stature, anæmia, rickets, scrofula, debility, œdema, etc., and is only temporarily beneficial in cases where there is great vascular or nervous excitement, as, in active forms of insanity, excessive mental irritation, irritable or inflammatory conditions of the brain, eye, or nervous system generally, wakefulness, restlessness, etc.

The prolonged action of light will not only prevent deviations of the osseous system, but, by exciting perspiration and preserving permanent activity of the functions of the skin, will ward off attacks of scrofula and of phthisis, and prove exceedingly beneficial in the treatment of most chronic affections. Insolation, or an exposure to the rays of the sun is resorted to in some countries for the purpose of arousing the vital powers when depressed or languishing, as, in cases of extreme feebleness, paralysis, indolent ulcers, etc.

In certain diseases of the eyes, too strong a light, or even any light at all falling upon these organs, will greatly aggravate them, in which cases the eyes must be properly protected, not only from the full action of light, by colored spectacles, shades, etc., but also from sudden transitions from darkness to light, and *vice versa*.

HEAT OR CALORIC.

This material principle of life is formed in living bodies by the act of breathing, in which it is the result of the oxygenation of the blood as well as of the combinations to which this chemical action gives rise. Excessive cold, in which the animal heat is nearly all absorbed, is followed by congelation and gangrene. The development of the vital movements of plants and animals, especially among those of an inferior order, are retarded or suspended by the action of cold. A moderate degree of cold induces sleep. As an opposite result of the same principle, the natives of very warm climates have the periods of puberty, turn of life, old age, and death to occur at an earlier age than the natives of temperate regions.

Heat, at a certain temperature, is a stimulant of a vivifying char-

acter, and is absolutely necessary for the preservation and continuance of life. If increased beyond this temperature, it becomes a cause of excitement, exhaustion, and disease. The most robust will have their constitutions enfeebled by the profuse perspiration it gives rise to. At a still higher temperature, heat is destructive to vital action.

Patients laboring under chronic diseases should always be kept comfortably warm by the proper amount of clothing, and should guard against cold, especially of the feet, the back, and the armpits. The rooms they occupy should also be kept at a temperature not too high, but which should be regulated by the feeling of comfort and warmth they experience when not in motion. Too much warmth favors debility and retards a cure.

ELECTRICITY.

Electricity pervades all matter, existing either in a latent or unperceived state, or in a free and demonstrable condition. Its action upon matter produces various results, known as mechanical, luminous, calorific, chemical, magnetic, or physiological.

Electricity, Magnetism, and Galvanism are but modifications of the same force or agent. When at rest, or in a state of equilibrium, it is called *statical;* when in motion it is termed *dynamical.*

Static or frictional electricity is always small in *quantity*, but in a state of high *tension* or elasticity, and possesses a very feeble chemical action; the sparks drawn from a common electrical machine are very large, in consequence of the small *quantity* of the fluid and the high *intensity*.

Dynamic electricity, under the forms of galvanism and electro-magnetism, results from a decomposition of the natural electricity of the material employed and the liberation of active electricity; it is always large in *quantity* but of very low *intensity*, and is very powerful in effecting chemical decompositions; its sparks, even from very large batteries, are very small.

Although frictional electricity has sometimes been serviceable in the treatment of disease, it has not proved so generally applicable and efficacious as galvanism and electro-magnetism, which may be considered the true medical electricity. Indeed, I believe that for therapeutical purposes static electricity can be entirely dispensed with. Some forms of disease may be permanently cured by dynamic electricity, and without any internal medication. In a large number of cases, however, internal remedies will be required in addition. When the current is properly applied to diseased

organs, it tends to render them more susceptible to the action of the medicines administered, thereby expediting the cure.

Electricity is supposed to be composed of two contrary forces or fluids, which are called positive and negative electricity; and the points or materials from which these forces are given off are termed *poles*—there being a *negative* pole, and a *positive* pole. In the ordinary voltaic pile the zinc forms the positive pole, and is at the top of the pile, while the copper forms the negative, and is at the bottom. In the decomposition of water by the galvanic pile, its oxygen is always attracted to the positive pole, and its hydrogen to the negative.

In the constant batteries, however, where the metals are plunged into separate vessels, the current assumes a different direction, so that the zinc forms the negative pole, and the copper or platinum the positive.

Any substance whose component atoms are all alike, or as much so as possible, and closely arranged or packed together, will permit the electrical currents to pass rapidly through them, and are termed *conductors*. A greater or less degree of resistance to the passage of an electrical current is presented by all conducting bodies, in consequence of which the intensity of the current is diminished according to the degree of resistance. Metals are the best conductors, and their conductibility ranks as follows, the best being the first named: Silver, copper, gold, iron, platinum, lead, and mercury, which is the worst conductor of them all.

A substance whose atoms are irregular, or of different capacities, and loosely arranged or packed together, does not permit the electric force applied to it to be readily conveyed from one of its atoms to the other, and forms a *non-conductor*. Hence glass, caoutchouc, wood, dry air, etc., are termed non-conductors. Fluids are worse conductors than metals; elevation of temperature, however, increases the conductibility of the former, and lessens that of the latter.

The human body is a conductor of electricity, the greatest resistance to the passage of the current being offered by the dry epidermis. If the epidermis be moistened with salt water, this resistance will be much diminished; much more so if the fluid be warm; and entirely so if the epidermis be removed at that part to which the electrode or conducting wire is applied.

When one electrified body exerts an influence upon another conducting body, inducing an opposite state of electricity in the latter, although this last may be separated from the other by a non-conducting medium, this action or power of electricity is termed *induc-*

tion. Thus, if a non-magnetized bar of iron be held perpendicular to the earth, it will immediately acquire magnetic properties, and the magnetic needle, upon being applied to it, will show that the lower part of the bar is in an opposite state of electricity to that of the hemisphere in which the experiment is tried, while its upper end will be in the same electrical condition as the hemisphere. The bar of iron is now said to be magnetized by induction from the earth. When electricity is induced by the influence of other electricity, it is termed "electro-dynamic induction," or "electro-magnetism;" when induced by the influence of magnetism, it is called "magneto-electric induction," or magneto-electricity.

The terms *quantity* and *intensity*, as applied to voltaic or galvanic currents, have the following meaning: A current formed by a single pair, (or one plate of zinc and copper,) if passed through short and thick wire, connecting the two poles, will be great in quantity; but if the current be produced by a pile consisting of a number of pairs, whose elements present the same amount of surface, taken together, as the single pair, and the poles of this pile be connected by a long, fine wire, there will be the same quantity of electricity as in the former case; but, in passing through the fine wire, the electricity must necessarily be in a state of greater *density* or *tension* than that which passes through the thick wire, and these differences in the density of the voltaic currents are comprehended by the terms of quantity and intensity. (*Althaus.*)

The discovery of magnetism by induction, viz., that soft iron, when surrounded by a helix of copper wire covered with silk or other insulating substance, becomes powerfully magnetic while passing an electric current through the wire, led to the introduction of electro-magnetic instruments, many forms of which have been manufactured and presented to the profession for the treatment of disease. Some are electro-magnetic or volta-electric, and the others magneto-electric, and each give out what are termed, "interrupted induced currents," or "interrupted currents of induction."

The electro-magnetic instrument is that in which the current is induced by a single galvanic pair, by the action of acids or other decomposing fluid; and although it is somewhat more troublesome to the practitioner than the magneto-electric instruments, yet it furnishes a much larger quantity of electricity than these last, the current of which is possessed of physiological and therapeutical properties not exactly the same as that induced by a permanent magnet of steel, and which acts more especially on the motor nerves and muscles, and the sentient nerves.

The magneto-electric instrument is that which is put into opera-

tion merely by the turning of a handle, which rotates a soft-iron armature before the two poles of a fixed horse-shoe magnet, causing magnetization and demagnetization of the soft iron, from which sudden changes in its condition, electric currents are produced, the intensity of which depends upon the power of the permanent horse-shoe magnet, the diameter of the wire wound around the armature of soft iron, the number of convolutions of the wire, the distance of the armature from the poles of the magnet, and the velocity with which the wheel is turned. The objections to this instrument are, that it frequently gets out of order, that the permanent magnet in time loses its magnetism and requires to be remagnetized, and that an assistant is generally needed to turn the handle.

The medical man who employs electricity in the treatment of disease should possess both sorts of induction machines; the volta-electric for neuralgia, paralysis, etc.; and the magneto-electric for defect of vision, and for the absorption of rheumatic callosities. Every electro-magnetic apparatus designed for medical use must furnish two induction currents, viz.: the primary and the secondary, as sometimes a current of low tension may be required, and at others one of high tension. The electro-magnetic instruments manufactured by Jas. Foster & Co., of this city, are arranged so that the operator may employ either the primary or secondary current, as he may prefer.

The first or primary wire of the helix (bobbin of induction) of an electro-magnetic instrument has its extremities connected with the poles of the battery; as the inducing current generally proceeds from a single pair, this wire must be somewhat short and thick, in order to present but slight resistance to the passage of the current so that it may produce a powerful electro-magnet. In addition to the inducing current of the battery, there is another and stronger current developed in the short, thick wire, which is owing to the spirals (coils) of the wire, when very close together, acting mutually upon each other,—so that the spirals serve both as inducing body and as induced body. This current is called the "*primary current*," "extra current," "direct current," or "current of the first order," and occurs both when the circuit is broken and at the moment of its re-establishment. The direction of this current is opposite to that of the battery current on *closing* the circuit, and is equal to it on *opening*. If a piece of soft iron be introduced into the helix, the energy of this current will be greatly augmented; it gives out sparks, shocks, and heat, and will decompose water. The primary current is, therefore, the result of induc-

tion by its own spirals and by the temporary magnet; its action is chiefly on the contractile power of the muscles, because of its comparatively low tension.

The current induced in the second wire, which is long and fine, is due to induction by the current of the battery and by the electro-magnet, and is termed the "*secondary current*," "induced current," or "current of the second order;" its direction is quite equal to that of the primary current, and like this current, it is the most powerful on *opening* or establishing the circuit. The secondary current acts chiefly upon the nerves of sensation and on the retina; it possesses a higher degree of tension than the current induced in the short and thick wire.

If, in a closed circuit, two points are connected by an additional conductor, a derivation of the current is brought about. The current, as it existed before the derivation was made, is termed the primitive current; the additional conductor, derivation wire, and the portion of the current that passes through this wire, is called the *derived current.* (*Althaus.*)

The intensity of the currents induced by voltaic electricity depends upon the intensity of the inducing current of the battery, the transverse section and the number of convolutions of the wires, the current being stronger according to the length and fineness of the wire, and upon the more or less insulated state of the soft iron placed within the helix.

Induction currents differ from the continuous galvanic current in this respect—the latter always moves in the same direction, while the former move alternately in different directions. Hence, in the electro-magnetic, and magneto-electric apparatuses there is no permanent positive or negative pole, and for physiological or therapeutical purposes it is therefore immaterial which of the conducting wires or electrodes is placed at any given point. But it may be well enough to recollect that both the primary and secondary currents are much more powerful on *opening* the circuit than on *closing* it, and have at the same time a direction equal to that of the inducing current of the battery; therefore, in employing induction currents, those only should be regarded which are induced on opening the circuit.

The negative pole of a galvanic pile, and of induction machines, has a stronger effect on the nerves of the skin than the positive pole; consequently, the negative pole may be readily distinguished by the stronger sensation it excites; but for this purpose the size and condition (moist or dry) of the conductors or electrodes must be equal, and the parts of the skin acted upon should be of equal

thickness, also containing, as nearly as possible an equal distribution of sentient nerves.

In honor of Professor Faraday, of England, whose untiring efforts and investigations have brought the subject of electricity to its present elevated position in science, the term "Faradaic electricity" has been adopted to express electro-magnetism, or magneto-electricity; also "Faradaic currents," to signify induction currents; and "Faradization," as designating the localization of induction currents to a single muscle.

The instruments for the purpose of making therapeutical employment of the continuous galvanic current are *Daniell's Batteries*, and *Pulvermacher's improved chains*. The Galvanic bath has already been referred to. When Daniell's Battery is used, a continuous current may be sent through the body, by filling two vessels with salt water and connecting them separately with the poles of the battery; then, if the patient immerse one hand or foot in one vessel, and the other in the second vessel, the current will pass through the limbs and body from one pole to the other.

If it be desired to localize the continuous current in certain parts of the body, insulated directors or excitors are employed, the extremity of one of which must be connected with the negative pole of the battery, and the extremity of the other with the positive pole; the free extremities of each must be covered with moistened sponge or flannel, to be applied to the desired points on the body.—To practice *Electro-puncture*, attach two fine platina needles at the free extremity of the directors or conductors, in place of the flannel or sponge, and introduce them into the tissue to be acted upon.—If the *galvanic cautery* is to be used, the instrument invented for this purpose by Professor Middeldorpff, of Breslau, or the one by Mr. Ellis, may be attached to the free extremity of the conductors, and then applied, secundum artem, to the part requiring cauterization.*

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* Professor Middeldorpff's galvanic cautery consists of a wooden handle composed of two lateral halves which can be separated from each other; this is traversed its whole length by two gilt copper wires, by which the current is conveyed. One of these wires is divided into two halves; if these two halves be separated from each other, there is no action of the current; but by uniting them, which is easily done by a screw, the circuit is established. At their posterior extremities the wires are connected with the poles of the battery; while at the anterior end a platinum wire is inserted, which is rendered incandescent as soon as the circuit is established. To this platinum wire different forms may be given, according to the shape of the tissues upon which we desire to act. This instrument, while cold, may, therefore, be introduced into a cavity. When it is in its

In those cases where it is desirable to produce a continuous current of galvanism, and without the intervention of conductors or electrodes, there is no instrument superior to *Pulvermacher's improved galvanic chains.* The principle upon which these are made is as follows: thin zinc wire is wound around a small rod of wood; one end of the wire entering the wood, the other end terminating in a loop or ring. At the opposite end to the zinc loop there is a loop of thinner copper wire, which winds round the rod in the interspaces of the zinc wire, and enters the wood at the opposite end. This forms one element, which, in order to form a chain, is attached to another element, and this to another, and so on, until as many elements are connected as may be required. But in order that a galvanic current may be produced, each link or element must be properly connected with its fellow, that is, the zinc ring of one must be in contact with the copper ring of the other, and its copper loop with the zinc loop of this, and which mode of attachment must be kept up among all the elements forming the chain. At one end of this chain the zinc wire is free, forming the positive pole; at the other end the copper wire is free, forming the negative pole.

When these chains are immersed in vinegar, the wood is impregnated with the fluid, and the action of the battery is excited, and a steady current of galvanic electricity is kept up. This chain gives out electricity of high tension, and in sufficient quan-

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right place, the circuit is made by uniting the two parts of one of the conducting wires; and if the cauterization is to be discontinued, the circuit is broken by separating the two parts of that wire; after which the instrument may be removed without injury to the parts.

Mr. Ellis's instrument is described in the London *Lancet*, vol. II, p. 502, 1835, and is designed to cauterize a considerable surface. A straight silver catheter, with the end cut off, forms the body; at its upper end the catheter is slit open and broached, so as to form a socket for the porcelain cauterizer. Within this catheter are placed two conducting wires which connect with the poles of a battery; the free extremities of these wires connect with a piece of platinum wire, which is coiled around the porcelain pencil in order to heat it to whiteness. This may be employed in induration of the os and cervix uteri, in ulceration of the os, prolapsus uteri, prolapsus of the anterior wall of the vagina, fissure of the anus, etc. A glass speculum is first introduced into the vagina; the os is then cleansed with a piece of wool, the cautery heated and quenched in the diseased tissue; the duration of the application and the depth of its introduction depending upon the effect required. Eschars are readily produced, and the cervix uteri is often seen to contract under the application of the cautery. Four pairs of Grove's battery are sufficient to render platina wires incandescent, but it is essential that the plates of the battery should possess a large surface, in order to liberate a large quantity of electricity. (*Althaus.*)

tity for almost any medical purpose. Six links will yield sufficient electricity to decompose water into its component gases. These chains are very useful in many nervous disorders; muscular debility; hemiplegia; paralysis of children, and atrophy from wasting of the anterior roots of the spinal nerves; general progressive muscular atrophy of children; central or cerebral paralysis; spinal paralysis; neuralgia; sciatica; stiff joints; œdema of the limbs; hysteria; hysterical paralysis; aphonia; epilepsy; torpid liver; asthma; amenorrhea; dysmenorrhea; spinal irritation; nervous debility; constipation; deafness not due to actual disease or structural change; rheumatism; dyspepsia; paralysis of the bladder; chorea; impotency; writer's cramp; hysterical cramps and contractions; loss of smell; loss of taste, etc. As the chains have a very remarkable action on the retina, they should be applied with caution to the face, and should not be used at all in amaurosis.

M. Pulvermacher has also invented an instrument which he calls the Electro-Physiological Modificator, which, when attached to the chains, enables the operator to interrupt and renew the current at will, or to produce rapid vibrations. He has also invented a most perfect apparatus, termed the Galvanic Chain Band, which can be adapted to any part of the body or limbs.

These chains and bands may be used apart from the body by means of conductors; but more generally they are worn next the body, keeping up a continuous current of galvanic electricity. They are used of various powers, from five to two hundred and forty elements.

Galvanism may be applied in several ways, as—1. With the hand; 2. with conductors; 3. with *metallic wires*.

1. When patients are extremely sensitive to galvanic action, the operator holding one conductor, has the other applied to the sensitive part, and, having previously well dried the skin of the patient, he passes the fingers, also dry, of the hand not occupied in holding the conductor over the surface of the patient's body, or of that part of it intended to be acted upon.

2. When we desire to *localize* the electricity in the skin, and the terminal extremities of the cutaneous nerves, it is effected by thoroughly drying the skin, and then placing one dry metallic conductor upon the affected part, or near it, and the other metallic conductor, also dry, upon a part somewhat distant from the affected region.

If, however, we desire to penetrate to the internal organs, muscles or nerves, the skin, as well as the metallic conductors, should be well moistened with salt water.

In stimulating a paralyzed muscle, a pointed metallic conductor, covered with moistened sponge, should be used, as we are thus enabled to search out any particular muscle, and stimulate it individually. Some of the deeper muscles are not easy to get at, and it requires some anatomical knowledge to discover the point where the motor nerve enters the muscle, upon which spot the conductor should be placed.

3. Metallic wires, or a wire brush, is sometimes required, as in paralysis of sensation of the surface; they are to be applied in the same manner as the metallic conductors.

The galvanic current enters the body at the positive or zinc pole, and is removed at the negative or copper, so that a current may be directed from the center to the circumference, and vice versa. In stimulating nerves of sensation the positive pole must be placed at the periphery, the negative at the center, and the current must be interrupted. In soothing nerves of sensation, the direction must be the same, but the current must be continuous. In stimulating nerves of motion, the positive pole must be placed at the center, the negative at the circumference, and the current must be interrupted; in soothing, the current must be in the same direction, but continuous.—In cases where a continued supply of the galvanic stimulus is required, the method of proceeding is,—after the muscles have ceased to respond to the stimulus, alter the situations of the poles of the battery; place the positive pole where the negative was before, and vice versa, the muscles will immediately respond to the fresh stimulus. This is founded upon the rule laid down by Matteucci,—"The electric current restores the excitability of a nerve which has been exhausted by a reverse current." (*H. Lobb.*)

The subject of galvanism in its therapeutic applications is one of great interest, and occupies an extensive field; it is impossible to do it anything like justice in the present work, further than to refer to it in the same manner as to other remedial agents, for instance, jalap, rhubarb, etc., which are more especially described in Materia Medicas, etc. Certain points have, however, been presented which it was thought should be understood by medical men, and which, it is hoped, may enable them to successfully employ this agent in the treatment of disease; for a thorough knowledge of the matter, the reader is referred to the several valuable works which have been published, among which may be named,—Althaus on Medical Electricity, 1 vol., p. 352; M. A. de la Rive on Electricity in Theory and Practice, translated by Charles Walker, 3 vols., p. 603; De l'électrization localisée et de

son application à la physiologie, la pathologie, et la thérapeutique, par M. Duchenne, p. 809; Harry Lobb on Galvanism, p. 152; On Animal Electricity, by E. Dubois Raymond, p. 214; Humphrey's Electro-Physiology of Man, p. 228; and A. C. Garratt's Medical Uses of Electricity, p. 716.

OCCUPATIONS. SOCIETY. PASSIONS. MENTAL INFLUENCES. GENERATIVE FUNCTIONS.

In a state of health, in whatever circumstances of life a man may be placed, his well-being requires the means for exercising his muscles and his mind; a purely sedentary life being a permanent cause of disease and death. Man was never designed by nature to languish in a state of repose, and an effeminate life subjects him to unhealthy humors and diseases; he must not only strengthen the mind, but more especially the muscles in order to render himself healthy, stout, and vigorous. If this be true for persons already in the enjoyment of health, it is much more so, as a general rule, for those suffering from chronic diseases.

However, it is a very frequent occurrence that a patient afflicted with a chronic affection, pursues an occupation quite incompatible with his disease, as well as with its successful treatment, and which he is compelled by the force of circumstances to continue; thus, a mechanic, or a professional man, whose family is dependent upon him for support, and whose pecuniary situation is but moderate, will be required to continue his labors, whatever they may be, until his disease prostrates or destroys him. Sewing females, and sedentary persons generally, are more especially found in this category. With such patients, although circumstances are against them, yet the physician must endeavor to prescribe such a course of hygienic measures as will prove as beneficial for them as the circumstances will allow, and which their conditions will permit them to practice. However, there will be instances frequently presented where a complete change of the business occupation of the patient will be imperatively demanded, in order to preserve life; and great tact and judgment is required on the part of the practitioner in selecting a vocation suitable to the disease and the peculiar circumstances surrounding the patient. A very erroneous idea prevails in society, I may say both among patients and physicians, or, at all events if it is not really entertained, the course pursued certainly favors the belief that it is, and which is, that no matter what may be the nature of a chronic disease, if it does not too greatly debilitate, or, if taken under treatment at an early period, the physician ought to be able to treat it successfully, with-

out regard to the patient's occupation. Such an idea is decidedly wrong, and is fraught with evil to the patient's health and purse, as well as to the physician's professional reputation; and medical men can not be too careful to disabuse the public sentiment regarding this point.

Persons of lymphatic constitution are, as a general rule, unfit for severe daily labor, and should, therefore, endeavor to follow a profession requiring only a moderate degree of exercise, as for instance, gardening, etc., and, on the other hand, they should carefully avoid all occupations of a sedentary nature. Persons predisposed to consumption and to scrofulous diseases, should remove to country places where the climate is equable, and the air is pure; if possible, they should pursue the chase, hunting, horseback riding, agricultural labors; if they are wealthy, the greater part of their early life should be passed in traveling from one healthy position to another; otherwise they should occupy themselves with business which requires traveling, as agents, peddlers, collectors, etc. The vocation of a sailor will be found beneficially adapted to most persons of this kind. Gardening, dumb-bells, jumping the rope, moderately dancing, horseback exercise, and calisthenics, are more especially suitable for females.

The military service is improper for persons disposed to consumption, or born of consumptive parents, because the duties to which the soldiers are subjected, especially those belonging to the infantry, frequently give rise to this disease. The children of consumptive parents, those born in very moist countries or in the neighborhood of swamps, as well as laborers, etiolated by dwelling in cold and unhealthy workshops, should not, as a general rule, be admitted into the ranks of the infantry; the service in the navy is better adapted to them. Agriculturalists, men accustomed to labor in the open air, and mountaineers, form the best soldiers for land service.

All occupations in which the atmosphere is more or less filled with floating particles of dust and various foreign articles, should be avoided by persons disposed to diseases of the eyes, nose, throat, or lungs; too moist an atmosphere, or sudden changes from warm to cold or cold to warm, should especially be avoided by this class of patients, as well as by those subject to diseases of the ear. Persons whose business requires them to travel in railroad cars where there is a constant supply of dust and cinders, should protect their ears therefrom by inserting a small pledget of cotton in each ear; and those who are subject to diseases of the air-passages, should also guard them as much as possible from the action

of the dust, etc. Any profession requiring a constant stooping position is improper for a patient laboring under any chronic disease whatever.

The most suitable occupations for females, as far as regards health, are, sewing with machines, attendance in retail dry-goods or fancy stores, either as proprietresses or clerks, photographing, traveling as agents, railroad conductresses, gardening, calisthenic instructresses, telegraphing, clerking in a post office, and, indeed, any character of business requiring moderate exercise, with more or less exposure to the open air.

Indeed, occupations in which a fair amount of exercise is called for, with opportunities for enjoying the open air, and in which no severe mental labor is required are preferable for all chronic patients, avoiding, as much as possible, sedentary professions, confinement in close rooms, inhalation of an impure or dusty atmosphere, obnoxious vapors, exposure to steam, cold, damp, etc. In the treatment of chronic disease, it will be seldom required of the patient to neglect his business, indeed, it is preferable that he should pursue it, so long as fatigue and exposures are avoided; of course, this does not refer to those patients, the severity, character, or duration of whose diseases has so greatly debilitated them, as to compel them to confinement within doors, nor to those with whom exercise would increase the severity of the disease, or endanger life.

It is of importance that the physician attends to the character of the companions with whom his patient associates; he should be advised to avoid all society of a gloomy, or a too excitable character. Cheerfulness contributes greatly to assist in the restoration to health; hence, the society should be cheerful and pleasing, avoiding those persons who are given to recommending recipes and new cures, finding fault with physicians in attendance, or discouraging the patient by unfavorable predictions, etc. Unfortunately for the sick, there is a class of persons who seem to delight in depreciating the merits of medical men, and who are ever ready with some recipe, of the action of which upon the system, they are wholly ignorant, but which, according to their statements, must be sure to cure, "because Mr. so-and-so, or Mrs. Thingumy," as they have been informed, "had exactly the same disease, and was cured by it, after having tried all the doctors without any benefit." Or, again, "if you keep on with Dr. —— you will be sure never to get well, because there was Mr. ——, and Mrs. ——, and Miss ——, who were treated by him, and all of them died." As if medical men possessed omnipotent power to remove disease

and prolong life—and which statements are more commonly either untrue, misrepresented, or exaggerated. Such persons are the patient's bane, more to be dreaded by him than by the physician.

Between the mind and the body there is a direct and intimate sympathy, and so powerful is this, that any disturbance of the one produces a corresponding influence upon the other. How this sympathy of action between the two is effected, is still a matter for philosophy to discover. Yet it is well known that the passions have exerted such an influence upon the system, as to have caused the hair to become suddenly whitened, to have given rise to fever, epilepsy, paralysis, insanity, apoplexy, etc., according to the character of the passion, and the peculiar temperament and predispositions of the constitution. It is not a matter of astonishment to observe the amount of disease and premature death in this country, when we understand the excessive and continued action of the brains of its citizens, in search of pleasure, profit, or discovery. A certain amount of mental exercise is necessary for the health of the body as well as health of the brain; and either an augmented or decreased amount of this action exerts a proportional deleterious influence upon the whole man. The *natural passions* of the human mind, which, when controlled within proper bounds, are intended for salutary and useful purposes, become powerful causes of disease when permitted to be aroused by improper objects, or when allowed to proceed to an unreasonable or ungovernable extent; and these, in particular, should be studied, in order that they may be held subservient to the health and proper comfort of each individual.

The mind of a patient should be kept as calm and regular as possible; and everything calculated to maintain a constant state of despondency, doubts, or anxious thoughts, should be avoided. He should not yield to the influence of any powerful or irregular passion, as joy, grief, jealousy, anger, fear, etc., because an excess of any passion, or a continuation of passions which keep the mind, and through it the body, in a constant state of excitement or depression, always produce unfavorable impressions upon the system, retarding the cure, and not unfrequently aggravating the disease. A moderate degree of those passions which produce pleasant impressions, materially aids in the restoration to health, and patients should be advised to cultivate these passions to a reasonable extent, as a powerful auxiliary to the general therapeutic treatment. A constant state of mental anxiety, or of uncertainty, in relation to any matter, is not only deleterious to health, but has a powerful influence in preventing a recovery from

disease; the physician should endeavor to guard his patient from these influences as much as possible. Mental influence exerts a much greater power over the body for good or evil, than ordinary medicinal treatment; and in the treatment of all diseases the medical attendant should not rely upon his remedies alone, but should cultivate, direct, and, if possible, control the mind of his patient, so as to dispel doubts, anxieties, and despondency, by effecting a state of mental calmness, encouragement, and confidence. I am fully satisfied that there are many patients laboring under severe forms of disease, who can be cured solely through the agency of the mind—an agency but little understood by medical men, and especially by those who imagine that disease can only be removed by drugs, and that a "placebo" treatment is gross deception—the patients of such men are greatly to be pitied.

As for myself, I take the ground, that when a patient applies to a physician he applies with the view of being cured, and cares not what may be the means used, so that they are not of an injurious character—hence, I employ whatever means I believe capable of effecting a cure, without regard to the source from which they are derived—and if I can perform the cure solely through mental influence and placebo remedies, I will not adopt any other course—it is my privilege and right as a physician to do so—and it is a duty which my patient expects and requires of me. His grand object is to be cured—mine, to cure, without a slavish deference to books or authorities. The Almighty has given to every man brains, mind, reasoning powers, judgment, etc., for his own use and to determine his own actions in life; and he, who dare not employ his mind and act for himself, but who tamely yields to the dictates of others, is unfit to be a freeman—is indeed, already the most contemptible of all slaves. Slavery of the body is due to the unjust principle that "might makes right," and is a forced servitude; but, where the body and mind are both free to act, and the person voluntarily submits to the views and dictates of others, as, observed among the so-called "old-school doctors," who, as if nature, who in general distributes her gifts with an impartial hand, has favored them with all useful knowledge in matters of medicine, to the exclusion of all others, bow with servile reverence to authority, who dare not employ or investigate outside of their own pale, who persecute all who have the manliness to investigate for themselves, and who discourteously treat all whose opinions differ from their own—such a condition of voluntary slavery is truly most contemptible, and the craven slaves deserve to be both pitied and despised.

While referring to the passions, it may not be amiss to say a few words concerning the function of generation. Excess in sexual indulgences will of itself engender disease among the most healthy persons, producing imperfect nutrition, difficult digestion, emaciation, paleness, sadness, debilitating sweats, difficult breathing, palpitations, aneurisms, pains in the chest, back, shoulders, head, and loins, nervous diseases, epilepsy, paralysis, consumption, dullness and hollowness of the eyes, weakness of sight, vertigo, premature wrinkles, etc. If one wishes to be young in this respect when he becomes old, he must be old while he is young.

When cohabitation is followed by one or more of the following symptoms, as great exhaustion, palpitation of the heart, debility, headache, especially in the back part of the head, dimness of sight, inability to concentrate thought, physical or mental indolence, weakness of the back, transient loss of memory, bleeding from the nose, or nervous irritability, however slight, or of however short duration they may be, it is an indication that the sexual act is carried to too great an excess, even though several hours should elapse before the symptoms manifest themselves; in such cases, the health and life of the person demand that he be more moderate in his pleasures, or abstain from them for a time or altogether. The latter, more especially when, with some of these symptoms, a weakness of the genital organs is experienced.

The man who abuses himself is cacochymied at twenty-five, and old at thirty; the wise man, moderate in his desires and acts, still enjoys the favors of nature at sixty years. For the youth, as well as for the old man, love is a siren, which charms and injures those whom it subjugates; the first has need of all his forces for growth and mental strength; the latter, to preserve his life; the offering which they lay upon the altar of Venus, they have wrested from that of Hygiea, and the result is debility, moral perversion, disease, and death. Age modifies the conditions of all our organs, and as we advance in years we should likewise modify all our habits and desires. The physician should not flatter men of fifty, or women of forty years of age; for at these ages, with a few exceptions, the virile energies commence to diminish, and although in the man, semen continues to be formed in the testes, yet the failure of nervous and muscular power admonish him that nature desires to free him from any further efforts to reproduce his kind.

There is nothing that costs the system so much as the act of reproduction; in transmitting life we transmit even our own. The semen is, as it were, life itself, and is parted with only at the expense of the nervous system and of the vital principle; when

improperly discharged it gives a shock to the organism, which deteriorates the being, by lessening the powers of the mind, debilitating the whole system, and hastening death. If man conformed to the laws of nature, morals, and health, his sexual contacts would be very rare; they would occur solely for the purpose of reproduction, and never out of the sacred ties of wedlock; they would be avoided, with a view to the health of the mother and of the child, both during gestation and during the suckling period, as well as during the most simple indispositions. At the age of sixty, they would be avoided altogether. But, molded by social customs, and deceived by his prejudices and pleasures, man does not perceive the true plan of nature, and abuses that pleasure which should be the most infrequent. And when we consider that men through their perverted imaginations have made a necessity of this excess; when we see sickly beings or those of a delicate constitution giving themselves up to erotic spasms, even to delirium; when we observe aged men, men with white hairs or bald heads, so imprudent as to give themselves to pleasures which nature would have them shun, we may comprehend why there are so many miserable and deformed infants, so many incurable diseases among adults, so many sudden deaths in advanced age. He who is desirous of preserving his intellect and his health, will never be guilty of excess in the generative act, and will cease it altogether at the age of sixty. Those who seek to over excite their worn-out and decrepit organs, by so-called, aphrodisiacs, cantharides, flagellation, and by changing the persons with whom they debauch themselves, are always punished by decrepitude, insanity, and idiotism.

The seminal fluid is the balsam of life; it gives life and preserves it. While its ejection enfeebles, its preservation in the natural reservoirs sustains and increases strength and health. Newton and Pascal were chaste and continent their whole lives. Athletes condemn the sexual organs to inaction. A young man who abstains from the pleasures of love, will be able to apply his mind more intensely to his studies, and will have more agility and strength in his gymnastic exercises; continence will always assure him the victory.

Aside from the fact that a large proportion of chronic diseases among males and females, are due to sexual excesses and abuses, it is an undoubted truth that the incurability of many of these diseases is owing to a similar cause. Physicians prescribe medicines, order diet, exercise, etc., but rarely, if ever, notice the sexual functions, either from a sense of false delicacy, or because an attention

to these functions is not deemed essential in the treatment; and yet there is no portion of the treatment of greater importance to the patient than this, so constantly and universally neglected. A person afflicted with a chronic disease should be prohibited from sexual indulgences, he should be advised to shun all physical and mental excitements, books, tableaux, spectacles, and even companions, which can in any manner excite obscene desires or lead to lewd ideas. He should, in a word, be physically and mentally continent. Sexual feelings irritate the brain and spinal marrow, which irritation is extended over the whole organism, producing more positive evil upon it, than can be done by a neglect of many important hygienic measures. Let physicians, who have their patient's welfare at heart, bear this in mind; an attention to it will reflect to their professional credit, and will facilitate the patient's restoration to health.

CONSTIPATION. REGULARITY OF BOWELS. ATTENTION TO THE CONDITION OF THE STOMACH. REGULARITY OF THE FUNCTIONS OF THE KIDNEYS. URINE IN HEALTH AND IN DISEASE, AND ITS INDICATIONS.

In the treatment of chronic diseases it is of the utmost importance that the bowels be kept regular daily; a constipated condition augments unfavorable symptoms, prevents the proper action of remedies, and retards recovery. The alvine matters are composed not only of the non-nutritive portions of food, but also of a quantity of humors which, from want of harmony, disagree with the functions and with health.

Liquid and badly elaborated stools are the result of a morbid condition; if they are allowed to continue, they gradually lead to debility, emaciation, and hectic fever.

When the stools are too hard, or of difficult evacuation, the visceral circulation becomes obstructed, from whence results plethora, cerebral congestions, etc.

However, nothing is absolute in the organism taken in its totality; nothing is exactly alike among individuals. Some appear to be naturally disposed to costiveness, while others have their stools quite soft, and, in either case, without affecting the health; the former owe their constipation, in a measure, to the energy and the dryness of the intestinal tube; the latter to a state of relaxation and to the more ready secretion of intestinal mucus. Rare exceptions have been met with in which persons could remain for a long time without defecation, and without any appreciable injury to health; and old men are sometimes known to have enjoyed the best health only when they were slightly constipated. But, al-

though this may be true in a state of health, in the treatment of disease a different order of things must be observed.

As a general rule, well-formed dejections, somewhat soft or a little hard, not of too dark or too light a color, exhaling but little odor, and occurring at regular periods once in every twenty-four hours, indicate that the digestion is complete, that it is finished, that it is restorative, that the digestive tube is in a good condition, and that nutrition has been well made.

With but very few exceptions, in the treatment of chronic diseases, it is an imperative duty of the physician to make use of means to regulate the bowels of his patient, so that he will have one healthy natural evacuation, at regular intervals, in every twenty-four hours, and never to exceed two, as in the case of some plethoric or corpulent individuals. Without an attention to this matter, but little benefit can be expected from treatment.

Active purgation does not remedy a torpid condition of the bowels, and is very seldom required in the treatment of chronic diseases, except at the commencement of the treatment, to remove accumulated feculent matter, in cases where there has been an obstinate constipation for some time previously, and in some few cases where the derivative influence of catharsis is required. More injury has been effected by active purgation than by any other kind of medication, especially since the introduction of Le Roy's purgative, Hygiene pills, Brandreth pills, and a host of similar nostrums: diseases of the eyes, inflammations and irritations of the digestive tube, torpid liver, hemorrhoids, enfeeblement of the peristaltic nervous power, incurable constipation, and many other difficulties of the abdominal viscera, have been the results of the continued employment of these drastics. Purgatives reduce the temperature, remove morbid products, act as derivatives, and aid in the elimination of urea, and are, generally, more useful in the early stages of active diseases; in chronic diseases they are rarely indicated.

If possible, the bowels should be regulated by articles of food which agree with the stomach, and which do not neutralize or interfere with the action of the medicines prescribed, as, ripe fruits, stewed fruits, dates, prunes, figs, brown bread, Indian-meal, corn bread, etc. If these do not answer, daily injections should be employed whenever they will answer the purpose. The injections may consist merely of cold water, or cold infusion of bitter tonics, and where there is a great loss of nervous energy, some Tincture of Nux Vomica, or Solution of Strychnia may be added; these will be found, in every respect, superior to injections composed of laxative

medicines, a continued use of which will give rise to debility of the intestines and augment the difficulty which we are endeavoring to obviate. In order to suit the convenience of patients, who object to injections during the day, the best time to administer them, is immediately after rising in the morning.

Many patients have a great aversion to the use of injections; in such cases, as well as in those where the other means heretofore named fail to effect the desired result, it will be necessary to have recourse to laxatives, as will be found under the treatment for constipation, of which I employ the powdered Rhubarb more commonly.

In all cases of costiveness every proper means should be employed to establish a healthy regular action of the bowels, and when this is once established, the agents employed for this purpose should be omitted, not suddenly, but in a gradual manner. An attention to the preceding hygienic measures is of such great importance to the patient that I am thoroughly convinced, from experience, that at least one-half of the chronic diseases to which mankind are subject may be permanently cured by a rigid attention to them, especially to those which relate to the skin, the bowels, exercise in the open air, and diet, and this, too, without a particle of medicine being used.

While on this subject, I will make a few brief statements relative to the condition of the stomach, which may prove useful to practitioners engaged in the treatment of chronic diseases. I have found in my practice that the state of the stomach has much to do with the action of remedies taken into it; thus, when there has been an acid condition of the stomach, known by the white coat on the tongue, the agents which have been successfully prescribed in other cases of disease, similar to the one under consideration, have often failed to produce any beneficial results; but, as soon as the acid condition was removed, the remedial influence of the agents were immediately appreciated. This condition of the stomach is frequently a great obstacle to the action of medicines, and thereby to the patient's recovery, and physicians should constantly bear it in mind. I have frequently treated cases who had been under the previous attendance of medical men without deriving any benefit whatever, and have cured them by the administration of the same remedies that were prescribed for them by the former medical attendant, solely, by first removing the acid condition of the stomach, which had been neglected or overlooked, and which acidity interfered with the medicines, either by changing their character, neutralizing their effects, or by impairing the sensibility

or impressibility of the vital powers of the stomach. A debilitated condition of the stomach, known by paleness of the body of the tongue, or an irritated or inflamed condition, known by unnatural redness of the body of the tongue, will frequently produce similar results, the medicines administered not acting favorably until the abnormal condition has been modified or removed by appropriate treatment. May not this be one of the reasons why there is such a discrepancy in the views of medical men regarding the therapeutical influence of certain valuable medicines; some of whom consider them of great efficacy, while others deny that they possess any remedial virtue?

An attention to the action of the *kidneys* is likewise an all-important measure in the management of chronic diseases; as these organs remove from the blood all those effete matters which, if permitted to remain, would speedily destroy life. The quantity, quality, odor, and color of the urine are so many indices, diagnosing the character of many diseases, as well as prognosing their progress. A medical writer makes the following remarks relative to the urine:—

"In times past, the physical qualities of the urine, that is, its color, odor, deposits, more or less critical aspects, etc., were only considered in the diagnosis of disease, giving, indeed, but an imperfect idea of its nature or treatment. But, in modern times, chemical analysis and the microscope have shed the most important light upon disease and its treatment. The fathers of chemical science, Lavoisier, Fourcroy, Vauquelin, and others, decomposed the urine, demonstrated it to contain the elements of stone, gout, scrofula, dropsy, hepatitis, etc., explained a host of vital phenomena until then enigmatical, and gave some hope of being able to discover the source of diseases, and of verifying certainty in their treatment. Soon after, Becquerel, Lecanu, Nauche, Rayer, etc., indicated the existence of several diseases by an examination of the urine, as, diabetes, dropsy, diseases of the kidneys and of the bladder, and even the condition of pregnancy at its very commencement. Andral and Gavarret also, attending to the microscopic investigation of the blood, observed inflammation, chlorosis, syphilis, and scrofula, in the alteration of the globules of the blood, and in the proportion of its fibrin. Lauwenhocth, Kersochen, and other micrographers, detected in animal fluids myriads of moving bodies, (animalcules?) whose forms varied according to the medium they inhabited; circulating with the blood, chyle, milk, serum, saliva, swimming in ichorous fluids, or in purulent matters,

they escaped with the urine, astonishing these observers by their number, forms, and exceeding tenuity.

"At this day, the micro-chemical investigation of the urine, notwithstanding the aversion or distaste of such study, is pursued by all true and sincere physicians who desire to benefit suffering humanity. It has already revealed the existence of many serious diseases, even before our other modes of investigation had been able to indicate them, and has thrown light upon a host of chronic diseases, the cause, progress, and treatment of which was unknown or involved in much obscurity.

"The urine comes from the blood, and serves to purify it; being separated from it by the kidneys, which are the secretory organs of the urine, from which it is conveyed to the bladder for expulsion, by means of the two tubes called 'ureters.' All the morbid principles which alter the blood and injure health appear to enter into its composition; thus, it is found to contain bile, milk, blood, fat, pus, urea, gelatine, albumen, tuberculous matters, as well as microscopic vegetations and animalcules; it also contains the chlorides, phosphates, oxalates, and sulphates of lime, ammonia, etc.; likewise most of the medicines as well as the poisons received into the system; it also contains the elements emanating from diseased organs, in most, if not in all instances. It varies according to the health, gives the premonitory indications of disease, pointing out its increase or diminution, the danger or return to health; it removes from the system pernicious and hurtful humors, as well as the used-up or effete matters thrown off from our several organs.

"When passed shortly after drinking, or after a meal, the urine is not yet perfected, it does not contain the salts, the principles of disease, nor the organic elements which enter into its composition when passed at a later period; it is only the urine from the drinks taken. But the urine passed on rising in the morning, several hours after a meal, and which has been elaborated during sleep, is the urine from the blood, and contains all the properties of urine, all the elements or principles of disease; and is that which the physician should prefer for analysis. For the medical man, it is the compass which guides him in the unlimited chaos of disease and in its treatment; for the patient, it is the thermometer of his condition, the premonitory indication of the decrease or aggravation of his malady; and for the healthy man, it is the regulator of his diet and of his life.

"No fluid of the economy is more rapidly modified by diet, temperature, change of habits, or moral impressions than the

urine; thus, it becomes fetid by the use of asparagus; acquires the odor of violets under the influence of turpentine, resins, and some volatile oils; it becomes red by the use of sorrel, the root of the strawberry plant, red beet or madder; black or dark by the employment of cassia, or the preparations of iron; while fear, grief, anger, and all lively impressions suppress it, or cause it to flow more limpid and more abundantly.

"During health, the quantity of urine is nearly one-third or one-half of that of the food taken; women furnish more than men, and children more than adults; vegetable diet renders it more abundant than animal, and it is also secreted more abundantly during the night than through the day. As a general rule, the secretion of urine is in inverse ratio with the other secretions, as, the saliva, perspiration, and stools; its temperature is always equal to that of the body, and is nearly the same with all persons.

"Slightly odorous and slightly colored in the earlier years of life, the urine contains but little except some phosphates and benzoic acid in small quantity, among healthy new-born infants; phosphate of lime and phosphoric acid develop themselves in greater abundance as we advance in years; and it is the presence of these salts which dispose old men to calculi and diseases of the urinary passages.

"The morning urine, when in a normal condition, is transparent and of a lemon-yellow color, of a uniform tint, and more deeply colored among men than among women and children; it is higher colored among those of bilious temperament, shaded only by a light cloud, which is conveyed to the surface of the fluid, and which soon contracts, condenses, falls, and is deposited as a white sediment, leaving the urine perfectly clear. And if this urine is never too highly colored, nor too much loaded with salts, etc., if its amount is proportioned to that of the drinks, if the elements constituting it are in just proportion, it indicates vigor, and a good condition of the organs. Similar urine voided in the morning after the night's rest, without any effort, and in proper quantity, is an indication of good health; it shows that the habits of living are regular, that the excesses of the previous day have not surcharged the stomach, nor enfeebled the organism; it also shows that the function of digestion is accomplished without effort or difficulty, that the night's sleep has proven restorative, that the mass of blood is of a good character, and that the functions are well performed.

"But any change in the urine is a change in the economy; thus, the urine is always less abundant and higher colored previous to

acute and painful diseases; in the commencement of coryza and rheumatism, it is in small quantity; it is scanty after violent exercise, perspiration, and serious diarrhea; at the onset of most inflammatory diseases it is higher colored and in diminished amount; and if it continues scanty throughout the course of the inflammation, especially when this is located in the lungs, and albumen is also formed in it, the prognosis is unfavorable, and both patient and physician must be on their guard.

"When the urine is too abundant, it indicates a general debility, or relaxation and alteration of the kidneys; this abundant flow apprises hypochondriacs and hysterical persons of the approach of their crises, and when the abundance continues for a length of time, emaciation is present. This abundance is an unfavorable indication in chronic diseases; it is indicative of the obstinacy of the congestions, but it does not indicate diabetes mellitus, unless analysis discovers in it saccharine matter, lactic acid, lactate of ammonia, albumen, and the other principles common to it in this disease.

"Turbid urine may be the result of colds, of too violent exercise, of any excess at the table, or of some lively moral affection; it is also the forerunner of rheumatism, gouty affections, catarrhs, or the secret progress of a chronic disease. This turbidness is due to a defect in the proportion of the constituent elements of the urine, there being an excess of gelatinous animal matter, uric acid, and urate of ammonia.

"If the turbidness of the urine is persistent, if it contains flakes which float in the fluid and are not precipitated, if it is a little darker colored, if it imparts a yellow stain to white linen, if there becomes attached to the sides and bottom of the vessel containing it, a yellowish, reddish, or brownish substance, loaded with small crystals of phosphoric and uric acids, if it contains albumen, these are serious indications in acute diseases, announcing obstinate engorgements of the abdominal organs.

"Every one is aware of the variations of the barometer, and we know that the fluctuations of the column of mercury are closely associated with the variable conditions of the atmosphere; so, to the practised observer, variations of the urine as well as of the elements composing it, point out with certainty the changes in health, and the condition of organs. Is the urine mucilaginous, viscid, albuminous and frothy, the disease is of a consumptive nature, and the patient wastes away; and if this appearance of the urine is persistent, if whitish granulations united in groups in an obscure and cloudy mucus are visible under the microscope,

(or pus globules), pulmonary consumption is imminent. At a later period, if these granulations increase, becoming larger and forming granular globules, the urine being more alkaline, it is an indication of the advanced progress of the consumption. Finally, if these granulations dissolve and become transformed into a filamentous matter presenting opaline spots, the urine being more alkaline and containing more albumen and more of the ammoniaco-magnesian phosphate, the consumption is 'galloping.'

"Take urine apparently normal, indicating health, place a drop or two under the microscope—if grayish globules, more or less voluminous, are observed, in masses, suspended in a mucus *sui-generis*, it is indicative of cancer. If these globules are brownish, the mucus whitish, the transparency of the urine disturbed, the urine less acid, more alkaline, and more albuminous, it is cancer of the womb. The quantity, the color, and the nature of these elements are the sign, the measure, and the degree of the disease.

"A pale and slightly greenish urine, indicates discoloration, anemia, chlorosis, debility; if this urine becomes mucus, more dense, more acid, precipitating, upon the addition of nitric acid, an abundance of urates, if it contains albumen, it indicates a disease of the heart.

"An orange-yellow urine indicates a commencing inflammation; more deeply colored, saffron or brownish, the skin being yellow, jaundice is present; still more deeply colored, inclining toward a brown, staining linen of a very bright color, containing more uric acid and more albumen, the liver will be found engorged; serious disease is manifesting itself. Finally, if the urine is of saffron yellow color, dense, and of the consistence of thin starch or wet clay, containing, moreover, albumen and purulent matter, it signifies a serious disorganization of the liver, or an abscess of this organ.

"At the commencement of an attack of gout, little or none of the acid phosphate of lime is present in the urine; at the termination of the attack the phosphate reappears, and the urine returns to its normal condition several days after the cessation of the inflammation, always holding minute grains of crystallized uric acid in suspension.

"In diabetes, the urine contains little or no urea, a saccharine matter, albumen, etc.; the urea reappears, and the albumen and saccharine matter disappear only with the return of health.

"A child is attacked with cough and soreness or inflammation of the throat or air-passages; if its urine is white and turbid, milky, more scanty than in the normal state, disengaging carbonate of ammonia, it warns us of the presence of croup.

"When the urine is loaded with phosphate and carbonate of lime, it indicates softening and deformation of the bones—it is the work of dissolution of the bony system, rickets; the calcareous phosphate of the bone is absorbed and carried off, while the gelatinous or animal portion alone remains. This softening, ulceration, dissolving, or scrofulous condition of the bones, appears to be the result of a strumous principle combined with a peculiar acid, which is always met with in the urine of these unfortunate patients.

"If the urine is bloody, it may be due to disease of the bladder, of the neck of the bladder, of the ureters, or of the kidneys; or there may be calculi in these organs lacerating them; or, it may follow the rupture of some blood-vessels consequent upon a fall, blow, or strain.

"If the urine is purulent, the pus comes either from the altered and diseased bladder, prostate, neck of the bladder, or kidneys; or it emanates from other organs laboring under far advanced organic lesions.

"An albuminous, purulent, and bloody urine indicates a cancerous disorganization of the urinary passages. If it contains organic detritus, decomposed blood, and albumen, it points to an alteration of the kidneys, to Bright's disease. Is the urine purulent, albuminous, and sandy or gravelly, there is renal calculus, with abscess of the kidneys. Is it only purulent, the pus comes either from the bladder, the neck of the bladder, prostate, or the kidneys; or it emanates from other organs suffering from advanced organic lesions. It is in this kind of urine, and from the nature of the elements it contains, that the physician, armed with the microscope and chemical analysis, will be enabled to recognize the hidden cause of disease and of the alteration of organs, and, by this kind of investigation, to discover the remedy and often effect astonishing cures.

"When the urine is less abundant, albuminous, with diminished urea, dropsy is making its appearance; but if, at a later period, it becomes red and turbid, depositing an abundant flocculent sediment, sometimes reddish, at others whitish, giving a strongly ammoniacal odor, readily frothing upon agitation and remaining so for some time, also giving by analysis, ammonia, sulphates and phosphates of lime, albumen, a coloring oily matter, morbid elements, little or no urea, it indicates a rapidly fatal dropsy.

"In all diseases, if the urine continues dense without any deposit, having the color and consistence of oil, containing albumen, and having a fatty pellicle floating upon it, it indicates marasmus,

decomposition; and if to these qualities is added a deep red, brown, or blackish color, the prognosis is fatal.

"But, if a cloud forms in the urine, condenses, and falls down, if the morbid elements diminish, the prognosis is more favorable, and the disease will be of shorter duration. Fortunate is that patient whose urine gives a cloud which condenses, falls, and forms a deposit; but we must suspect urine which, at the commencement of disease gives signs of coction; still more must we distrust urine in which the cloud formed, instead of being deposited, is elevated and kept at the surface.

"Urinary deposits are according to the disease; being sandy and gravelly in gravel, stone, and congestion of the abdominal organs; often tinged with blood in diseases of the kidneys, ureters, and bladder; purulent in ulcerations of the urinary passages; red, and like brickdust in rheumatism and anasarca; reddish and in abundance in coryza and pulmonary catarrh; whitish, and attaching themselves to the sides of the vessels holding the urine, in all diseases where there is debility and relaxation of the mucous membranes, as in chronic catarrh, piles, and where there is a tendency to dropsy. In abdominal congestions, hypochondria, chlorosis, and intermittent fevers, these deposits frequently have the appearance of bran or meal; in softening of the bones they are loaded with phosphate of lime; in diseases of the liver they are of a saffron-yellow color; and in croup they are white and milky, becoming blackish in the most dangerous cases.

"These are a few of the facts connected with the examination of the urine in disease. To give, even summarily, the innumerable shades of this fluid in diseases would not only require a large volume, but the aid of the painter would be necessary; and to describe the numerous elements which compose it, in health and disease, would require a treatise on organic chemistry. We would have to refer to ancient and modern examinations of the urine; to reproduce the analysis of Chaptal, Fourcroy, Le Canu, Becquerel, Vogel, Neubauer, Funke, Verdeil, Beale, Bird, Hassall, Thudicum, and others, with the urine of rickets, gout, dropsies, syphilis, fevers, stone, etc., as well as the observations of micrographers upon the blood, pus, semen, and animalcules contained in the urine; we would have to show the alteration of the blood when it has reached the kidneys, as well as the other viscera, giving its normal and abnormal elements which escape through the urine; to show that the presence of albumen, in nearly all chronic diseases, from simple gastralgia even to diseases of the brain and spinal marrow, indicates the tendency to dropsy, and even to that grave and hopeless mal-

ady, albuminaria; and to form a treatise upon organic chemistry and microscopic observations."

Although I am not prepared to indorse all the statements of the above writer, yet he has referred to a sufficient number of facts to point out to us the imperative necessity of attending to the urine, both in health and in disease, and of maintaining the kidneys and urinary apparatus in as normal a condition as possible, for any departure from this exerts a proportionate deleterious influence upon the organism.

In order that the practitioner may understand some of the conditions of the urine in health and in disease, I will give a brief statement compiled from the best authorities; remarking that the nearer to a normal state the urine is maintained, the nearer is the approach to health,—and if a patient finds his urine gradually becoming more natural, as regards quantity, quality, color, odor, and deposits, he may rest assured that disease is gradually being removed to make way for a state of health and strength. I will also observe, that in prescribing constitutional remedies to patients, I always watch their influence upon the urine, and if I find a particular one affects this fluid so as to cause a more healthy condition of it, I persevere in the use of such particular article or articles as long as this influence continues, having found from a long experience that those particular alterative or constitutional remedies are the best and most suitable to the individual cases in which they are given, that gradually correct the color, quantity, and quality of the urine; indeed, as a general rule, they are the remedies with which to perform a cure in such individual cases, if a cure is at all to be had.*

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*There is a class of men who style themselves "uroscopians," or "urine doctors," and who pretend to diagnose diseases and prescribe to patients from a bare inspection of their urine; and although it has been frequently demonstrated that not one of them can distinguish the urine of a horse or of any other animal, from that of a man, yet it is strange what unlimited faith the common people have in their skill; it is very rarely indeed that these men effect cures. To show that their diagnosing by the urine is simply an imposition, or a system of guesswork, I give what was sold to a young man for an extravagant price as "*Dr. Dellembaugh's mode of discriminating diseases by the urine,*" as follows:

"*Dropsy.* Urine with sediment and beads around the sides of the glass. Test: sulphuric acid will cause the sediment to fall to the bottom of the glass, and remain high-colored.

"*Pains.* When the urine has specks, or an appearance of sand in it, and will not settle.

"*Fever and Ague.* The urine is high-colored at the top, and clear at the bottom, with large beads around the glass.

"*Pregnancy.* Urine has a sediment at the bottom, resembling a bee-hive flattening.

"*Derangement of Mind.* Urine high-colored with large beads on the top,—when

The urine of a healthy individual is, when just passed, clear, of a straw or light amber-yellow color, has the temperature of the body, varying from 92° to 100° F., a peculiar, aromatic, violet-like odor, termed "urinous," a bitterish, saline, somewhat disagreeable taste, and a specific gravity ranging from 1.003 to 1.030, but averaging from 1.015 to 1.0120. That which is passed after drinking much fluid is called *urina potus;* it is commonly pale, and of a specific gravity ranging from 1.003 to 1.009. That which is passed after the digestion of a full meal, is called *urina chyli*, and has a specific gravity of from 1.025 to 1.030. That which is passed after a night's rest, *urina sanguinis*, furnishes the best specimen of the average density of the whole urine, as well as of its normal or abnormal condition; its density is from 1.015 to 1.025. Infants' urine is inodorous, colorless, of low specific gravity, and has but little reaction on litmus paper.

In the examination of urine, the different specimens passed at various periods of the day, should be tested both separately and combined; their color, opacity, transparency, odor, reaction, etc., should be carefully noted. And not only should the urine be

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they are around on the sides of the glass, fever is indicated; but when on the top and not around the glass, it indicates more serious derangement of the mind. —— Urine milky-white, and producing no stain, indicates lowness of mind, weakness of constitution, nervousness, etc., with other diseases, owing to the age and sex.

"*Worms.* Urine rough and pale, white with slimy sediment.

"*Constipation.* Urine oily on the top.

"*Typhus Fever.* Urine of a dead red color, and the sediment sinks, with no beads or any smell.

"*Common Fever.* Urine shows beads with high bright red color; if there is much sediment it is a favorable sign.

"*Inflammation.* Urine dark or nearly black.

"*Jaundice.* Urine has a yellowish tinge, much resembling the tincture of saffron; if thick, and a darkish yellow is at the sides of the glass, it is a good sign.

"*Asthma.* Urine light-colored with little sediment and a few beads, but appears to be dusty.

"*Insanity.* Urine milky-white; when sulphuric acid is added it should foam up and turn brown.

"*Diabetes.* Urine of a clear spring color, and sweetish taste.

"*Flooding.* Urine has streaks of blood through it.

"*Rickets.* Urine of a bluish pale color.

"*Tape-worm.* Urine is of the color of that which indicates worms. It can be told better by the appetite. If the patient takes sweet oil for two evenings in succession, he will become very sick and restless.

"*Gravel.* Urine scanty, with lumps of sand in the bottom of the glass.

"*Cow's Urine.* Urine color of water, and smells much of the animal.

"*Beasts' Urine.* Precipitates a sediment when sulphuric acid is added to it.

"N. B. Urine from different persons will not unite."

examined immediately after it has been voided, but also after it has been allowed to stand for twelve and twenty-four hours.

According to calculations made by careful observers the minimum quantity of urine passed by a person in health in twenty-four hours is about thirty-two fluidounces; the maximum amount is eighty-one fluidounces; and the medium quantity is about fifty-two fluidounces. It must be recollected, however, that the quantity of urine passed in twenty-four hours depends upon several circumstances; thus, an abstinence from drink diminishes the urinary secretion, while the injection of large quantities of fluids may increase it even to several pints. Again, when other organs which eliminate water, as the skin, lungs, and bowels are actively engaged in this secretion, the amount of fluid from the kidneys will depend in a measure upon the relative excretory activity of these organs. The quantity of urine is also determined by exercise, rest, sleep, mental influences, atmospheric influences, etc., all of which must be taken into consideration when any great departure from the usual quantity is observed; exercise and the waking condition, as well as certain articles of diet, augment the excretory action of the kidneys, while rest, inactivity, and sleep diminish it, as well as congestion and inflammation of the kidneys, structural diseases of these organs, and acute diseases generally. No conclusion should be formed from the quantity of urine passed in one day; but it should be *measured* for several days in succession.

The maximum, minimum, and mean amounts of the fluids, solids, and various ingredients of normal urine passed during twenty-four hours, as herein given, have been determined by trials on many persons in health by various physiologists,—the persons living well and taking regular exercise. The average of eight or ten days usually gives the proper amount, of the various ingredients, to the individual. If the living, physiological conditions, atmosphere, etc., are kept even, the results will always be about the same with the same individual; any great departure from them, either way, showing a pathological condition.

A person, in the absence of any powerful physiological condition of the skin or body, as when too much or too little fluid is taken, etc., passes about the same amount of urine every day; if he passes an amount which is greatly above or below the limits of the range, proper to him, some pathological cause is generally present. (*Parkes.*)

According to Vogel and others the following statements deduced from general experience may ordinarily be regarded as facts:

1. The quantity of urine is diminished in all acute febrile and

inflammatory diseases. A constant diminution of the quantity of urine, in most diseases, is accompanied by, and therefore pathognomonic of, a constant increase of the intensity of the disease. When the quantity of urine remains very low (25¾ fluidounces per day), for any length of time, then we may conclude that the intensity of the disease has not abated. On the other hand, a constant increase in the quantity of the urine is a favorable symptom, and shows that the patient has passed the acme, and that the diseased action is abating.

2. When a disease, acute or chronic, takes a fatal turn, the quantity of urine becomes frequently very low, or remains in a fluctuating state; this is not usual, however, in cases where the cause of the fatal termination is a sudden interference with the nervous powers, or with the mechanical action of the lungs and heart.

3. In dropsical diseases, with or without diseased kidneys, the quantity of urine is materially diminished; an increased flow is an indication of improvement, that is when the kidneys are not diseased, as well as an indication for the administration of diuretics.

4. In those diseases termed diabetes, the quantity of the urine is materially increased.

5. During the period of convalescence from febrile or inflammatory diseases, the quantity of urine becomes normal, or exceeds in some cases the normal quantity.

Urine remaining clear and transparent for a short time after being passed, other things being equal, is, in general, an indication of health; yet, clearness alone is not a positive sign, as many abnormal substances and many pathological alterations in the quantities of the urinary normal ingredients may be found in clear urine. If urine is voided in a turbid state, or becomes turbid soon after its emission, with a deposit formed upon the sides and bottom of the vessel containing it, it is an indication of disease, and should be attended to.

The color of urine varies with its quantity and density; that which is passed soon after drinking freely of water or watery fluids is of a very pale straw color, varying from nearly colorless, through a faint greenish tint, up to straw-yellow. It is usually neutral in its reaction, sometimes alkaline, and seldom acid. Persons in an anemic state, whose urine is deficient in urea and solids generally, as well as diabetic patients, are apt to excrete a pale urine. The ordinary urine of health is of an amber color; in hot weather and after active exercise the urine is generally of a dark amber, or reddish tint. Many useful indications relative to the state of the

system may be had by an attention to the color of the urine, the principal of which are as follows:

1. As long as a patient secretes *pale urine*, he is not affected by any severe illness of a febrile and acute nature; he may be anemic or be laboring under diabetes, or some structural disease of the kidneys.

2. Highly-colored urine varies from a *reddish-yellow* to a *red color*, it is of decidedly acid reaction, of high specific gravity, and indicates the presence of a large amount of solids, particularly urea. It may be produced by the persons voiding it drinking only a small amount of fluid; by an excess of nutritive nitrogenous matter in the blood, as, among those who are fond of wines and high living; by violent exercise and free perspiration, which lessens the quantity of water in the blood; and by acute febrile diseases in which there is a rapid disintegration of tissue and waste of matter. Two or more of the above circumstances combined, will also give rise to high color of the urine, as, fever and perspiration, or large meals and violent exercise. The indication, however, from this kind of urine is not to be derived from the amount of fluid passed in a given time, but to the actual quantity of solids this urine contains. Highly-colored urine contains a large amount of uræmatine or coloring matter of urine.

3. Urine colored from *red* to *brown*, or *deep brown*, is generally due to the presence of coloring principles of certain articles, which have been absorbed into the blood, and afterwards eliminated by urine; as, the coloring principle of a strong infusion of roasted coffee, chimaphila, logwood, rhubarb, senna, etc. If a small quantity of mineral acid be added to urine colored by any of these substances, it will change the color to a bright yellow; but if the presence of uræmatine has given rise to the red or brown color of the urine, it will, if changed at all by the acids, become darker. Again, if aqua ammonia be added to urine colored *dark-orange* by rhubarb, it changes the color to a crimson, thus showing it not to be bilious urine, which is of a brown, yellowish, or reddish-brown color, and indicates an impediment to or suspension of the flow of bile from the liver into the intestinal canal.

4. A *red*, *rosy*, or *pink* color of the urine, or of its deposits, the urine being of an acid reaction, is due to a pathological product termed "purpurine" or "urerythrine," and is indicative of the presence of a very serious pathological condition. It is present in organic disease of the liver, hepatic (not peritoneal), ascites, in splenic diseases, etc., and is indicative of a quickened metamorphosis of hæmatin.

5. The color of urine, varying from *red* to *purple* may be due to the presence of "urrhodine" or "indigo red," which is a product of decomposition of uroxanthine, and which with blue pigments makes the urine violet. Unless in large quantity, it is not to be considered as a pathological phenomenon, as the health does not appear to be disturbed by its presence.

6. *Lemon-yellow* colored urine is due to the presence of an excess of "uroxanthine" or "indican," with deficiency of uræmatine, and is indicative of diseases of the serous membranes, the kidneys, and the spinal marrow, and cholera. Excess of uroxanthine is apt to be present in diseases of the nervous tissue, phthisis, diabetes, gout, dysentery, reactive stage of cholera, lead colic, Bright's disease, and in chronic atonic diseases, indicating deficient oxidation, and lessened metamorphosis of hematin, or a slightly perverted metamorphosis.

7. A *deep blue* color of the urine may be due to "cyanurine," or "uroglaucine," (indigo), which is sometimes the product of the decomposition of uroxanthine in the ammoniacal decomposition of the urine in the bladder, and has been observed in cystitis and Bright's disease. Cyanurine is a mixture of uroglaucine and urrhodine.

8. *Yellowish-green*, or *brownish-green* urine is owing to the presence of coloring principles of bile, the urine giving a very acid reaction; it indicates some obstruction to the passage of bile from the liver and gall bladder into the intestines; the presence of the constituents of bile in the blood; or excessive activity of the liver.

9. A *greenish*, *apple-green*, or *grass-green* colored urine is due to a mixture of uroxanthine with uroglaucine or any of the blue coloring principles, the urine being alkaline, decomposed, and containing much carbonate of ammonia; it has occurred in cystitis and Bright's disease.

10. *Violet* colored urine is due to a mixture of the normal red coloring matter of urine, uræmatine, with the abnormal blue pigment, uroglaucine.

11. Dark urine of a *reddish-brown*, *brown*, or *porter-like color*, sometimes like ink, is due to "hæmatin" or dissolved blood corpuscles, which is the result of severe pathological action in the body, and indicates a rapid disintegration of the red-blood corpuscles, as in typhus, inhalation of arseniuretted hydrogen, but which, however, admits of a favorable prognosis, unless it be a symptom of severe scorbutic or septic disorders, or when followed by discoloration of the skin and suppression of urine, in which case the prognosis is very unfavorable.

12. *Black*, or *blackish-gray urine*, may like the preceding be due to "hæmatin," or to a black pigment, "melanin." But it must be recollected that the urine also becomes black from the internal use of some medicines, as tar, creosote, and carbolic acid.—Hæmatin or blood pigment in the urine gives a more or less brown or black color to it; and indicates a general or local affection of the blood, due to septic or profound cachectic diseases; as typhus, malignant small-pox, pernicious remittents, scurvy, and sometimes Bright's disease, febrile jaundice, etc.

The odor of healthy urine is peculiar, and is incapable of being destroyed by any of the chemical processes used in analysis of this fluid; this normal odor is retained for a long time if the urine be acid, but it soon becomes offensive, if the liquid be alkaline, from decomposition; sometimes it has an offensive odor when first passed, which is an indication of its alkalinity. In acute disease the urine has a strong odor; in anemic conditions its smell is very slight or entirely wanting; in diabetes it has an odor like that of whey, which changes to an alcoholic one when fermentation commences; and it emits a peculiar and fishy smell in some cases of indigestion. An alteration in its odor is occasioned by certain articles of food, as asparagus, beans, onions, garlic, etc.; and some medicines likewise affect its odor, as saffron, cubebs, copaiba, assafœtida; certain essential oils, etc.; oil of turpentine communicates a violet odor to it.

The taste of the urine is of no scientific value, farther than to ascertain its sweetness in diabetes, which may be determined, however, by other and less repugnant measures.

Healthy urine has an acid chemical reaction, coloring blue litmus paper red. When it has a neutral or alkaline reaction, it is indicative of abnormal action in the system; though an acid urine is not always a sign of health. When neutral, urine has no action on blue or reddened litmus paper; when alkaline it restores reddened litmus to its original blue.

The acidity of the urine is principally due to the presence of acid salts, as phosphates, sulphates, urates, hippurates, volatile odorous acids, as well as free organic acids; a little carbonic acid is also present. This acidity is essential to the urine, as it not only tends to keep the earthy phosphates in solution, but prevents the urine from decomposing too rapidly, and becoming alkaline. Ordinarily, urine upon standing for a time, in hot weather, loses its acidity gradually, becomes neutral, and in two or three days is more or less alkaline. When the urine is preternaturally acid, it

is indicative of acid stomach, derangements of the functions of digestion, gout, rheumatism, etc.

The quantity of the free acid in urine is determined by a very simple volumetric analysis;* it is diminished by the administration of caustic alkalis as well as their carbonates, while it is increased by the use of mineral acids, some organic acids, and some drugs. With some exceptions, the acidity of the urine diminishes in both chronic and acute diseases.

When an acid urine is converted into alkaline within twenty-four hours after it has been voided, it is due to some existing pathological condition. Though it must be recollected that the process of decomposition and consequent alkalinity of normal urine may be facilitated by high temperature, heat, the presence of pus

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*The amount of the acidity of the urine is determined by careful neutralizing with soda, and may be expressed by saying, (not that it is equal to so much alkali, but) that it is equal to so much crystallized oxalic acid.

A solution of caustic soda is to be so graduated that every cubic centimeter, (equal to 15.434 Troy grains of distilled water), indicates exactly ten milligrammes (equal to .15434 Tr. grs.), of oxalic acid. For this purpose, one gramme (15.434 Tr. grs.) of dry oxalic acid is dissolved in enough distilled water to make exactly 100 cubic centimetres (1543.4023 Tr. grs.) of solution. Every 10 cub. cent. (154.34023 Tr. grs.) of this solution contains one-tenth gramme (1.5434 Tr. grs.) of oxalic acid.

Ten cub. cent. of this solution of oxalic acid is placed into a small beaker glass, and a few drops of tincture of litmus carefully added to it, until it is colored red. The dilute solution of caustic soda is now to be cautiously added until the red color has been changed into the original litmus blue. Suppose to effect this it requires 6 cub. cent. (92.604 Tr. grs. dist. water) of the solution of caustic soda, then they would correspond to one decigramme (1.5434 Tr. grs.) of oxalic acid.

We now add to every 600 cub. cent. (9260.4138 Tr. grs.) of the solution of caustic soda 400 cub. cent. (6173.6092 Tr. grs.) of distilled water, and thus obtain 1000 cub. cent. (15434.023 Tr. grs.) of standard solution, of which one cub. cent. (15.434 Tr. grs.) exactly neutralizes ten milligrammes (.15434 Tr. grs.) of oxalic acid. If after the addition of ten cub. cent. of this solution to ten cub. cent. of the solution of oxalic acid reddened by litmus, the blue color appears, the solution is correct and ready for use.

To apply this to urine, take 50 or 100 cub. cent. (771.701 or 1543.4023 Tr. grs.) of fresh urine, and add to it in small quantities at a time, not to exceed ½ cub. cent. (7.717 Tr. grs.) of the prepared standard solution of soda, and after every new addition, place a drop of the mixture upon neutral blue litmus paper; as soon as the spot covered by the drop does not become red any longer, the analysis is finished; being careful that the neutrality is exact, and that there is not an excess of the soda solution. We then determine by calculation, from the amount of caustic soda, standard solution, used, the amount of oxalic acid which would be equivalent to the amount of unknown acid actually contained in the urine. The average amount of free acid discharged in a state of health is equivalent to from 2 to 4 grammes (30.868 to 61.736 Tr. grs.) of oxalic acid.

and mucus, and minute portions of urine already in a state of alkaline decomposition.

Abnormal urine may be voided in an alkaline or neutral state, or it may become so shortly after its emission. A neutral or alkaline condition of the urine is due to the presence of fixed or volatile alkalis, more generally carbonate of ammonia, which is formed from the decomposition of urea. Ammoniacal urine is always pale, fetid, and turbid from the presence of phosphate of lime and triple phosphates; urine which is alkaline from the presence of bicarbonates is usually clear. If there is just enough alkali present to neutralize the free acid of the urine, then this fluid, being neutral, will not exert any influence upon either blue or reddened litmus paper; but when there is an excess of alkali, the urine colors blue litmus paper red.

Animal food has a tendency to diminish the acidity of the urine, and even cause it to become alkaline; the use of apples, lemon-juice, and many acid fruits produces similar results. But the alkalinity, which occurs after using these articles, is not persistent, and is of no practical importance. But an alkalinity due to the presence of volatile alkalis, or to the administration of alkalis and earths or their carbonates, for an unreasonable length of time, is always indicative of disease, as, stone in the bladder, inflammation of the mucous coat of the bladder, weakness of the bladder, urethral stricture, enlargement of the prostate, paralysis, spinal disease, great weakness and prostration, etc. The urine is also alkaline in typhus fever, coma, and in the decrepit state of aged persons.

The diagnosis of disease or the determination of a remedy, from the acid or alkaline character of the urine, should never be based upon the reaction of a single specimen of it, but upon that of several, procured at different periods. Ammoniacal urine, when due to retention of this fluid, or to certain conditions of the bladder, is best removed, and the urine restored to its acid state, by washing out the bladder at several different times with warm water, by means of a syringe and double canula. Where this course is ineffective, and the urine continues pale and alkaline, tonics and preparations of iron are indicated.

The specific gravity of urine enables us to determine the amount of fluids and solids contained in it. The ordinary manner of ascertaining the specific gravity, and which, though not absolutely correct, is sufficiently so for practical purposes, is by means of a correctly graduated urinometer. Those instruments of this kind, whose scales are divided into equal parts are erroneous, being based upon the supposition that the strata of the urine is also of equal

density. But this is not the case; the density of this fluid increases with the depth from the surface, and the scale should be graduated according to the different densities of the respective columns of urine. When determining the specific gravity of urine, it should be brought to a temperature of 60° F., else erroneous conclusions may be arrived at.

As already stated, the specific gravity of healthy urine ranges from 1.003 to 1.030, averaging from 1.015 to 1.0120, the variations being due to the varying amount of water and of solids which it contains. We can not determine the particular ingredient which is affected, by the specific gravity, but we can tell the aggregate amount of solids present in the urine. This is determined as follows, for urine whose specific gravity does not exceed 1.018: double the last two figures expressing the specific gravity; the product shows the number of parts (or grains) of solids contained in any thousand parts or grains of urine. Thus, urine of a specific gravity, 1.014, contains 28 grains of solids in every 1000 grains of fluid.

Where the specific gravity exceeds 1.018, multiply the last two figures expressing it by 2.33, and the result is the number of parts of solids contained in any thousand parts of urine; thus, if the specific gravity be 1.025, the urine contains 58.25 parts of solids in every 1000 parts.

By determining the amount of solids in 1000 parts of urine, we may, if we have ascertained the amount of urine voided in twenty-four hours, easily calculate the whole amount of solids secreted with it by the following rule: as 1000 parts is to the parts of solids contained in this amount, so is the weight of the whole amount of urine passed in the 24 hours, to the amount of solids contained in it. Thus, a patient passes 8500 grains of urine in 24 hours, of specific gravity 1.015; what amount of solids did it contain?

grains.		grains.		grains.		grains.
1000	:	30	: :	8500	:	255, the whole amount of solids.

This method, however, merely gives approximative results; where any approach to accuracy is required, a given quantity of the urine, say 1000 grains, must be evaporated to dryness at a low, even temperature, and the solid material remaining be weighed.

The object, then, of ascertaining the specific gravity of urine, is to determine the quantity of solids passed with it. The maximum amount of solids passed in health in twenty-four hours is 1234.72 grains; the minimum quantity is 617.36 grains; and the mean quantity, 926.04 grains. Any great and constant departure from the mean amount leads to a supposition of abnormal action, which should be carefully investigated by the practitioner.

The specific gravity of the urine, and consequently the amount of solids present is subject to very great variations, as the result of both functional derangement and disease. Thus, urine of very low specific gravity is the result of a retention of urea and other elements of urine in the blood, or of an impaired eliminative power of the kidneys, as in chlorosis, many hysterical and nervous affections, structural disease of the kidneys, etc.; in which cases the quantity of urine is also much diminished, and more or less albumen is present. In chronic disease where the amount of solids has been diminished, but is gradually increasing under treatment, it is a prognosis of improvement, except in diabetes mellitus, where an increase of solids in the urine is indicative of an increase in the severity of the disease.

In acute diseases, when there is an increase in the amount of solids in the urine during the height of the disease, it indicates an excessive disintegration of the tissues and juices of the body, which must lead to exhaustion of the system, and is an unfavorable symptom. A constant and gradual decrease of the amount of solids is as unfavorable as a diminution in the quantity of urine passed, because it indicates the decay of life. A small amount of solids with a small quantity of urine, is indicative of anemia, or, disease of the kidneys. If the quantity of fluid be very large, while the amount of solids is small, it may be due to excess of drink, or may accompany hysteria, anemia, etc.; this condition of the urine has been called "hydruria," and is considered a favorable symptom in dropsy and anemic conditions generally. When the urine is small in quantity and the amount of solids, although larger than in the preceding instances, is still below the normal standard, it indicates acute disease. When both the solids and water are present in excess, it is an indication of diabetes; diabetes mellitus if sugar is present, and diabetes insipidus if the increased amount of solids is due to other matters than sugar. When urea is retained in the blood, in consequence of disease of the kidneys, it gives rise to drowsiness, stupor, dropsical effusions and death.

When healthy urine is allowed to rest for a short time, a small, light, grayish-white cloud gradually settles toward the bottom, which is composed of mucus and epithelial scales. The normal amount of mucus passed in twenty-four hours is about 7.28 grains; but the eye should be accustomed to estimate the proper amount in urine by frequent inspection of urine in glass vessels by transmitted light. The mucus is principally derived from the bladder and urethra; the epithelium from the kidneys, bladder, urethra, and va-

gina. Dilute tincture of iodine added to the urine in small quantity, precipitates and colors the mucus.

Alkalinity of the urine from decomposed urea, as well as a large quantity of free acid may cause an excess of mucus in the urine; so also will stone in the bladder, irritation of the bladder and urinary passages, as well as other diseases of these parts, as stricture, irritable prostate, paralysis or catarrh of the bladder, etc. When there is an excess of mucus in urine, that fluid soon undergoes putrefaction; and albumen is seldom, if ever, present.

In the catarrh of the bladder of old people, mucus is largely secreted, and astringent remedies by mouth, and by injection into the bladder, with tonics internally, are indicated.

The character of the epithelium met with in the mucus, when in excessive amount, and which can only be ascertained under the microscope, also assists in determining the location of the diseased parts from which they have been thrown off. Pelvic epithelium is never found in healthy urine; its presence there is indicative of disease in the pelvis of the kidneys; while renal epithelium in urine is always an evidence of disease of the renal tubes,—a more or less rapid desquamation of them. The disease is worse when the epithelium is mixed with fatty products,—fatty degeneration of the kidneys. Cancer cells indicate cancer of kidney or bladder, or both. Bladder epithelium in increased quantity indicates more or less catarrhal inflammation of the bladder.

The normal constituents of urine are as follows:

1. *Urea*, $C_2 H_4 N_2 O_2$, is the principal product of the metamorphosis in the body of nitrogenized food, which, incapable of being more highly oxidized, can no longer serve the purposes of life, and is therefore excreted by the urine; it possesses neither an acid nor an alkaline reaction. Urea is formed in the blood, from which it is separated and eliminated by the kidneys; but if these organs be diseased, the urea, failing to be excreted, accumulates in the blood, upon which it acts as a poison, and produces many serious and even fatal symptoms, especially of the brain. The maximum amount of urea in healthy urine is about 688.2 grains in twenty-four hours; the minimum amount, in the same time, is 286.1 grains; and the mean amount is 512.1 grains. During waking hours, or during physical and mental exertion more urea is produced than during sleep, or during an equal period of inactivity. A large amount of nitrogenized food causes an increase of urea; while a small amount of vegetable food produces a diminution of it.

Urine containing an excess of urea, is usually clear and free from sediments, of rather a dark yellow color, of a strong urinous smell,

and has a specific gravity of 1.020 to 1.030; its excess is owing to active oxygenation of uric acid, and is generally associated with derangement of the digestive functions, as well as of the cutaneous, and also with plethoric conditions of the system. It is common in the severe stages of most all acute and inflammatory diseases, pyæmia, septæmia, diptheria, convulsive paroxysms, rheumatism, diabetes insipidus, and in urine depositing oxalate of lime. The treatment is to lessen this inordinate waste of tissue, by regulating the bowels, exercising moderately, light diet, diaphoretics, sedatives, keeping the skin in a healthy condition by bathings and frictions, cool water douches to the head and back, and avoiding hard study, violent exercise, etc. In severe dyspepsia, in addition to the above, vegetable and chalybeate tonics may be given. Alcohol, tea, and coffee lessen the amount of urea, while common salt and alkalies increase it.

Urine containing a deficiency of urea has a specific gravity of 1.001 to 1.008, and the quantity of urine excreted is usually increased. Its deficiency is due to a limited production of urea in the blood, as well as to a failure of the excretory powers of the kidneys; when urea is retained in the blood it gives rise to a group of symptoms termed "uræmia." Deficient urea is met with in anemic conditions, hepatic dropsy, cirrhosis, chronic nervous affections, as hysteria, neuralgia, epilepsy, and most convulsive diseases, paralysis, chlorosis, acute yellow atrophy of the liver, Asiatic cholera, following a fit of asthma, jaundice, last stage of cancer of the liver, chronic Bright's disease, and in most chronic and nervous diseases. The treatment is to stimulate the kidneys by exercise and diuretics, and to aid in the elimination of urea from the blood by keeping the bowels and skin in a healthy condition, and by stimulating the cutaneous functions from time to time; medicines to influence the liver, and alteratives to improve the character of the blood and nervous system, are also indicated, as well as vegetable tonics, chalybeates, and an abundant nitrogenous diet.

"If, in cases of fever, such as typhoid and typhus, or of the exanathemata, such as small-pox and measles, or of inflammatory affections, such as pneumonia and meningitis, a decrease in the daily elimination of urea is observed, it may be regarded as a most favorable sign for the prognosis; for no sooner does a change for the better take place in these affections, than an immediate diminution in the amount of urea is observable. During convalescence the quantity is frequently below the normal standard; whereas, in cases tending to a fatal termination, even in spite of the true febrile symptoms having passed away, the daily excretion of urea still remains

high. Hence this sign may be a valuable and truthful guide when all others fail. If, on the other hand, in those diseases in which the excretion of urea is known to be abnormally small, such, for instance, as paralysis, cholera, or the different forms of albuminaria, an increase in its amount during the course of the case is noticed, it is an equally favorable sign for the prognosis; while, on the contrary, any further reduction in the amount of the eliminated urea can not be otherwise regarded than a most untoward event, as, even when the other symptoms have improved, it is an almost infallible index of approaching danger." (*G. Harley.*)

2. *Uric Acid*, $C_{10}N_4H_4O_6$, also called "Lithic Acid," is a constant normal ingredient of the urine; it occurs in the blood as urate of soda, or urate of ammonia, from which it is set free either when it reaches the kidneys, when the urine containing it reaches the bladder, or after the urine has been voided. The maximum amount of uric acid in healthy urine is about 14.49 grains in twenty-four hours; the minimum amount, in the same time, is 4.32 grains; and the mean amount is 8.56 grains. Uric acid is common to persons who indulge liberally in a meat diet and alcoholic drinks, as well as to persons of sedentary habits. When uric acid deposits occur constantly from day to day, it is an indication of disease; but their occasional presence, especially when occurring after the urine has stood for a long time, is of but little importance. Urine containing an excess of uric acid is usually scanty in quantity, of an acid reaction, and high color, and gives dirty-white, blue, black, yellow, pink, or red deposits, generally mixed with urate of soda or ammonia, mucus, etc., which adhere to the sides of the vessel containing it, forming incrustations thereon; the urine has a specific gravity of 1.020 to 1.025. An excess of this acid is due to a deficient oxygenation, which prevents it from being converted into a soluble urate. A few drops of nitric or hydrochloric acid to urine will facilitate the deposition of uric acid. Uric acid in excess is met with in the urine of persons laboring under gout, rheumatism, diseases of the liver, especially congestion of that organ, as well as cancer, in which it is in excess with amorphous urates, likewise cardiac affections, chronic diseases of the respiratory organs, chronic bronchitis, emphysema of the lung, pneumonia, various forms of skin disease, chorea, dyspepsia, febrile diseases, diseases of the reproductive organs, injuries or excessive straining of the loins, several other chronic diseases, etc. The crystals of uric acid occur in an innumerable variety of forms, all of which may be referred to some modification of the rhombus, square or rectangle.

In cases of excess of uric acid, the object of treatment is to

favor the further oxidation of the uric acid formed, and to promote its solution and elimination from the blood as rapidly as possible. For this purpose, good air and moderate exercise daily, are required, together with an especial attention to the functions of the skin, regularity of bowels but not active purgation, proper diet, and an improvement of the digestive powers by appropriate tonics, alteratives, and alkalis, as carbonate of potash, acetate of potash, phosphate of soda, borate of soda, phosphate of ammonia, etc.—but it must be remembered that although alkalis may cause the deposit of uric acid to disappear, they will not always correct the original fault or error which occasioned the deposit. Borax must be avoided among pregnant females. Wine, beer, and excess of animal food should be prohibited. In anemic persons preparations of iron may be administered. If the excess of uric acid be due to disease of the liver, tonics, alteratives, podophyllin, leptandrin, dandelion, colchicum, etc., are indicated, as well as diuretics, epigeæ repens, eupatorium purpureum, etc. If it be due to a gouty or rheumatic tendency, colchicum, cimicifuga, caulophyllum, veratria, iodide of potash or ammonia, etc., are indicated. In febrile and inflammatory diseases, antiphlogistic and febrifuge remedies are required; in cases of cold, or a chill, whereby the action of the skin is checked, diaphoretics and a warm bath or two, will soon lessen the uric acid excess. In most cases, the use of ripe fruits containing acetic, citric or tartaric acids in combination with an alkali, will prove beneficial. Remove the cause, and in all cases the excess of uric acid will gradually disappear.

3. Although free uric acid may be deposited in the urine, it is very often met with, combined with certain bases, and colored with normal or abnormal pigment, forming "yellow, lateritious, brickdust, or fever" sediments. The most common base with which it is combined, is soda—less frequently with potash or lime—and still less commonly with ammonia. All urates are either insoluble, or only slightly soluble in water.

The addition of nitric, hydrochloric or acetic acid to urine containing urates, gives rise to their decomposition followed by a precipitate of free uric acid.

a. Urate of Soda, $C_{10}\ H_3\ Na\ N_4\ O_6$, forms the most common urinary sediment, it is soluble in boiling water, but precipitates as the solution cools, in short hexagonal prisms; thick six-sided plates forming sometimes star-like groups; round, yellowish or white opaque masses, with projecting processes. In the urine, urate of soda is usually amorphous from the presence of chloride of sodium, and is accompanied with urates of ammonia, lime or

magnesia, giving rise to a high-colored, dense, turbid, and slightly acid urine; sometimes, however, it is neutral or even alkaline. If the urine be pale, becoming opaque on cooling, its specific gravity will be about 1.012; if it be of a pale amber color, giving a copious fawn-colored deposit on cooling, its sp. gr. will be about 1.018; if it be high colored, giving a reddish-brown, or brickdust sediment on cooling, its sp. gr. will be about 1.025. The indications and treatment, are similar to those named for uric acid.

b. Urate of Ammonia, $C_{10}\ H_3\ (N\ H_4)\ N_4\ O_6$, generally occurs in urine as a dark, granular, perfectly amorphous precipitate, on cooling; in disease, it is usually met with in the brick-red or pale fawn-colored sediments, which are dissolved on heating the urine; urate of ammonia is the only urate which gives off ammoniacal fumes when heated in a solution of caustic potash or soda.

c. Urate of Lime, $C_{10}\ H_3\ Ca\ N_4\ O_6+2$ Aq., occasionally occurs in the urine in small quantities; it also forms the gouty tumors met with near the joints.—The *bi-urates* of *lime*, *ammonia*, *magnesia*, and *potassa* are also found in urinary deposits, especially the first three.

4. *Creatine* and *Creatinine* take their origin in the disintegration of the muscular tissues, and when their amount is abnormal, there must be undue waste and disintegration of the muscular tissue, due to over-exertion, or wasting induced by hectic, marasmus, or active inflammatory disease. Creatine, $C_8\ H_9\ N_3\ O_4+2$ Aq., is soluble in boiling water, and is deposited in the form of transparent, brilliant, and pearly crystals, of variously modified forms of the right rectangular or right rhomboidal prism. Healthy urine usually contains a small quantity of creatine; about 4.7 grains is the average amount passed in the course of 24 hours by persons in health.

Creatinine, $C_8\ H_7\ N_3\ O_2$, is the product of decomposition of creatine; it is more soluble in water than creatine, restores the blue color to reddened litmus, and is deposited in the form of right rectangular prisms. In healthy urine, about 7 grains is the average amount of creatinine passed in 24 hours. The treatment in excess of creatine and creatinine must be according to the cause of the wasting of the muscular tissues.

5. The normal *coloring matter* of urine (*urohæmatin*) is derived from hæmatin or pigment of the blood, and has been called "uræmatine," or "urophæine." Uræmatine gives to healthy urine its various shades of color according to the quantity of it present in this fluid. The amount excreted in 24 hours has not been

determined, though it is considerably increased in fevers and typhoid conditions, while in chlorosis, anemia, hysteria, and nervous diseases its quantity is dimished.

6. *Hippuric Acid*, C_{18} H_9 NO_6, is a normal constituent of urine, though it is not always present; it is usually formed by the decomposition of benzoic or cinnamic acids taken internally. It is not found in the urine of animals that live exclusively on meat; but among vegetable feeders, the more exclusive the diet the greater is the increase of the hippuric acid. This acid crystallizes in long, glistening, transparent prisms, having four sides, and is soluble in hot water and alcohol. It never forms a deposit in urine, but is obtained by concentrating the urine, then adding half its bulk of hydrochloric acid, and allowing it to stand for a few hours. When present in excess in the urine, that is, when more than about 10 grains is passed every 24 hours, (and not produced from the diet,) it indicates deficient action of the lungs, skin, and liver, or the use of food deficient in nitrogen. Hippuric acid has been found in the acid urine of fever patients, and in diabetic urine.

Urine containing excess of hippuric acid, is usually faintly acid, neutral, or alkaline, having a whey-like odor, a specific gravity of 1.006 to 1.008, and frequently holding triple phosphate of magnesia; the quantity of the urine being commonly in excess. The means of treatment are nitrogenous diet, and less food containing excess of carbon; moderate exercise daily in the open air; chalybeates; attention to the skin and bowels, as well as the liver and lungs.

7. *Chloride of Sodium*, Na Cl, is found in various proportions in urine, depending upon the quantity ingested with the food; the average amount per 24 hours being from 154.34 grains to 200.642 grains, or a medium quantity of 177 grains. The range above and below this mean may, however, vary from 30 to 60 per cent., or more. The amount of chlorine discharged by an individual varies on different days, according to and corresponding with the amount of chloride of sodium taken with his food; the largest amount of chlorine per hour, is secreted a few hours after the largest meal of the day, the smallest amount is invariably secreted during the night, as the secretory activity of the kidneys, as regards chlorine, appears to be diminished during rest and sleep, while mental and bodily activity will increase the secretory activity of the kidneys, for chlorine, at any time during the day and night.

In all acute febrile diseases, the amount of chlorine discharged in the urine sinks rapidly to a minimum, until, in certain cases, it disappears entirely for a short time; when the diseased action is

abating, the amount of the chlorides rises during convalescence, sometimes above the normal average. In chronic diseases the excretion of chlorine is generally diminished. As the chlorine diminishes in quantity the more serious becomes the prognosis; as it rises in amount, the indication is a returning to health. In urine, chloride of sodium always appears in octohedral forms; and urine containing a normal amount of urea, will, if chloride of sodium be present, when evaporated, show the urea in the form of crosslets and daggers, under the microscope. Besides chloride of sodium, urine also contains a certain quantity of chloride of potassium.

8. *Sulphuric Acid*, and *Sulphates* in the urine are derived from the sulphates introduced with the food taken into the stomach, as well as from the oxidation of the sulphur of the albuminous matters contained in the body. The quantity of sulphuric acid passed with the urine in 24 hours ranges from 14 to 32 grains. The use of sulphuric acid, sulphur, sulphate of soda, and other sulphates as well as sulphurets, violent mental or physical exercise, and a purely animal diet, cause an increase of the sulphates in urine; while a purely vegetable diet causes the amount of sulphates to sink considerably below the average under ordinary mixed diet. In disease, no satisfactory results have been obtained as to the amount of sulphates in urine; in most acute diseases, as well as in chronic, the amount appears to be diminished, to a greater or less extent below the normal average. In diseases characterized by a considerable disintegration of muscular tissue, there will be an unusual amount of sulphate in the urine; as in chorea, acute rheumatism, certain skin diseases, etc., but not in typhoid fever, and scarlatina. Where but little food is taken, a considerable decrease of sulphuric acid occurs. A determination of the quantity of sulphuric acid is useful for determining the amount of disintegration of albuminous matters in the system, in cases where the ingestion of sulphur in any form or combination is very low or altogether suspended.

9. *Phosphoric Acid* in the form of *Phosphates* gives a very important class of salts which exist in greater or less quantity in all the tissues of the body, in the secretions, and in considerable proportion in the blood. The maximum and minimum amount of phosphoric acid discharged in 24 hours varies considerably, being from 18½ to 75 grains; of which the mean amount of 37.01 grains of the acid is united with alkalis, and 8.62 grains with earths. Of the phosphoric acid eliminated in the urine in the form of phosphates, the greater proportion is doubtless taken in the food; but

a certain amount is formed in the organism by the oxidation of the phosphorus of albuminous tissues, which takes place during their disintegration. Much of the phosphoric acid formed in the organism is doubtless produced in the nervous tissue.

In acute but not very severe diseases, the amount of phosphoric acid in the urine decreases at first, most probably in consequence of the low diet, and afterward rises again with a more liberal allowance of food. During convalescence, the normal amount is sometimes exceeded, in consequence of an increased quantity of food. If the illness, though combined with violent fever, only lasts a short time, the decrease of the amount of phosphoric acid is sometimes very slight and scarcely perceptible.

When the diseases are of a more severe nature, so as to cause a long abstinence from food, or to take a fatal turn, the decrease of phosphoric acid in the urine becomes much more considerable. In some exceptional cases the amount of phosphoric acid discharged during the height of acute diseases, may considerably exceed the amount discharged during health.

In chronic diseases the excretion of phosphoric acid takes a very irregular course, and though remaining mostly below the normal average, may sometimes considerably exceed it.

The following are the phosphates more commonly met with in the urine:

a. Acid Phosphate of Soda, Na O, 2HO, PO_5+12 Aq., to which, in many cases the acid reaction of the urine is due; it may be obtained in crystals.

b. Ammonio-Phosphate of Soda, Na O, NH_4 O, HO, PO_5+8 Aq., or microcosmic salt, forms beautiful transparent four-sided prisms, The two preceding alkaline phosphates are soluble in water, nitric, and hydrochloric acids.

c. Ammonio-Phosphate of Magnesia, PO_5, 2 Mg O, NH_4 O+12 Aq., also called Triple Phosphate, Basic or Stellar Phosphate, forms rectangular prisms, as well as stellar and foliaceous crystals, the urine being clear, and of normal specific gravity. This salt is more common to the young. It is a combination of an alkaline and an earthy phosphate; is slightly soluble in water, but is rendered insoluble by the addition of a trace of ammonia.

d. Phosphate of Lime, (acid.) PO_5+3Ca O+HO, insoluble in water, and not constant in urine.

e. Phosphate of Lime, 3Ca, O, PO_5, a normal constituent of urine, and like the preceding phosphate insoluble, and amorphous.

All these phosphates have a white and lime-like appearance, and change to a golden yellow color by contact with a solution of

nitrate of silver. A deposit of the earthy phosphates is not a proof of their being in excess, as it may only indicate an alkaline condition of the urine. The alkaline phosphates are frequently in excess in acid urine, without being deposited.

Urine containing an abundance of earthy phosphates, may be dark-brown, greenish-brown, or whey-like, very fetid, alkaline or neutral, with dense, ropy mucus, and often tinted with blood; in some instances it will be acid when voided, but speedily becomes neutral or alkaline. One thousand parts of normal urine contain 1 to 5 parts of earthy phosphates.

When the urine is pale, or white like whey, specific gravity ranging from 1.005 to 1.014, alkaline, fetid, and giving a copious deposit of the phosphatic salt,—this condition of the urine may be due to some abnormality of the spinal marrow; to organic disease of the kidneys; exhaustion of the nervous system; marasmus, or renal calculi. The liver, skin, and bowels should be kept in as normal a condition as possible; moderate exercise should be taken, together with counter-irritation; use of vegetable acids; cold bathing with friction in drying; tonics; diuretic alteratives; nitro-muriatic or benzoic acid; colchicum; proper diet, etc.

When the urine is pale, fetid, faintly acid, of a greenish cast occasionally, viscid or gelatinous from abundance of puriform mucus, forming long, tough ropes when drawn out, which often interferes with its escape from the bladder, with a thick opaque creamy deposit, and specific gravity from 1.005 to 1.014, it indicates a diseased state of the mucous membrane of the bladder, enlarged prostate, or calculus. The bowels should be attended to, as well as the skin; moderate exercise; injections into the bladder of infusion of golden seal, etc.; internal use of balsam of sulphur, mucilaginous diuretics, and an avoidance of acid or greasy food. In this case the copious deposit of the earthy phosphates will be apt to have mixed with it a greater or less quantity of triple phosphates in the form of prisms. Among old persons this character of urine indicates serious disease.

When the urine is of an amber hue, acidulous or neutral at the time of voiding, frequently having urea in excess, and with a specific gravity varying from 1.025 to 1.030, it is indicative of irritative dyspepsia; mal-assimilation of food; irritability or exhaustion of the nervous system; depression of the vital powers, etc. Regularity of the bowels; activity of the cutaneous functions; moderate exercise; nutritious food of easy digestibility; tonics; diuretics; alteratives; strychnia, with traveling, are among the remedial means to be employed.

The presence of earthy phosphates in the urine is indicative of the alkaline condition of that fluid. But it must be remembered that animal diet increases the acidity of the urine, while vegetable diet makes it alkaline. An excess of earthy phosphates in the urine rarely occurs. If the precipitate of earthy phosphates is entirely amorphous, we may conclude that the alkali which caused it was not ammonia.

If, however, the precipitate contains crystals of triple phosphate, it indicates the presence of ammonia, arising most probably from decomposition of urea.

The alkaline phosphates in excess indicate a more than usual disintegration of tissues rich in phosphorus, or an unusual activity of the brain or nervous system, as, in acute mania, phrenitis, convulsions, etc.

10. The alkalies, *Potash* and *Soda*, in the form of phosphates, carbonates, or sulphates, exist in the urine in various amounts; there being a large proportion of the soda salts which predominate in the blood, and a small one of the potash salts which are found in considerable quantities in the muscles. The amount of potash passed in the urine during 24 hours varies from 26.36 grains to 107.77 grains; that of soda, from 79.75 to 171 grains.

11. The alkaline earths, *Lime* and *Magnesia*, occur in the urine in the form of acid phosphates in solution; they are also met with as deposits in alkaline urine, and as concretions in urinary calculi, of which they most frequently constitute the crust. As generally met with they are amorphous. The amount of lime passed in 24 hours in healthy urine varies from 2.33 to 6.36 grains; and of magnesia, from 2.53 to 4.21 grains. *Carbonate of lime* is rarely met with; *oxalate of lime* frequently.

12. *Iron* is found in healthy urine in various proportions, being derived from hæmatin, and forming a constituent of uræmatine. Its presence indicates the amount of iron which enters the blood when it is taken as a medicine.

13. *Silica* has been met with in the urine, in traces only, being derived from the use of wheat and other similar plants as food; also *alumina*, derived from the alum taken in eating baker's bread.

14. *Extractives*, which includes various substances, as pigment, creatine, creatinine, xanthine, hypoxanthine, xanthoglobulin, omichmyloxide, certain acids, resins, substances containing sulphur and phosphorus, etc., are passed in the urine, as far as it is possible to ascertain to the maximum amount of 231 grains per 24 hours; minimum 92½ grains; and mean amount of 154 grains.

The abnormal matters found in urine are:

1. *Ammonia* has been found in healthy urine, averaging about 10.8 grains in 24 hours; the minimum quantity being 4.63 grains, and the maximum 15.434 grains; but whether this ammonia is a healthy ingredient of urine, or is the result of decomposition of the urea in the urine by the means used to detect the presence of ammonia, is not yet satisfactorily determined. Ammonia exists as urate, lactate, also in combination with phosphoric acid and soda, and with phosphoric acid and magnesia; it is also present as chloride of ammonium. When the salts of ammonia are taken into the stomach, the ammonia passes unchanged through the system and is discharged in the urine.

As a general rule when the salts of ammonia are in the urine, they are formed in the acid, and especially in the alkaline fermentation of the urine. In acid pathological urine, as in typhus, measles, scarlatina, etc., the occurrence of ammonia is not unusual; in alkaline urine it is almost constantly present, from decomposition of urea.

2. *Blood* or any of its anatomical elements when present in the urine indicates active or passive hemorrhage; excessive congestion of the kidneys; renal calculus; rupture of capillary veins in the kidneys, their pelves, or ureters, or of enlarged veins in the bladder; vicarious menstruation; diseased conditions of the blood; mechanical violence; malignant diseases, etc. Blood corpuscles can be seen under the microscope. Fibrin, an albuminoid substance which spontaneously coagulates, is present in many cases in bloody urine, as well as when no blood corpuscles are present. Most commonly, when fibrin is in the urine, fat and albumen are also present, forming "chylo-serous urine." (*For detection of urohæmatin*, see Anemia.)

a. Most frequently the presence of blood in urine is a symptom of the first or acute stage of those diseases of the kidney which are caused by the entrance into the blood of a specific poison; such as acute desquamative nephritis.

b. Or its presence may indicate ulcerated cancer of the kidney.

c. Or it may be due to the mechanical effects of renal concretions, or to ulcerations set up in the pelves and calyces of the kidneys by these bodies.

d. Or it may be indicative of certain diseases of the bladder, as, vesical hemorrhoids, or, softening cancerous growths of that organ.

e. Stone in the bladder, as well as chronic cystitis accompanied by erosion or ulceration, frequently give rise to hemorrhage from that organ.

The treatment must be according to the nature of the affection, and the source of the hemorrhage; rest, gallic acid, astringent diu-

retics, astringent injections into the bladder, tonics, alteratives, perchloride or persulphate of iron, etc.

3. *Chylous urine* contains one, several, or all of the following ingredients, viz.: red-blood corpuscles, white-blood corpuscles, shreds and films of fibrin, albumen, albuminoid matter, and fatty matters. Chylous urine is milky and turbid, the milky character being due principally to the fatty particles. When coagula of fibrin are present in urine, which have coagulated after the excretion of the urine, it is indicative of acute desquamative nephritis. The causes of chylous urine are at present unknown; it is peculiar to certain tropical countries. Chylous urine is generally acid, decomposes more readily than healthy urine, and forms a spontaneous, fragile, fibrinous coagulum; when ether is added to it the fatty matter is dissolved, and on evaporation of the ether, the fat is left behind. In the treatment, large doses of gallic acid have given the best results.

4. *Casts of uriniferous tubules* are of several kinds, and can only be seen under the microscope; as renal casts frequently occur in urine where there is no permanent disease of the kidneys, too much importance must not be attached to their temporary occurrence. When the serum transudes through the renal vessels it appears to be accompanied by a coagulable material which being effused into the urinary tubes, spontaneously coagulates there, forming a cast or mold of the tube, and entangling in its meshes any loose bodies, as particles of epithelium, etc., that may happen to be in the tube at the time. This cast is gradually washed out by the fluid secreted behind it, and finds its way into the urine; its diameter and general characters, as well as the characters of the various substances entangled in it, enable us to ascertain the nature of the morbid changes going on in the tubes at the time the cast was formed. Thus,—if the epithelium be abnormally adherent, the cast will be very narrow; if, on the other hand, the epithelium be removed, the cast will be of the width of the tube. Should the epithelium be disintegrating, the cast will afford evidence of the change. If in a state of fatty degeneration, fat cells will be entangled in it. In hemorrhage from any part of the secreting structure, blood corpuscles are present; and when suppuration occurs, the cast contains pus-corpuscles. When the transudation of the coagulable material occurs in a tube to which the epithelium is intimately adherent, or in a tube whose walls are smooth, the cast will be clear and perfectly transparent. (*L. Beale.*)

When these casts are in considerable numbers, being constantly found in the urine for some time, their pathological indications are as follows:

a. Epithelial casts from the urinary tubules, often contain many perfect cells of renal epithelium, blood globules, free epithelium, and epithelial debris, and are generally accompanied with a considerable deposit of uric acid. They indicate acute nephritis, or the elimination of morbid substances from the blood by the kidneys. When they remain in the urine for some time, and are mixed with much blood or pus, the prognosis is unfavorable; when they are observed for only a limited period of time, it is favorable.

b. Small waxy casts are derived from tubes in which the epithelial lining is entire, and indicate a chronic disease of the kidneys, termed "non-desquamative nephritis." In some of these cases, symptoms of blood-poisoning come on, and a rapidly fatal result occurs.

c. Granular casts are indicative of chronic desquamative nephritis, and of degenerated condition of the epithelium of the urinary tubules. When they occur after the acute form of the disease, the prognosis is favorable; but it is unfavorable when they are found in persons subject to gout, etc.

d. Casts containing fat are indicative of fatty degeneration of the kidneys.

5. *Albumen* may be detected in urine by heating it, or by adding nitric or hydrochloric acid to it—either of which causes a white coagulum or insoluble precipitate to form; the urine should have a slightly acid reaction either naturally or by the aid of some acetic or other acid. Both heat and nitric acid should be used in testing for albumen, being careful not to employ too large nor too small an amount of acid. If the deposit or coagulum produced by heat, or by nitric acid, is not dissolved subsequently by nitric acid or by heat, it is undoubtedly albumen. It must be recollected that a mere drop or two of nitric acid added to albuminous urine, prevents the formation of a coagulum, although a large quantity of albumen may be present. In these investigations great care must be had that the test tubes employed are perfectly clean. The practitioner must not rest satisfied with one examination, but should institute several at various intervals.

Urine containing albumen may be pale or high-colored, acid, neutral, or alkaline, of variable specific gravity, as well as quantity, and usually contains epithelial scales, blood corpuscles, mucus, casts of the urinary tubules, and saline sediments. Albumen is never found in healthy urine; its presence indicates a temporary, chronic, or permanent disease of the kidneys, as, congestion; granular disease; fungus hæmatodes; anasarca following scarlet fever; consumption; disease of the heart; cerebral softening; disease of pancreas, etc.

The treatment will depend entirely upon the symptoms present, and the character of the disease.

6. *Pus* in urine can be determined only under the microscope; the pus-corpuscles are more or less globular, nucleated, and frequently present quiescent granules within their anterior. Water causes the corpuscles to swell up, become pale and indistinct; acetic acid renders them more transparent and exhibits their nuclei more distinctly. Urine containing pus is mostly slightly alkaline, sometimes acid or neutral, and is always albuminous; it deposits a pale greenish-yellow or cream-colored precipitate, which is readily diffused again by agitation. Upon heating the urine, the albumen present coagulates, and is not soluble in nitric acid. The presence of pus in urine may be due to suppurative inflammation of some part of the genito-urinary mucous membrane, as, of the urethra, prostate, bladder, ureters, pelves of the kidneys, or of the secreting structure of the organ; it may also be due to absorption of purulent matter, and to abscess opening upon any part of the surface of the genito-urinary mucous membrane. The treatment must be according to the location of the disease, its characters and symptoms. Gallic acid, alum, tincture of muriate of iron, geraniin, etc., with alteratives and tonics are indicated. If the pus proceeds from the mucous membrane of the urethra, or of the bladder, astringent injections will be useful.

7. *Semen* or *Spermatic Filaments*, in urine, may be due to nocturnal emissions, but are frequently met with in the urine of healthy persons wholly free from any disease of the reproductive or urinary organs.

8. *Bile* in urine imparts a very dark-yellow color to this fluid, sometimes reddish-brown, or greenish, together with a more or less bitter taste. To detect the coloring matter of bile, (*biliverdin*), spread a few drops of the urine over a white, china plate, so as to form a thin layer, then allow a drop of nitric acid, containing some nitrous acid, to fall upon the center of this layer. If bile be present a blue color will appear in the circle of urine formed; this will enlarge towards the circumference of the plate, and the circle next to the drop of acid assumes a violet color. The blue and violet circles expand, and an inner red circle appears. Or, if acetate of lead, in solution, be added to urine it will cause a yellowish precipitate.—If urine containing bile be allowed to stand for a few days, the crystals of triple phosphate which form will have a yellow tinge.—Pettenkofer's test will detect biliary acids in urine.

Bile may be present in the urine of healthy persons during hot weather. The bile acids are not always present in the urine in

jaundice, as they may be destroyed in the blood, but the coloring matter of bile is always present in this disease. When bile is found in the urine it indicates that the flow of bile from the liver into the intestines is impeded or entirely suspended.

9. *Leucine*, $C_{12}\ H_{13}\ NO_4$, or oxide of cheese, has been met with in the urine of patients with disease of the liver, and spleen, in rheumatism, tuberculosis, typhus, variola, etc.

10. *Tyrosine*, $C_{18}\ H_{11}\ NO_6$, occurs in the urine of patients having the same diseases as those in which leucine is met with.

11. *Xanthine*, $C_{10}\ H_4\ N_4\ O_4$, is frequently met with in the urine in disease, but its pathological importance, as well as that of *Hypoxanthine*, $C_{10}\ H_4\ N_4\ O_2$, is not yet understood. The same may be said of *Sarcine* or *Carnine*, $C_{10}\ H_4\ N_4\ O_2$; *Allantoine*, $C_8\ H_6\ N_4\ O_6$; and *Inosite*, $C_{12}\ H_{12}\ O_{12}+4$ HO.

12. *Cystine*, $C_6\ H_6\ NS_2\ O_4$, occurs in the form of calculus, as a sediment, and in solution. As a sediment it forms a white or light-fawn colored, amorphous, rather bulky deposit, or appears at once in six-sided plates or rosettes, which are readily soluble in aqueous solutions of ammonia, potash, soda, lime, and oxalic acid. Urine containing cystine is of a pale greenish-yellow color, feeble acidity, or neutral, soon becoming alkaline, low specific gravity, commonly deficient in urea and uric acid, and often a peculiar sweetbriar-like odor, and, when decomposed, evolves sulphuretted hydrogen. Mucus, epithelium, and ammoniaco-phosphates of magnesia are very usual. Acetic acid precipitates cystine when in the urine. Cystine contains nearly 27 per cent. of sulphur. The pathological value of cystine is not well known, but supposed to be perverted assimilation of the albuminous and gelatinous tissues; imperfect or perverted secretion of bile; deficient oxidation. Cystine has been met with in chlorosis, anemia, scrofula, etc.; the ordinary symptoms connected with its appearance, are occasional pain in the back, debility, pallor of skin. The general therapeutical indications are to correct the condition of the liver; improve the state of the assimilative functions; diet, air, exercise, etc. Chalybeates in chlorosis and anemia. Cystine very much resembles *Taurine*, $C_4\ H_7\ NO_6\ S_2$, which is derived from the decomposed bile acids, and contains about 25 per cent. of sulphur.

13. *Grape* or *Diabetic Sugar*, $C_{12}\ H_{12}\ O_{12}+2$ Aq., although sometimes met with in small quantity in healthy urine for a short time, occurs in large quantities in diabetes mellitus as a constant ingredient. The urine is usually of a very pale color, clear and greenish, of specific gravity 1.025 to 1.055, and possesses a peculiar odor which has been compared to that of violets, new hay, apples,

whey, musk, sour milk, and horse's urine. Sometimes the specific gravity is of the healthy standard. The urine is passed in large quantities, is apt to be deficient in urea, generally has an acid reaction, and a sweetish taste. The presence of sugar in the urine is supposed to be due to mal-assimilation of saccharine matters. *Acetone*, $C_6 H_6 O_2$, has been discovered in diabetic urine, and probably imparts to this its peculiar odor.

14. *Oxalate of Lime*, Ca O, $C_2 O_3$+2 Aq., crystallizes in well-defined octohedra, having one axis much shorter than the other two, and it also occurs in the form of dumb bells. Urine containing oxalate of lime is generally of a dark-amber color, of decided acid reaction, occasionally neutral or alkaline, of specific gravity 1.015 to 1.025, and, in most cases, contains urea in excess. Oxalate of lime is often found associated with other deposits, as, abundant urate of soda, or of earthy phosphates, also, of epithelial cells. Sometimes the urine is of a greenish tint, with the coloring principle of blood present; when it is pale, the specific gravity is low. Oxalate of lime, whether in the form of crystals or dumb bells, may be seen under the microscope; they may be formed in the tubes of the kidneys, in the bladder, or, as is more commonly the case, after the urine has been voided. These crystals or dumb bells are found in the urine in a vast number of diseases. Their presence in urine may indicate:

a. That oxalic acid or any of its compounds has been introduced into the stomach, as an ingredient of food, as a medicine, or as a poison.

b. When in considerable quantity and for a long period of time, during which the ingestion of oxalic acid, in any form, into the stomach was excluded, it indicates the existence of a disorder, the nature of which is, at present, wholly unknown.

c. Oxalate of lime is frequently found in not very small amounts, in the urine of patients recovering from severe diseases.

d. A small amount of oxalic acid, not permanent in its appearance, is of no pathological importance.

e. The presence of oxalate of lime in urine, may indicate disease of the kidney.

Oxalic deposits are probably due to deficient oxygenation, and to mal-assimilation of food in primary digestion, and are generally found in diseases where there is great depression of the vital forces, irritation of the spinal marrow, or, serious functional derangement of the digestive organs. They are also met with in care-worn persons, among those who over-exert their brains in literary, scientific, business, and other studies, who masturbate or commit

sexual excesses, who live high but take too little exercise, etc. As a general rule any thing which improves the general health and promotes oxygenation, will diminish the tendency to oxalic deposits, as, cold bathing, exercise, attention to diet, bitter tonics, iron, nitric acid, hydrochloric acid, etc.

With this brief reference to the ingredients met with in healthy and unhealthy urine, I close this part of the work. It is impossible to enter into a full detail of these matters in a work like the present. However, those who desire to become fully instructed relative to normal and abnormal urine, its ingredients, and methods of detecting them, and determining their quantities, as well as their pathological importance, the diseases in which they occur, and the treatment, are referred to the following valuable works, from several of which, the preceding matter relative to the urine has been compiled:

Thudicum's Pathology of Urine; Beale on Urine, Urinary Deposits, and Calculi; Parkes on Urine; Bird on Urinary Deposits; Bowman's Medical Chemistry; Neubauer and Vogel on the Urine, etc.

PART II.

REMARKS CONCERNING THE CAUSES, SYMPTOMS, CURABILITY, AND TREATMENT OF CHRONIC DISEASES.

A KNOWLEDGE of the causes of chronic diseases will be of great value to the practitioner, not only enabling him to indicate them to persons in health who may consequently avoid them, but, in the treatment of this class of diseases, especially in their early stages, affording him great and effectual aid, as he may thereby more advantageously advise his patients of the circumstances and conditions of which they may avail themselves, and, at the same time, prohibit exposure to those causes which tend to produce or perpetuate disease. These causes should be classified, and their importance shown, as well as their relations or tendencies.

The difference between Acute and Chronic Diseases, may be briefly summed up, thus:—Diseases, more or less severe in their character, which are accompanied by feverish or active inflammatory symptoms, affecting the circulation and the nervous system, which run through their course rapidly, requiring prompt and active treatment, terminating in a few days or weeks in health, chronic disease, or death, are *acute;* while those diseases, more or less severe in their character, which affect one or more organs of the body, without being accompanied by feverish or active inflammatory symptoms, which require steady, long-continued treatment, and which progress slowly, terminating, after months or even years, in health, or in death, are *chronic.* Acute disease being confined more especially to the fluids of the system, may result in the return of the fluids to their normal condition; in a partial return to their healthy state, with abnormal action of one or more organs, (chronic disease); or, in decomposition of the fluids, or solids, or both, (death). Chronic disease, on the contrary, seldom manifests itself until some solid tissue becomes affected, although the fluids may have been in an abnormal condition for an indefinite

length of time previously; and a person may be suffering from chronic disease in the fluids of the system without having any suspicion of the fact, until the functions of some organ become so deranged as to give rise to marked symptoms. This description of the difference between acute and chronic forms of disease will answer for all practical purposes.

The causes of chronic disease, with the exception of those which are secondary, accidental, or coincidental, are but few in number, and a careful investigation of them will demonstrate that their principal influence is, as a general rule, exerted upon the cutaneous functions, diminishing, suppressing, or changing the character of the insensible perspiration, and is also, but with less intensity, exerted upon the respiratory passages. The influence of these causes is transmitted to internal organs through the agency of the nervous and vascular systems,—by means of the first, the impressions are conveyed to the solids, producing irritation in them; by means of the last, the effete matters, which the skin ought to eliminate from the system in the form of insensible perspiration, are mingled with the blood, altering its elementary composition to a greater or less extent, and causing the local lesions met with in both acute and chronic diseases. What the special action of the perspiratory elements may be in effecting alterations of the blood, and in producing local lesions, we have but a limited knowledge; yet, from the fact that these elements consist principally of worn-out and devitalized matters of the system, we must conclude that their retention is a cause, probably the most frequent cause of the morbid changes observed in the fluids in many diseases. Besides, it is well known that when the skin in a state of perspiration is suddenly exposed to cold, persons so influenced become ill, the character and severity of the disease varying according to the age, sex, temperament, resisting power of the system, season, climate, and condition of the system or of some of the organs,—the several forms of disease, thus produced in different individuals, being due to one identical cause, viz., suppressed perspiration.

Among the causes of chronic diseases, moisture, want of exercise, atmospherical vicissitudes, locality, deprivation of pure air, and of sunlight, are the most prominent. Animals frequently die of chronic diseases, yet we do not hear of the disease or the death being attributed to intemperance or other vices of society, onanism, inhalation of animal, vegetable, or mineral powders, tight corsets, to a constrained position during work, etc. True, these are causes of chronic disease among the human race, but they are secondary, or accidental causes, as much so as when a disease is produced by a

severe blow or wound, and often exert but a feeble influence in the production of chronic disease. And with regard to these secondary or accidental causes I will say, that, to preserve health and promote longevity, an absolute avoidance of them is not only necessary for patients, but also for persons in health. The effects of secondary or accidental causes are especially to be observed in large cities, in which places chronic diseases are very common; the host of causes which concur in their production can hardly be separated by observation and analysis.

A moist atmosphere not only interferes with the evaporation of insensible perspiration from the surface of the body, but it also prevents the requisite amount of fluid in form of vapor being carried off through the respiratory passages, thus lessening the activity of the skin as well as of the lungs, from which diminished action more or less effete matter is retained in the system. If this suppression occurs suddenly, acute disease is the result, which may, according to its nature, severity, and therapeutical treatment terminate in health, chronic disease, or death; if it occurs slowly and continuously, the changes in the fluids are effected by degrees, and chronic diseases gradually manifest themselves. From this cause, chronic diseases are more numerous in moist climates, and in direct ratio with the declivity of the locations. If the moist air be in a state of rest, the evacuation of fluid from the surface of the body will be at its minimum; if, however, it be in motion, it will be more favorable, as air in motion facilitates the evaporation of the fluid exhaled by perspiration. It must also be recollected that moisture favors the development of microscopic fungi, so frequently met with both as a result, and a cause of disease.

Want of exercise has been named as a primary cause of chronic diseases; this, in connection with moisture, prevails over all other causes in the production of these maladies; the principal action of these two causes is exerted upon the skin, checking the functions of this organ, and repelling into the circulation superfluous or excrementitious elements which should be eliminated from the system, and which produce morbid changes in the blood, resulting in chronic disease of one or several organs.

The favorable influence of exercise upon the constitution of man, as well as the dangers accompanying a sedentary life, have been known for ages. In all localities, muscular exercise either in the open air, or in dwellings, is absolutely indispensable for the maintenance of health; it is by motion that life is manifested, that the constitution acquires and preserves its energy. A sedentary life diminishes the expansive action of the nervous system, the activity

of the circulation ; it tends to determine the blood from the external capillary system to the internal or visceral ; the capillary circulation becoming enfeebled, the excretory functions of the skin become inactive, and congestions occur in the organs, eventually giving rise to chronic diseases.

Notwithstanding the influence of moisture in causing disease, we find, even in instances where secondary causes are also present, as bad food, inhalations of various powders, noxious emanations, improper ventilation, etc., that the expansive and sudorific action of muscular exercise in the open air is sufficient to advantageously counterbalance the influence of dampness and lowlands in very many cases. This is observed among those persons who are exposed to dampness during their hours of labor, but whose exercise preserves them from chronic diseases, with the exception, perhaps, of rheumatic pains arising from the influence of the moisture upon the skin, as, with dyers, soap-boilers, tanners, bleachers, etc. Exercise, in provoking perspiration, sustains the skin in a constant state of normal excitation. Yet it must be borne in mind that moisture exerts a general influence which muscular exercise can not always counterbalance; and it may even happen that in exciting perspiration, it will render one more readily susceptible to the debilitating and concentric influence of cold and moisture.

The freedom from disease among active persons has been attributed by some not to their exercise in the open air, but to their individual physical strength,—the effect being mistaken for the cause. Physical strength, undoubtedly, gives to man a long-continued resisting power to disease, but finally, unless he exercises, the causes of disease exert their baneful influence, and deteriorate his constitution.

The influence of exposure to atmospheric vicissitudes in producing disease is well known to all medical men, and, like the preceding causes, it is exerted chiefly upon the cutaneous and respiratory functions.—A deprivation of pure air prevents the blood from being properly oxygenized, from which results nervous debility and languid action of the cutaneous capillary functions.—Sunlight appears to exert an electric, vivifying, and salutary influence upon organic nature, as observed in the healthful appearance of organized bodies exposed to its influence, and in the degenerate condition of those deprived of its action. Vitality is refreshed and strengthened by the action of the solar rays, while their absence tends to depress, debilitate, and destroy. The high dwellings of cities, and the large and leafy trees placed around them, check the currents of air, tend

to keep up moisture, and interfere with the salutary effects of sunlight on the constitution of man. It is not only by its electrical action that sunlight favorably influences the human body, but also, by aiding in the evaporation of moisture, causing the insensible perspiration to be rapidly removed.

From this hasty glance at the causes of chronic disease, it will be seen that they all exert an influence, principally upon the functions of the skin, and, in a less degree, upon those of the pulmonary organs; and which facts will materially assist us in our treatment of this class of diseases. The secondary causes, as improper or insufficient diet, intemperance, etc., are so well understood, that I will not occupy the reader's attention with more than this reference to them, but will remark, however, that while investigating the primary causes of disease, we must take into account the elevation or the declivity of each locality, its dryness or dampness, the changes of temperature, difference in professions, customs, and regimen, the peculiar construction of the houses, as well as the nature of the soil upon which they are built, also the height and direction of mountains in the vicinity, if any are present. This accomplished satisfactorily, the physician may then direct his attention to the secondary or accidental causes which may have facilitated or even produced the disease which he is called upon to treat.

I may say here that there appears to be a certain condition of the fluids and solids of the body, as well as certain relations between them, which are necessary for that state termed "health"—or, in other words, an *equilibrium*. Whatever tends to maintain this equilibrium sustains and preserves health, and whatever deranges this equilibrium is a cause of disease; the greater the degree of derangement, and the longer it is kept up, the more severe will be the disease.

It is seldom, indeed, that actual disease is transmitted from parent to child, with the exception of maladies due to a poison or virus in the system, as, for instance, syphilis. Yet the *tendency* to certain forms of disease, as scrofula, consumption, rheumatism, etc., may pass in families from one generation to another, so that upon exposure to the exciting causes the disease will become developed. And I do not see how it could be otherwise; for a parent lacking in his own system those elements or vital qualifications necessary to the production and preservation of healthy glands, lungs, or muscles, etc., certainly can not be expected to endow his offspring with powers which he does not possess, but must, as it were, entail upon his children those deficiencies and tendencies to certain maladies which are natural to and form part of his constitution. This hereditary

tendency may be so active that the peculiar disease will start into existence, almost from birth, upon the slightest cause; or it may be so chronic that many years of exposure to the primary or secondary causes will be required in order to its development; or, one parent being healthy, the tendency to the peculiar disease of the other may thereby be rendered null, or be so modified as to require extraordinary causes for its production. And, between these extremes, various causes may lead to innumerable shades or degrees of predisposition to the parental malady.

I will here state, that notwithstanding what authors have said of hereditary diseases, I am fully satisfied, that, as a general rule, by a proper course of hygienic and therapeutic management, commenced early in life, and persistently continued in to adult age, such diseases, or rather the tendencies to them, are capable of being either wholly removed, or so modified as to preserve the person from subsequent attack of the parental disease; also that, in the latter instance, where there is a subsequent attack, a continuance of the modifying course for a few successive generations, will thoroughly eradicate the peculiar tendency from the family.

The character of the disease which may attack persons not possessing hereditary tendencies, and who have been exposed to the causes of disease, will depend entirely upon the nature of the morbid changes effected in the blood, influencing one or more of its various elements, as well as upon the degree of resisting power to disease possessed by the constitution, or by the organs of the body; thus, of several persons exposed to the same causes, one may have a tuberculous disease; another, a scorbutic; a third, erysipelatous; a fourth, malignant; a fifth, anemic, etc.

As to which organ or organs may be attacked by the disease, this will depend principally upon their degree of departure from a strictly healthy condition, and the character of the blood disease, except in those cases, where, from temperament, certain organs are more disposed to attacks of disease than others. If those elements of the blood which are necessary for the vitality of the kidneys, are in superabundance, deficient, or diseased, these organs will be attacked; if it be the elements required for the life of the liver, which are in an abnormal state, this organ will be the affected one; if the morbid elements in the blood are those upon which the vitality of the osseous system depends, the bones will be the solid structures which must yield to the morbid influences.

Numerous elements enter into the composition of blood, as, water, fibrin, albumen, hæmatin, (an insoluble ferruginous substance), hæmato-crystallin, fat, extractive matter, cell-membranes, mineral

substances, chlorine, sulphuric acid, phosphoric acid, potassium, sodium, oxygen, phosphate of lime, phosphate of magnesia, etc. A deficiency or an excess of one or more of these elements, or the presence of some abnormal elements variously affecting the condition of the blood, must, necessarily, produce a disease corresponding with the character of the changes undergone by this fluid, and with the resisting power of the system, or, of certain organs, to attacks of disease; hence the variety of diseases, both as to character and location, which we are constantly observing. Attention has been turned of late to the chemistry of the blood, and indeed of the elements of the human body generally, but although considerable has been done, the matter is still in its infancy; further chemical researches are required, and other and more delicate tests have yet to be formed, before any very satisfactory conclusions can be arrived at.

In order to treat disease successfully and scientifically, the constituents of all the solids and fluids of the body, and their various relations with each other, should be well understood; likewise, the constituent principles of all remedial agents, and the various effects they are capable of producing when in contact with the elements of the body, both individually and collectively; then, we will have, a descriptive or nosological medicine, giving the symptoms or external signs; an organic medicine describing the lesions of organs; and an atomic, molecular, or chemical medicine, describing the molecular alterations of the fluids and solids, etc., and the changes they undergo by contact with each other and with remedial agents. Probably ages will pass before such knowledge will be perfected.

A chronic disease, no matter what organ or organs may be affected, is invariably the same; thus, a scrofulous or tuberculous disease is the same in all patients, whether it be located in the glands of the neck, the lungs, or the brain, etc; a scorbutic disease is the same, no matter where it may be located; and so, in other forms of chronic diseases. But the *symptoms* will vary according, to the nature of the disease, the organ or combination of organs attacked and their particular functions, the amount of disturbance effected in the organs, the character and scope of their sympathetic relations, and the degree of susceptibility or sensibility of neighboring organs. Thus, if disease attacks the lungs, there will be a series of symptoms developed which are in strict accordance with the character of the disease, the functions of these organs, and the degree of disturbance in them; if, instead of the lungs, the same disease attacks the kidneys, the difference between the symptoms developed in this case and in the previous one will be due to and in accordance with the

peculiar functions of, and the degree of derangement in, the kidneys. If, instead of the lungs and kidneys, the disease should locate in the brain, an entire new set of symptoms would be presented, in accordance with the functions, etc., of this organ. So that the same kind of disease may present a host of symptoms, very dissimilar to each other, but which are due to the circumstances just named. And it is from these differences in symptoms, that medical men are enabled to ascertain the character, severity, and location of disease.—A complication of two or more forms of disease may sometimes be met with, presenting symptoms in accordance with the character of the diseases, the condition of the system, and the nature and functions of the tissues or organs affected, etc., but such complications are comparatively rare.

There appears to be but three actions exerted on animal matter when under abnormal influences, viz.: irritation, inflammation, and decomposition,—the character and degree of each of which depends upon the nature and amount of unhealthy influence present, together with the condition of the parts acted upon and the surrounding circumstances affecting them. Thus we may have irritation produced slowly or rapidly, of varying degrees of severity and duration, which, if not removed, will be followed by a sudden or gradual attack of inflammatory action, of greater or lesser severity and duration, and, if not subdued, terminating in decomposition, as, induration, suppuration, fatty degeneration, tubercula, carcinoma, etc., or death. When these influences are suddenly brought into action, with more or less intensity, as a general rule, we have acute disease; when they occur gradually and with comparative mildness, we have chronic disease. Life itself, or vitality, is intimately associated with action, motion, chemical changes, or what may be termed a normal irritation, resulting in gradual decomposition of old tissues, and recomposition or the formation of new ones. When the irritation is abnormal the decomposition is in excess over the recomposition.

The character of the decomposition of internal organs is only to be observed after death, by dissection or post-mortem examinations. The study of the changes effected in organs or tissues by disease, is termed Pathological or Morbid Anatomy, and is of value inasmuch as it reveals to us the effects of disease upon organs, and sometimes enables us, in conjunction with our knowledge of physiological anatomy, chemistry, physiology, etc., to determine the true character of a disease as well as its proper treatment. "Yet it must not be supposed that it always enables us to arrive at such knowledge; indeed, the instances in which this happens are the exceptions and

not the rule. More commonly, dissection reveals to us, not the disease itself, but the terrible inroads it has made upon certain organs; and even then we do not witness these results in a living tissue, but in a dead mass. Hence, in a strictly practical sense, pathological anatomy, thus far, has proved of but little utility. For instance, in order to cure a disease, were it only required to know its location, its various forms, and its effects upon the affected organs, the treatment of pulmonary consumption would present the most happy results. In this disease, medicine has attained a high degree of perfection, and we have a most thorough knowledge of it, in the exact description of its symptoms, in the multiplicity of observations, in the profound anatomical researches which give to us the character of the morbid changes in the tissues, and in the ingenious method of exploration which enables us almost invariably to determine the seat of the disease. Yet, with all this knowledge, how inefficient are our means of treatment. Similar remarks may be made with regard to many other diseases, as, cancer, Bright's disease of the kidney, softening of the brain, certain incurable diseases of the heart, liver, ovaries, etc.

"What then is the practical result to be derived from the labors of anatomists who have given to us faithful and hideous descriptions of morbid organic changes? Their labors, it is true, are undoubtedly valuable, even if they accomplish no more than to enlighten us with exact descriptions in obscure cases. Yet, as descriptive medicine is at an end after it has given to us the description of symptoms, so pathological anatomy ceases when it reveals to us the morbid organic changes which caused the symptoms. The benefits to be derived from pathological anatomy are yet in the future, and will be perfected when its revelations are aided by those of descriptive and atomic medicine, heretofore referred to. At present, medicine is by no means an exact science, and notwithstanding our knowledge of physiology, anatomy, chemistry, etc., the cure of diseases is arrived at only by experiment and observation."

Prof. Schultz, in his General Pathology, remarks: "Physicians open a body, and find hypertrophy of the liver, or hardness of the spleen, and conclude that the patient died from one or other of these affections! But they are blind to the fact, that hundreds pursue their daily avocations with enlarged livers and hypertrophied spleens, and that women can walk about with ovaria enlarged to the size of a child, till at last, being found in the dead body, it is presumed that death has ensued in consequence of these enlargements! Shall we never learn from such facts, that diseases do not originate from diseased masses and products, but that these same bodies are the effect

of disease, and the token that it has been present? Shall we never learn that the patient died, not from these pathological growths, but from the process of disease which called them into existence? and further, that we are not to direct our attention to the mere residues of disease, and the products of death, but rather to the destructive, or death-process itself?"

Alison, in his Outlines of Pathology, observes: "There are numerous cases arranged into different genera of disease; some of them very important and even rapidly fatal, for example, different forms of fever, certain cases of apoplexy and syncope, tetanus, hydrophobia, etc., which do not necessarily nor uniformly leave behind them, so far as is yet known, any alterations of textures, or other change perceptible to the anatomist, the pathology of which diseases, therefore, although it may derive assistance from, can not possibly be founded on the *knowledge of morbid appearances.*" *Pathological Anatomy is not Pathology.*

The various pathological appearances of different organs which have labored under the same forms of disease, as revealed to us by dissection, are due, not so much to the disease itself, as to the nature and arrangements of the constituents entering into the composition of each organ. Thus, the structure and the character of the tissue of the lungs, kidneys, and brain are widely different from each other; when these organs indurate, ulcerate, or decompose from the influence of a tuberculous disease, it could not, certainly, be expected that each organ would present similar appearances to the dissector; the morbid changes observed in each organ must vary in accordance with its peculiar composition and organization, and the microscopic examination, as before remarked, will only show the effects of the disease upon the several organs, but will not expose the disease itself.

Believing as I do that the brain and nervous system are more deeply associated with the conditions of health or disease than any other organs, it seems to me that in all post-mortem examinations, the brain and spinal cord, as well as the ganglia, should be inspected; thus, we find a certain pathological condition of the kidneys, liver, or stomach, etc., let us ascertain whether a softening, hardening, or other change of the nervous centers is associated with these diseases, as well as which of these centers, and what part of them. The blood of the heart and lungs, which has now lost its vitality, should also be examined chemically, as soon after death as possible, in order to detect and compare any changes between it in a dead and in a living state, as well as any differences which may exist in it, in these two states, in various forms of disease.

I have several times referred to "the resisting power to disease;" this is a power inherent to every human being, being strong in some and quite feeble in others. The intensity of this power is due to the great vital force and physical as well as mental energy of the individual; it is this power that enables one apparently of delicate constitution to safely pass through a serious attack of sickness, while its deficiency or feebleness in the otherwise healthy and seemingly-robust man permits a fatal termination to his illness, provided the treatment pursued therefor does not destroy him. It is to this power and its degree of intensity, that of several persons exposed to the same cause of disease, some sicken and die, others sicken and recover, while others, again, have little or no indisposition whatever. Continued health and long life are owing to this resisting power, which should be strengthened and maintained by a proper hygienic course of living, because it is certain to be enfeebled or destroyed by imprudences or excesses, and by continued exposure to one or more of the causes of disease.

Every disease has its curable stage under proper treatment, and its incurable stage under any treatment. The curable period is during the early part of the disease, and before decomposition or organic changes have occurred in the organs or tissues affected; the incurable period is in the advanced condition of disease, when the organs or tissues affected have become hardened, softened, undergone fatty degeneration, or, become morbidly changed in some other way. Yet, it must be recollected that it has frequently happened that cures have been effected in morbidly changed organs or tissues, where these have held a minor relation to the vital actions and powers of the system; but, when the organs or tissues so changed have an essential and direct relation with the powers of life, a cure is rarely, if ever, accomplished. This is true both of malignant and non-malignant diseases.

For this reason, pulmonary consumption in its last stages, softening of the brain, fatty degeneration of the kidneys, etc., can not be cured by any treatment, more especially when the tissues are extensively implicated.

The curability of a disease, although depending principally upon the period at which treatment is commenced, is also influenced by other conditions and circumstances, as, the state of the patient's general health, or the condition of his fluids and solids, the business he pursues, the locality he inhabits, the changes to which he is necessarily exposed, the degree of resisting power he possesses, hereditary tendencies, the susceptibility of his system to the influence of remedial agents, etc., all of which should be noted by the

physician, that he may overcome them, or remove his patient from these influences as far as lies in his power. As a general rule, few chronic diseases admit of permanent cure, if treatment be instituted after the vital powers have passed into the descending scale, no matter at what age this may occur; from this cause but few thorough cures of chronic disease are obtained after the age of fifty, or among those who have brought on premature old age by improper conduct.

It is by no means uncommon for physicians, and even those of considerable experience and judgment, when certain malignant or suspected malignant affections or formations are presented to their professional notice, to advise the patients so afflicted to "let the matter alone," or, "to wait until it presents a more serious aspect, and demands treatment;" and the reason given for such advice is that, "the case is one of doubtful character, and any interference might cause it to assume a malignant form," or that, "by waiting until the true character of the disease is developed, they will be the better enabled to treat it." This is entirely wrong. The earlier any disease whatever is brought under proper remedial influences, whether medicinal or surgical, the more susceptible it is of being cured, if a cure is at all possible; and by delaying curable measures to a later period of the malady, is only to permit it to increase in severity or malignancy, and consequently to become less curable. There may be some rare exceptions to this course, due, for instance, to the location of the parts affected, which interferes in some way with local applications, or surgical measures; or, in which these applications and measures will seriously involve important tissues or organs, and thus perhaps hasten a fatal termination; in either of which instances, in the majority of cases, palliative measures will be the only beneficial ones,—a cure being entirely out of the question. Yet, as a general rule, the above remarks hold good.

The length of time required to effect a cure in chronic disease is a matter in which patients especially manifest much concern; it appears to be a popular prevailing idea, that if fevers and inflammatory diseases, which act so powerfully upon the system, prostrating the patient upon a sick bed for weeks with more or less intense suffering, can be cured in a few days or weeks, chronic diseases which present less intense symptoms and which do not confine the patient to his room, ought certainly to be cured in about the same length of time. And this erroneous opinion is frequently sustained by the course the medical man pursues, in

promising a quick cure, using mere palliatives to allay the symptoms and quiet the patient's anxiety, etc.

Acute diseases almost always attack suddenly, and are principally confined to the fluids of the body, and death would speedily ensue, especially in the higher grades where the tendency to decomposition is very great, did we neglect to quickly unlock the outlets for the elimination of morbid matters, and to lessen febrile or inflammatory action, adopting these measures with an energy or severity proportioned to the intensity of the acute attack. Hence, cures may be effected in from six hours to forty days, depending upon the nature of the disease, and the course of treatment pursued.

But with chronic diseases it is quite different; as a general rule, they are slow in developing themselves, from the fact that morbid materials are being constantly removed to a greater or less extent through the several excretory outlets of the body, and it is only when (from the continual retention and renewal of morbid changes in the fluids, the solids become abnormally influenced), the functions of an organ or set of organs become impaired, that the person realizes that he is laboring under some kind of disease. In acute disease an active treatment is the only true one; but in a chronic disease, the treatment must always be chronic if a permanent cure is aimed at; the remedies must act in a slow but constant and continued manner, and no sudden, magical, nor miraculous cures must be expected.

One of the most erroneous systems of practice, and one which is fraught with much danger, is the patching or palliating treatment, by which *symptoms* only are attacked, while the morbid changes giving rise to them are neglected or overlooked. Thus, a person suffering from pain, or a constant cough, applies to a medical man, who, instead of attacking the abnormal condition giving rise to his symptoms, merely palliates or deadens them by the administration of medicines which paralyze or destroy the nervous or muscular action of the parts concerned. The patient thinking himself cured, has an exalted opinion of the physician's skill; but, unfortunately, in a few weeks or months the symptoms reappear with increased severity—application is made to the same physician and with similar results, and he becomes a permanent customer of the physician,—always curing but never cured; or else, finally, after trying several other medical men with no better success, he loses all confidence in educated physicians, and, like a "drowning man catching at straws," flies to charlatans and advertised nostrums, with a faint hope that probably some one of these may

prove more serviceable. In the last stages of chronic disease, when no cure is to be expected, and also when the patient is much annoyed, or suffers severely from some one or more severe symptoms, palliative measures, to lessen his sufferings and to smooth his passage to the grave, are justifiable; but in no other instance.

No chronic disease can be cured by the administration of remedies for symptoms only; these may be palliated, but, nevertheless, the disease steadily progresses in its inroads upon the constitution, and will continue to do so until the palliating measures cease any longer to be of service, and then the symptoms will prove faithful indices, manifesting whether or not our medicines are effecting the desired salutary influences. The morbid conditions alone, as far as we know and understand them, must be attacked and removed by our remedial measures; the symptoms, like the hour and minute hands of a watch, are mere indices pointing out to us the nature and severity of the disease, and the effects produced upon it by our treatment,—and it is only when they become so severe and painful as to cause much suffering or danger, that the true medical man would attempt to palliate them; if his treatment for the morbid conditions causing the symptoms is successful, these will gradually diminish in severity and finally disappear, without a recourse to palliating measures.

Chronic diseases require a considerable length of time in order to be thoroughly cured, which cure has to be effected, molecule by molecule, cell by cell, globule by globule, during the changes effected in the system from a morbid to a healthy condition. The quantity of medicine, or the length of time necessary for a cure can never be precisely or satisfactorily known at the commencement of the treatment; this depends upon several conditions and circumstances, as, the character, duration, and severity of the disease, the condition and functions of the organ or organs diseased, the extent to which the brain and nervous system is involved, the age of the patient, the degree of resisting power, and the susceptibility of the system, or of the diseased organs or tissues, to the influence of medicines. I will refer to an instance or two, which although not strictly in accordance with the facts or the true merits of the matter under consideration, will, nevertheless, tend to convey a faint idea of the absolute necessity of length of time in order to effect cures in chronic diseases. A large three-story brick house may be torn down in eight or ten days by five or six men, but the same number of men can not rebuild it in the same length of time; it must be rebuilt, brick by brick, with the intervening mortar, timbers, etc., occupying several months before its erection can be per-

fected by the same number of workmen; so the broken-down system of months or years standing, must be rebuilt, molecule by molecule, cell by cell, etc., not only using agents to remove the morbid conditions of the fluids and solids, but likewise adopting measures to restore the functions of the various secretory, excretory, and other organs to their normal condition, as well as to impart tone and vigor to the brain and nervous system; the only advantage in the latter instance, that is, with the diseased system, being the presence and influence of vital action, which is absent in the house. Again, it is well known that brandy will intoxicate, yet no one can tell the exact quantity necessary, nor the time it will require to intoxicate any particular person or persons—this depends, the same as with medicines, upon the susceptibility of the parties to the influence of the brandy. One person may become inebriated in ten minutes from taking a wineglassful, while another will require three or four hours and a pint of liquor. So two patients, laboring under the same form of chronic disease, may pursue the same treatment—one will become permanently cured in three months, the other not until twelve or eighteen months of treatment have passed.

Chronic diseases of a similar character, and of six or seven years duration, may, with some patients require only three months for a cure, while with others, one, two, or three years may be necessary. Young, active persons can be more readily cured than individuals of advanced years; after fifty years of age, permanent cures are rarely effected, yet such patients can be materially benefited, so as to enjoy life, and even have it prolonged, by the adoption of the proper measures.

But there is one thing to which I would most earnestly call the attention of the physician, and which is of immense importance to his reputation, as well as to his patient's recovery, and that is to use in practice none but the purest and best medicines, whether extracts, tinctures, syrups, concentrated preparations, powders, or chemical principles. The difference in price between a superior and an inferior medicine not being generally known by the practitioner, he is apt to prefer the latter presuming that it may answer his purpose. Thus, a worthless article of rhubarb or of extract of belladonna, may be procured for fifty or sixty cents per pound, while a superior article of either will cost two dollars and upward per pound; the practitioner, looking only at the name of the article, its price, and the fee he will be likely to obtain from his patient, purchases the cheapest article; it fails to benefit his patient, and, forthwith, he attributes his insuccess not to the in-

feriority of his medicine, but to the fact that it is not suitable for the case. But this is not all, producing no desirable results from his inferior purchases, his patient applies to another medical man, who, if he employs good and pure articles, effects a cure, and perhaps with the very same remedy which failed with the first attendant, the last agent used being, however, of superior excellence. If physicians desire success, they should not hesitate, in all cases to obtain the very best medicines, and, if they are costly, the patient must pay the cost, if he desires health. Better to give up the patient entirely than to tinker with his health by means of cheap and inferior drugs. I have known inferior and cheap articles of jalap, rhubarb, etc., to have been given to patients for months with about as much benefit as they would have derived from the same quantity of sawdust. Procure good medicines or none at all; then, if the patient will not pay for them, dismiss him—for he is neither of service to himself nor to his medical attendant. It should be the pride and ambition of the physician to keep the very best of articles on hand; his reputation, and his success depend upon it.

In the *examination* of chronic disease, the physician should adopt some systematic plan, not only to aid in arriving at a correct diagnosis, but also to facilitate the investigation, and, at the same time, have no organ neglected. Many medical men after hearing a patient's statement, prescribe for him at once without any further examination, or perhaps they may ask a question or two in an indifferent manner; this is wrong, and betrays either indifference to the patient's welfare, or an ignorance of the subject or disease. Some ask a number of questions, but in such an irregular, random-like way, as to elicit no useful information, frequently bewildering the patient, as well as confusing their own ideas. Others, again, adopt the plan of interrogating by systems, confining their questions first to one system, say the Circulatory; then to another, the Respiratory; then to the Nervous; the Digestive; Genito-Urinary, and Integumentary. This last is a very excellent method, by means of which the physician ascertains all the derangements of one system before he approaches those of another, and then, from the aggregate symptoms, their character, severity, etc., he will be enabled to form a more positive and certain diagnosis, and arrive at a more correct mode of treatment. The Nervous System embraces the brain, spinal cord and nerves. The Circulatory System includes the heart, arteries, veins, and capillary blood-vessels. The Respiratory System includes the nares, the larynx, trachea, and lungs. The Digestive System comprises the mouth, tongue,

tonsils, fauces, pharynx, œsophagus, stomach, abdomen, liver, spleen, large and small intestines and peritoneum. The Genito-Urinary System embraces the kidneys, bladder, scrotum, testes, urethra, vagina, uterus, ovaries, and mammæ. The Integumentary System comprises the whole of the skin including the scalp.

Besides these, it will sometimes be necessary to examine in regard to the muscles, diaphragm, bones, eyes, ears, etc.

The course I generally pursue is, firstly—to listen to the patient's statement of symptoms,—secondly, to examine the different systems referred to above—thirdly, to ascertain as far as possible all the previous history of the case, as well as the patient's antecedents, *i. e.*, habits, previous sicknesses, injuries, exposures, business, health of parents, etc.

Several things are included in an examination besides mere questions and answers; as, 1, *inspection* of parts by the naked eye, with the aid of a speculum, or with a magnifying lens; the countenance, the chest, the abdomen, the eyes, the ears, the throat, the vagina, the uterus, the skin, etc., are the parts to be inspected, as to their normal or abnormal conditions; 2, *palpation*, which includes passing the tips of the fingers gently over a part, or making more or less deep pressure, and is designed to learn the seat of pain, the presence of tumors, fluids, or any alteration in form, size, density, and elasticity of an organ or tissue, mobility of parts, etc.; 3, *mensuration*, which is principally used in diseases of the chest, to ascertain any variations in size or circumference between similar points on opposite sides of the body, as well as to determine the extent of respiratory movements; 4, *percussion*, by which we may determine the condition of certain internal organs from the character of sound elicited; 5, *auscultation*, by which we may ascertain the condition of certain internal organs from the character of sound conveyed to the ear, either with or without the aid of a stethoscope. The lungs, heart, and arteries are the organs more commonly auscultated; and sometimes the abdomen, to determine the condition of pregnancy, etc.; 6, *chemical tests*, for the purpose of detecting albumen, bile, sugar, etc., in the urine; to detect poisons in the stomach or other organs, etc.; 7, *microscopic examination*, especially in obscure or obstinate cases, from which we may learn by an examination of the deposits in the urine, whether the kidneys, ureters, bladder, etc, are diseased; whether spermatorrhea is present; whether, from the appearance of portions of soft tumors, ulcers, fluid discharges, etc., placed under this instrument, certain affections are malignant or not, as well as the character of the expectoration, of uterine and vaginal discharges, etc. To enter

into a detailed account of all these methods of examination is not within the scope of the present work; they are thoroughly described in other works of easy access, and only demand a brief reference here; some of them, however, will be considered hereafter.

In the treatment of chronic diseases, it must be remembered that nature has given several outlets, through which disease or matters not wanted in the system are carried off; and that, from this cause, (the effete and morbid matters being constantly eliminated through the skin, kidneys, bowels, and lungs), a disease may remain in the system a long time before manifesting itself,—coming on slowly, the patient being made aware of its presence only when a solid becomes attacked—and this length of time will depend upon the activity of these several organs, their condition as to health, and the nature of the disease, varying from a few weeks to several years.

It must also be recollected that there are two great systems of membranes, which are designed to separate and envelop other organs, to absorb or secrete certain fluids, and which materially differ in their structure and vital properties; these are the mucous membranes or tissues, and the serous membranes or tissues, including the skin.

In a state of health, as a general rule, the secretions from the skin and serous membranes are of an acid character, and become alkaline only from the presence of disease; while, on the other hand, the secretions from mucous membranes are alkaline, and become acid only in consequenee of disease.—One writer observes,—"Serous membranes are supplied by a set of vessels distinct from those of the organs they inclose. This is an important pathological fact, because the affection of a viscus is not a necessary consequence of that of its investing membrane, and vice versa. It serves also as a grand distinctive feature between serous and mucous membranes."

Another medical writer states,—"The posterior spinal nerves are connected with and terminate in the serous membranes or serous surfaces of the body, organs, and limbs, including those of the skin and fascia of the muscles, and are the media of sensation.

"While the anterior motor nerves are connected with and terminate in the mucous membranes or mucous surfaces, including those of the fascia of the muscles, the bronchia, and the alimentary canal, and are the media only of the forces which produce motion.

"Insensibility in the mucous surfaces is as necessary to the maintenance of animal life, as sensibility is in the serous surfaces.

The most intense inflammation of the mucous surfaces produces no pain, without an extension of the disease to the serous surfaces,—and their apparent sensibility is the consequence of the papillary lymphatic glands which rise from the serous membranes,—conspicuously through them in some places, for the purposes of sensation,—as, in the tongue, nose, and genital organs."

As a general rule, medicines which exert sanative influences upon the diseased mucous tissue of one organ, as, for instance, the eye, will similarly influence unhealthy mucous tissues in other parts of the system, as, the throat, nose, stomach, kidneys, bladder, urethra, etc. While, on the other hand, medicines which healthily influence a diseased serous tissue of one part, will, in like manner, effect diseased serous tissues of other parts. By bearing this rule in mind, it will materially aid the practitioner in successfully treating chronic diseases, for, with a few exceptions, in which the articles act upon both mucous and serous tissues, as is the case, for instance, with the cimicifuga racemosa, it will be found that medicines solely confine their remedial action either to one or the other of these tissues.

It must also be recollected, that if the blood be unhealthy, it can not impart the necessary degree of health, strength, and vitality to organs and structures dependant upon it for nutrition, and that ultimately, the brain, nerves, lungs, heart, stomach, liver, kidneys, muscles, etc., will become deranged in their several functions, which derangement continuing, will terminate in organic lesions. The especial organ or organs in which disease will predominate, depends upon the peculiar relations between these and the abnormal constituents of the blood; thus, if the blood disease be confined to those constituents necessary for the nutrition of the bone, some portion of the osseous system will suffer; if the blood constituents required for the brain or nerves are abnormal, these organs will become diseased in preference to others, etc.

On the other hand, if there be a derangement of any one or more of the organs, it will interfere to a greater or less extent with the healthy condition of the blood, in accordance with, and in proportion to, the disease in the organ or organs; thus, if the lungs be diseased, the blood will also become diseased from improper oxygenization; if the stomach be deranged, the chyme and chyle will be unhealthy, and healthy blood can not be manufactured from it; if the kidneys be deranged in function, the blood will suffer according to the amount of urea, etc., thereby retained in it; if the skin, the effete perspirable matters not being eliminated, must necessarily contaminate the blood; and so on of the

brain, nerves, liver, spleen, etc. Thus, showing that disease of the blood, and of the organs, are, as it were, inseparable.

For these reasons, in the treatment of chronic diseases, I ordinarily employ what I have termed "Constitutional Treatment," or a treatment addressed especially to the blood, or to the disease, and "Auxiliary Treatment," or that which has an especial influence upon the organs suffering, functionally or otherwise, from the disease.

The agents employed in the Constitutional Treatment are those usually termed "alteratives," which effect normal changes in disease by some method of action not yet fully understood by medical men, but which, nevertheless, are used as blood purifiers upon the same principle that Ipecacuanha is administered as an emetic, viz., observation and experience have demonstrated the results which constantly follow their employment under certain conditions; and, indeed, this may be said of almost all articles employed in the practice of medicine.

The remedies which I have found to produce the most prompt and efficacious results, are, Compound Syrup of Yellow Dock, Compound Syrup of Stillingia, Compound Syrup of Turkey Corn, Iodine Pill, Iodide of Potassium, Iodide of Ammonium, Bromide of Potassium, Bromide of Ammonium, Chloride of Gold and Soda, Tincture of Black Cohosh, etc.; and I have generally found that that alterative remedy or combination of alteratives which promptly affects the urine, effecting normal changes in it both as to quantity and quality, will prove the best adapted to the individual patient in whom its use produces such changes. Of course, whenever we know of specific remedies against any peculiar form of disease, these are to be made use of in preference to all others, as, for instance, Iodide of Potassium, in case of lead poisoning of the tissues.

In the administration of medicines for the cure of chronic disease, both as a constitutional and an auxiliary treatment, there are several points to be borne in mind by the practitioner. Thus, the treatment pursued must not only purify the blood, and impart healthy activity to organs functionally deranged, but must also give nervous energy to them, so that there will be a sound vigorous vitality of the tissues; for "it is a fact worthy of notice that whatever purifying or eliminative agents are used, a cure of any disease is rarely effected, if the vitality of the tissues is not improved or made normal by tonics, generous diet, etc.; the brain and nervous system have, as a general rule, the greatest influence

over organs in causing or removing diseases of them. As a general rule, we find persons with active, energetic, nervous powers, and healthy constitution, capable of resisting all diseases termed parasitic, zymotic, nervous, and malchemical or blood diseases, to a much greater degree than others equally as healthy in constitution, but of less vigorous nervous power."

Again, it is always advisable, when it can be done, to so compound medicines, as to be able to fulfill several indications without having recourse to a separate agent or dose for each indication,—if the agents can be combined and administered in one dose, without interfering with their actions, or producing nauseous or injurious mixtures, it should be done,—in order that the patient shall not acquire an invincible repugnance to medicines, and that the stomach may be kept in as normal a condition as possible. If the food received into the stomach is properly digested, healthy chyme and chyle are formed, from which good blood may be made, and consequently, healthy secretions, and healthy action of the body generally. But if the gastric juices be diluted by a quantity of fluid before or soon after eating, or, if the nerves of the stomach be kept in a state of irritation by the too often repeated administration of medicines, we will not only fail of producing any desirable results, but will frequently increase the severity of the symptoms of disease.

The time or hour for giving medicines, is usually an hour before or an hour after each meal. Those medicines which would be decomposed, rendered inert, or made injurious, by the action of the gastric juice, or of the elements of the food, should be given when the stomach is empty, at least an hour and a half before a meal; those which can assimilate, as it were, with the nutritive elements of the food, should be taken at a time when the action of the digestive fluids have formed the food into chyme, say, about an hour or two after a meal; and those medicines which decompose each other, forming inert, stimulating, or poisonous compounds, when received into the stomach at the same time, should be taken alternately at separate periods, and at intervals between them that will be sufficient to prevent their coming into injurious contact with each other, etc.

In all chronic diseases, attended with great acidity and feebleness of the digestive organs, as manifested by a very thick and white coat upon the tongue, the body of the organ being quite pale, we need expect no benefit whatever from constitutional or auxiliary treatment until this condition is removed; the condition of the

stomach, especially, must be corrected before any permanently beneficial results will follow the administration of, otherwise, efficacious medicines. The course I usually pursue, in these cases, and from which I have derived the greatest success, is, to prescribe the Compound Charcoal Powder, to which may be added tonics, stimulants, or sedatives, as the case may require. The use of this powder must be persisted in until the tongue assumes a more healthy appearance, after which, the administration of the other remedies will be followed by desirable results. This rule is applicable to all forms of chronic disease.

The Auxiliary Treatment will depend entirely upon certain circumstances, or conditions of organs, connected with the disease; thus, if internal organs are engorged or torpid in their action, measures must be adopted to correct this; if any of the secretions are unhealthy, they must be improved; if there is an excessive action or reaction, it must be lessened by anodynes, sedatives, etc,—remembering that we have sedatives which exert their influence more especially upon the heart, the brain, the spinal cord, or the cerebro-spinal system, etc., and which must be employed with relation to their more especial influences; if there is too much debility, measures must be pursued to give tone and support to the flagging powers; and so with other conditions, meeting every requirement that may arise, and affording to the natural vital powers of the system all the assistance at our command, and without which our real remedies will not be enabled to have any curative effect.

Disease is due to debility, seldom, if at all, to excessive strength, or hyper-vital action; yet there may be an over-excited condition of certain organs requiring sedative or soothing remedies; or, a state of depression or debility, calling for the use of stimulants or tonics; which agents should be administered in connection with the constitutional treatment; the particular agents selected depending upon the system of organs which are excited or depressed. If the debility be due to anemia, a different class of agents will be demanded from that which would be used in cases arising from weak nerves, or, typhoid conditions. A strumous tendency will need agents which would not be required in its absence; and, in patients subject to erysipelas, still another class of agents will be wanted as auxiliary remedies in the treatment of chronic diseases. And so on of other diatheses or predispositions which may be connected with any form of disease.

If the nerves are weak, tonics, nervines, relaxants, or antispasmodics, etc., will be required, as indicated by the peculiar symptoms

present. If the stomach be torpid or irritated, the agents which act more especially in a favorable manner upon this organ when in such conditions, must be used; if the liver be torpid, or otherwise deranged, the remedies which exert their influence more particularly upon this organ must be administered, and so on of other organs, as the kidneys, bowels, brain, genital system, skin, etc., and which have been more particularly referred to in Part I. As regards the skin, it might be supposed from what has already been stated, that perspiration alone ought to be able to effect a cure in cases where a suppression of it has caused the disease; but, it must be remembered that a mere restoration of the perspiratory functions will not, of itself, tend to establish a cure, because, in addition to the retained perspiratory matters, morbid changes have occurred in the blood, and deep-seated diseases have located in the solids, requiring the aid of other and special means of treatment, to remove the chronic disease. The hygienic measures, as diet, exercise, etc., should also be prescribed in accordance with the character of the disease, the condition of organs affected, the temperament of the patient, and other circumstances connected with the case.

"For a physician to be successful in chronic diseases, and especially in nervous affections, he must be bright, firm, confident, and explicit; he must show that he knows the value of every symptom, and is able to explain it without a mist of words that mean nothing; he must prove that he knows what he has to do, that he knows how to do it, the time it will require, and the difficulties he will meet with. Such an one gains unlimited confidence; and his voice, his face, his manners, are all of them worth many a dose of the most vivifying medicine. Without this confidence, success is extremely doubtful. The bearing of this view is not, in some points, so satisfactory as could be wished for our profession, for it would dictate that the doctor who has not the power to inspire the patient with confidence, whether in himself or his art, is bound at once to consign him to another in the same or in a different line who has the envied faculty. . . . . The great point to be attained is, that the physician must be superior to the patient in every point where they come in contact, and let it be well known too. He must be able to read the truth or falsity of every new symptom; detect and punish every attempt at imposition; never give way while administering the cold douche, etc., until he is victorious; his word must be law; he must show little medical sympathy, and that of the most patronizing kind; in fine, he must be metaphorically the strict father, and he will soon influence his patient to be the happy child. . . . . The patient must not be left to himself; his will,

though it may be obstinate, is actually weak. He requires the support of a stronger mind, and is not comfortable till he has it. So it is with the so-called hysterical people; they suffer in many a form, painful alike to themselves and to others, until some master mind teaches them unequivocally that they are under control; they are like young saplings, which require the help of a stake to keep them upright till they are strong enough to stand alone."

PART III.

CHRONIC DISEASES.

CHRONIC DISEASES OF THE NERVOUS SYSTEM.

NOTWITHSTANDING the attention which has of late years been bestowed upon the functions, diseases, etc., of the brain, spinal cord, and nerves, by many eminent physiologists, our knowledge of them is yet very imperfect. True, some certainties have been obtained, but not sufficient to enable us to make positive statements or deductions. The peculiar and manifold functions and actions of these organs, not yet fully understood, their concealed positions within bony structures, the similarity of the symptoms attending their several diseases, even when of almost opposite characters, and the intimate sympathetic relations existing been them and other organs of the body, or, in a word, the unsettled state of their anatomy, physiology, etc., have all tended to throw great difficulty in the way of arriving at facts connected with them, and have thus, as a general rule, rendered their diagnosis and treatment somewhat uncertain.

Considerable knowledge, however, has been ascertained in the pathology of these organs by recent investigations, enabling us to determine the character of many affections common to them with greater accuracy than in years past, as well as to treat them with greater chances of success. And I believe the day is not far distant, when all the mysteries and intricacies connected with them will be as well understood as with those organs which are more readily recognizable by the sight, touch, and hearing. And when that day does arrive, I firmly believe that the practice of medicine will be greatly simplified, and that, in the greater part of diseases, if not in all of them, the most successful treatment will be found that which is properly addressed, locally or generally, to the nervous system.

The *symptoms* to which diseases of the brain, etc., give rise, may be stated as follows:

A dull, heavy feeling in the head, sometimes more or less severe pain or headache; periodical headache, dizziness, noises, or ringing in the ears; obtuseness of the mental faculties; confusion of ideas, weakness or temporary loss of memory; at times dejection of spirits; thoughts of suicide; startings during sleep; bad dreams; nightmare; sleep not refreshing; a difficulty or hesitation in answering questions; an indifference to surrounding objects; querulous; a sensation of numbness or tingling at the ends of the fingers and limbs; perverted vision; seeing stars and lights; sometimes total blindness; amaurosis; dullness of hearing; deafness; sometimes the sense of hearing is morbidly acute; unhealthy condition of any of the senses; delirium; insanity; convulsions; paralysis; apoplexy; impotency; extreme nervous debility; vomiting without epigastric tenderness; occasionally slight difficulty of swallowing; rigidity of the muscles of the neck; convulsive twitchings or drawing of the head to one side; twitchings of face and arms; want of command over the lower limbs; convulsions; when one of the restiform bodies is diseased, convulsions with a drawing or curving of the body to that side; if the cerebellum is diseased, there is a want of command over the limbs, an indecision in movement, a staggering or tendency to fall forward; St. Vitus' Dance, epilepsy; when the vermiform process is effected in the median line of the cerebellum, (organ of motion), catalepsy is present.

It will be seen that many of these symptoms have been and still continue to be treated as distinct diseases, as, epilepsy, paralysis, apoplexy, etc. And, probably, this will be the better course to adopt until such time as the true character and relations of these symptoms are ascertained; many of them being present when there is disease of other organs without any apparent malady of the brain or spinal marrow. When the serous tissues of the brain, throat, nose, eyes, or ears are diseased, as, in tuberculosis, pressure upon the occipital portion of the head, upon the lateral and posterior portions of the first cervical vertebral articulation, between this articulation and the skull, and upon the submaxillary and cervical ganglia of glands beneath the jaws and in the sides of the neck, (which glands will usually be found more or less enlarged), will almost always produce more or less soreness or pain in proportion to the activity of the disease,—the pain frequently darting toward the diseased point. And by this symptom disease in these parts may frequently be determined before the patient is made aware of its presence by any other symptoms. But, in the advanced stages of disease in these and

other organs, pressure upon the several parts of the spinal column and upon the spinal nerves, will, as a general rule, occasion no tenderness or pain, and hence, will prove of no value in the examination of the latter stages of disease.

The brain may be attacked with inflammation in one or several of its parts. Various names have been applied to the affection, according to the part attacked; thus, when the substance of the brain is affected, it has been called *Phrenitis*, *Encephalitis;* when the membranes covering the brain are affected, it is termed *Meningitis;* when the Cerebrum is attacked, it is termed *Cerebritis;* when the Arachnoid membrane, *Arachnitis;* the Cerebellum, *Cerebellitis;* and when there is an effusion of serum it has been termed *Acute* or *Chronic Meningitis* or *Meningo-Cephalitis.* With our present limited knowledge it is extremely difficult to correctly determine what symptoms indicate inflammation of the substance of the brain as distinguished from that of its membranes, and these various terms, however proper they may be in describing the disease, after a post-mortem examination, tend to confuse the practitioner, and, in the present state of medicine, are really of no practical value, as the treatment of each form of inflammation is about the same. Physicians of experience are well aware that every kind of symptom has been found in every variety of cerebral disease. Hence, until the pathognomonic symptoms of the seat of the inflammatory attack are positively known, the simpler the terms used in practice, the less confusion will there be in the diagnosis and treatment.

Chronic Inflammation of the Brain among adults may present the same symptoms as are common to the acute form, though of less intensity and a more gradual progress of the disease; "it may present a diversity of symptoms according to the particular part of the brain affected; or, it may proceed in a very slow, slight, and insidious manner, and escape detection until a dangerous or fatal change has taken place. The more chronic states may follow an imperfectly cured acute attack; and the latter may suddenly supervene on the former." (*Copeland.*) More commonly, chronic inflammation of the brain exists for a shorter or longer period, presenting obscure symptoms which hardly call the attention of the patient to them, until certain decided morbid conditions have been produced, as epilepsy, paralysis, softening of the brain, abscess, tumors, etc.; and as these conditions have generally been separately treated upon by writers, I will adopt the same plan, believing it to be the best—more especially as these conditions may exist unconnected with inflammation, some of them being, likewise, independent of any primary cerebral affection whatever.

I will previously remark, however, that when, after the subsidence of an acute phrenitis, the patient is left with more or less torpor or debility of the mental powers, vertigo, headache, etc.; or with watchfulness, incapability of mental exertion, tinnitus aurium, languor, pain in the limbs, increased sensibility, and marked erethism of the brain and whole nervous system, etc., the head should be kept cool, the surface of the body be properly attended to, and the bowels kept regular without purgation, and counter-irritation should be applied to the nape of the neck, or behind the ears, etc., as Croton Oil Liniment, Compound Tar Plaster, etc. Cool Water should be applied to the head two or three times daily, and the diet should be moderate, nourishing, and easy of digestion. Abstinence from business, study, and other mental applications, as well as traveling, cheerful society, change of scenery, and gentle exercise, will all be found valuable adjuvants.

If the disease passes into the chronic form, as manifested, by obstinate headache, derangement of the mental faculties, pains or spasms of the extremities, cramps, paralysis of particular parts, etc., the above measures should be energetically and persistently pursued, together with the internal administration of Iodide of Potassium, Iodide or Bromide of Ammonium, and such other agents, tonic, nervine, diuretic, anodyne, etc., as the peculiar symptoms of each case indicate.

HYPEREMIA OF THE BRAIN.

This condition has also been termed Cephalæmia, Encephalohæmia, and Cerebral Congestion; it may exist either in the cerebrum, or cerebellum, or both. When it exists in a milder degree it is known as Cerebral Plethora or Determination of Blood to the Head, in which case, although the patient may be able to attend to his usual vocations, he is annoyed with giddiness, noises in the ears, more or less headache, appearance of sparks or objects of a red color, constant desire for sleep, and sometimes sleeplessness; with some, there will be an excitation of the moral and physical powers, intellectual activity, while with others, on the contrary, there will be mental and physical inactivity, incapability of concentration or continued attention, stiffness, twitchings, cramps, etc., of the extremities. The pulse is somewhat frequent, the temporal and carotid arteries pulsating strongly; the temperature about the head is somewhat elevated; the countenance animated or suffused, and the eyes frequently red or injected.

The *symptoms* of hyperemia vary according to its degree, and to the particular part of the brain affected by it; there may be headache, vertigo, noises in the ears, numbness of the limbs, confusion of mind, somnolency, brilliancy or watering of the eyes, more or less slowness and sluggishness in motion, sometimes motion is increased; formication in the face or limbs, either on one or both sides, redness of the countenance, violent beating of the temporal and carotid arteries, the heart, at the same time, pulsating naturally; eyes injected; sometimes epistaxis; etc. These symptoms appear and disappear at longer or shorter intervals, as, every ten or twelve hours, every week, or every three or six months, etc.

The urine is usually paler than natural, slightly acid, or neutral, and contains mucus, phosphates, sulphates, and carbonate of ammonia, in various proportions; abundant urea will be present in the last stage of the disease.

In the more severe cases, nausea, vomiting, and other gastric disorders may usher in the disease; the patient will suddenly lose all consciousness, and fall down, and while in this state of insensibility the urine and feces may be passed involuntarily, the respiration will be difficult but not stertorous, and the pulsations full, strong, and frequent. This is one form of apoplexy, which is termed by the French, *Coup de sang*, and may occasion death in a few minutes, the brain showing no other lesion than congestion. If the attack does not prove fatal, after a longer or shorter period, consciousness becomes restored rapidly or gradually, with a temporary or permanent derangement of the intellect, delirium, impairment of the senses, difficulty of speech, general or partial weakness, and, sometimes, a temporary hemiplegia. Convulsions occasionally accompany the more severe forms of the disease. These symptoms will be found to vary, and to so great an extent, as to render it impossible to account for them, with our present limited knowledge of the functions of the brain.

The disease is more common to the male than the female, and though occasionally seen previous to the thirty-fifth year, it occurs more frequently after that age.

The *causes* which may develop a plethoric, or hyperemic condition of the brain are numerous; as, exposure to sudden changes of temperature; excessive cold; the use of opium and other narcotics, as well as of alcoholic liquors; over-exertion of the mind; great and long continued mental anxiety; violent muscular efforts; turning the head to look backward; want of exercise in the open air; sedentary occupations; suppressed habitual discharges; masturbation; excessive venery; organic diseases of the heart; de-

rangement of the respiratory, circulatory, or digestive systems; as well as the causes referred to under the article *Apoplexy*.

The *morbid appearances* observed after death are, in the less severe cases, in which death is due to some other disease, augmented vascularity of the brain and its membranes, and occasionally slight serous effusion between the membranes and into the ventricles. In the more severe degrees of the affection, when fatal, considerable vascularity of the scalp and cranial bones are sometimes noticed; a bright or dark-red color will be seen in the congested portions, which will be irregular or dotted in the white substance, and uniform in the gray. The blood-vessels are filled with dark blood, both those of the brain and its membranes. The substance of the brain, when cut into, is of a deeper hue than natural; if the medullary structure be divided, it will not be so white as in the normal state, and numerous minute bloody drops rapidly form upon the cut surface. In addition to these, other morbid conditions will be met with, according to the termination of the disease, or its complication, as,—serous effusion in the ventricles, or between the membranes; extravasation of blood; hemorrhage in some part; or, softening of some portion of the brain-substance.

The *treatment*, in the milder cases, consists in cold applications to the head daily, either by affusion, sponging, or the shower bath; keeping the bowels regular; the kidneys and skin in a healthy condition as far as their functions are concerned; warmth to the inferior extremities; together with moderate exercise, attention to the diet, cheerful society, and an avoidance of all causes which may tend to produce or keep up the difficulty, as, mental exertions, stimulating drinks, sleeping too long at a time, or in the horizontal position with the head not elevated, the use of too much fluid, an exposure to too great a degree of heat or cold, etc. Traveling, sea-voyages, and change of air are beneficial in obstinate cases.

In the more severe forms of the disease, the treatment must be more active. Copious evacuations from the bowels must be procured, and for which purpose the Compound Powder of Jalap one drachm, with about ten grains of Bitartrate of Potassa, should be administered every day for several days, or until the urgent symptoms have subsided. This not only removes morbid accumulations from the bowels, but by its derivative influence, causes a determination from the brain. But when there is great constitutional debility connected with the disease, it will be improper to administer cathartics or to make use of other depletive measures, and, in such cases, the bowels must be opened by injections and

mild aperients, as, infusion of Leptandra Virginica, Rheum Palmatum, etc. Warm alkaline pediluvia, sinapisms to the feet, and along the whole course of the spinal column, repeated at frequent intervals, are also proper. If the strength and condition of the patient will admit, a Spirit Vapor Bath repeated every day or every other day, will tend materially to lessen the severity of the attack.

The Compound Tar Plaster should be applied without delay to the occiput or nape of the neck, and a discharge be kept up for several weeks, or until the disease has decidedly improved; and, to avoid the delay of twenty-four or forty-eight hours, which is required for this plaster to remove the integument, before applying it, the hair may be shaven from the parts, and then some vesicating collodion be applied. The other measures named for the milder form, cold water to the head, etc., will also be indicated, and should be more actively employed.

In all cases, as soon as the more troublesome symptoms have disappeared, or become modified, the following preparation may be given to the patient with great advantage: Take of Sulphate of Quinia one drachm, Elixir Vitriol three fluidrachms; dissolve the Quinia in the Vitriol, and then add Tincture of Aconite Root six fluidrachms, Tincture of Black Cohosh four and a half fluidounces. The dose is ten or twenty drops every hour or two in about a tablespoonful of water. If the patient be pale or anemic, it will frequently happen that full doses of a solution of Citrate of Iron in Wine will have a very happy effect. In some cases, the preparation named under Chronic Peritonitis, composed of Blue Flag, Black Cohosh, Soluble Pyrophosphate of Iron, Glycerin, Water, etc., will also be of great benefit.

The hygienic measures will be similar to those named for the milder form.—I will state here that in persons having congestive cerebral tendencies, with a more or less constant pain or soreness in the back part of the head, I have removed the difficulty by a persistent use of Solution of Bromide of Ammonium, adding, in anemic cases, three or five minims of Solution of Perchloride of Iron to each dose. The Bromide may be given in solution, each dose holding two or three grains of the salt. Cold affusions or spongings to be also made daily upon the occiput and along the spinal column.

RAMOLLISSEMENT OR SOFTENING OF THE BRAIN.

Softening of the Brain is an affection which appears to have been known only in modern times. Its nature has been a subject

of much discussion, having been attributed by some physiologists wholly to chronic or acute inflammation; while others, of equal eminence, believe that it may occasionally be induced by other causes, especially in persons of advanced age, as, by a deficient vitality of the capillary vessels and substance of the brain, occurring either primarily, or in consequence of previously excited action, as well as a diminution or loss of the vital power and cohesion of the part affected, without any inflammatory symptoms whatever,—and which view is more in accordance with the several phenomena observed.

Bennett has described six kinds of softening, each having a different origin, as follows: "1. *Exudative* or *Inflammatory Softening*, from exudation which is infiltrated among the elementary nervous structures; 2. *Hemorrhagic Softening*, from a mechanical breaking up of the elementary nervous structures by hemorrhagic extravasations, whether in large masses or infiltrated in small isolated points; 3. *True Fatty Softening*, from fatty degeneration of the nerve cells, independent of exudation; 4. *Serous* or *Dropsical Softening*, from the mere imbibition of serum, which loosens the connection between the nerve tubes and cells; 5. *Mechanical Softening*, from mechanical violence in exposing the nervous centers after death; 6. *Putrefactive Softening*, from putrefaction after death. . . . . The first three only occur in the living subject, and give rise to symptoms, and of these three, the pure fatty degeneration, though frequently associated with the others, has been so seldom noticed, that we are to a great extent unacquainted with its symptoms as a special lesion. As regards the last three, they have been frequently confounded by morbid anatomists with the others, and all attributed to one cause."

Softening of the brain may occur at any part of this organ, and is commonly partial; it is more frequently observed in the gray than in the white matter, and more often in the gray matter of the convolutions than of the more central parts of the brain—it is very rarely found limited to the cortical substance, which appears to be its ordinary starting place, from whence it advances to the deeper parts of the organ. Occasionally it may be confined wholly to the central or medullary matter. The extent of the morbid change varies from a space not larger than a pea, to an involvement of the whole cerebral surface.

Softening of the brain presents no *symptoms* by which it can be accurately diagnosticated, and those which have been laid down by writers, are very irregular and erratic in their occurrence. The

disease has been divided into the *acute* and *chronic* forms, presenting symptoms as follows:

In *acute, inflammatory*, or *apoplectic, softening of the brain*, there is generally a fixed, local, sharp, acute pain in the head; though, in many instances, this may be absent. The mental faculties become weaker and weaker; the ideas dull or confused; the answers abrupt and quick; coma; or, the ideas may be wandering and excited, with loquacity, and frequently delirium. A numbness, a tingling, or prickling in the face or limbs may at first be observed; or a deep-seated coldness in limbs about to be, or already, paralyzed; sometimes, sensibility will be increased, there being a stiffness of the limbs, with pain, contractions, and cramps. There may also be a tremulous condition of the muscles, or tetanic contraction, or convulsions resembling epilepsy, or paralysis of one limb, or of one entire side of the body,—paralysis is the general rule in this disease. The expression of the face will be found to vary considerably; there may be a wild or wandering look with great mobility of countenance—a constant look of surprise, of indifference, of dullness, or of imbecility. The mouth may be drawn to one side, and upward; an eyebrow may be slightly elevated; or an eyelid may droop,—and these may especially occur when the patient laughs or speaks. Sometimes vomiting will be present, as well as double vision. Mucus is sometimes abundantly discharged from the eyes and mouth, varying in quantity with the variations of the other symptoms. The speech becomes altered, thick, or impossible; or meaningless sentences will be constantly uttered by the patient. The pulse is strong, full, or frequent; the countenance more or less injected, and often swoln; skin hot; more or less thirst; redness of the tongue; and retention of urine; these symptoms are more marked in the latter period of the disease. The urine will usually contain phosphates, fatty matters, purpurine, and sometimes cholesterine; it will be slightly acid, or neutral. In the latter stages urea is common.

Notwithstanding the difficulty in diagnosticating cerebral softening, certain symptoms have been named by writers, by which it may be determined from hemorrhage of the brain; thus, if, after an attack of apoplexy the paralyzed limbs temporarily recover their power, or become affected with twitchings, the attack is more likely to be from softening than from hemorrhage. When there is contraction of the muscles with rigidity and slight indications of apoplexy, softening of the brain may be suspected. When there is a perversion or loss of muscular power, (common also to meningitis), and this is confined to but one side of the body, it is

a strong indication of softening. Delirium in advanced life is more common when softening is present,—meningitis being a rare disease among old persons. If, during delirium, paralysis occurs, it is an almost certain indication of softening.

Acute softening of the brain may occur at any age, and is seldom if ever cured, the patients dying in from one to thirty days after the attack; more commonly on the ninth day. Sometimes the patient survives, but labors under the chronic form.

The symptoms of *chronic* or *non-inflammatory softening of the brain*, are as equivocal as those of the acute form. When it follows the acute form, there is a gradual improvement of all the symptoms. The mind though not wholly restored to its original vigor gradually becomes clearer; the speech gradually improves, though not fully restored; there may also be a diminution of the paralysis,—a greater capability of using the limbs, which condition is commonly preceded, as well as accompanied, by lively, prickling sensations in the palsied parts, which are sometimes quite painful, and which are indicative of softening, especially when they occur immediately after an attack of apoplexy; if they appear at a later period they may be due to a consecutive ramollissement around a clot or hemorrhagic cavity.

When the softening is gradual and progressive, not having been preceded by the acute form, it is more commonly met with in persons of advanced years. The patients complain of uneasy sensations and numbness about the head; this is succeeded by a fixed, more or less severe pain, generally frontal, but occasionally in the occipital part, and vertigo, which occasionally causes them to fall down, or to faint. After a few weeks, months, or years, numbness of the fingers and toes is experienced, with formication, usually on one side of the body only; these will be followed by weakness of the limbs, a difficulty in grasping objects and in retaining them in the hand; and in walking, one foot is usually dragged along. Sometimes muscular contraction with rigidity attacks the hand or elbow, and may extend to the whole of one side, changing in degree from time to time, until it remains permanent. There may also be a drawing of the mouth toward the paralyzed side, with injection and half-closed condition of the corresponding eye. The mind becomes impaired from the commencement, there being a failure of the memory, and a more or less enfeebled state of the attention, perceptions, judgment, and imagination.* The patient

* Dr. Bennett states that, generally, a "true exudative cerebral softening is preceded by more or less weakness of the intellect, and more especially by slow-

presents an appearance of astonishment, dullness, or indifference, and, at a later period, will occasionally sob or weep, without any apparent cause. The sense of touch becomes greatly diminished; vision is more or less distinct, or wholly abolished; hearing is usually defective; speech becomes confused or difficult from forgetfulness of words or from a paralyzed condition of the tongue, and there is a singular monotony of the voice. The pulse is apt to be slower and feebler than natural; the skin pale; and the temperature lower than in a state of health. At an advanced period, when paralysis becomes complete, the patient answers very slowly, or, being unable to express his wants, makes painful gesticulations to convey his meaning. Coma may follow the paralysis, or the two may occur together. The mental powers as well as those of sense become entirely abolished, the ability of retaining the excretions becomes lost, marasmus occurs, with gangrene of certain parts, and the patient sinks under the most complete coma.

In the latter period of the disease there will be want of appetite, dryness of the teeth and gums; a rough, brown, blackish, chopped, or finely fissured condition of the tongue; vomitings; involuntary discharge of the excretions; labored, and then stertorous breathing; feeble, irregular, unequal, or intermittent pulse; and a pale, sunken appearance of the countenance.

Persons suffering from ramollissement of the brain commonly have as the immediate cause of death, inflammation of the brain, hemorrhage, apoplexy, pneumonia of a low, hypostatic character, or from gangrene of the skin over the sacrum or the heel, which it is almost impossible to arrest, owing to the enfeebled condition of the vital powers.

If a patient complains of a violent pain confined to one side of the head, with or without emesis, and with more or less derangement of vision, but without paralysis, these are not indicative of softening, but may be symptoms of a *tumor in the brain*. If, in addition, convulsions simulating epilepsy occur, without paralysis

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ness in receiving mental impressions, or framing replies to questions, frequently combined with more or less headache, confusion of ideas, and perversion of motion. Much will depend upon the seat of the lesion, the mind being disordered most in proportion to the extent and nearness of the disease, to the hemispherical ganglion,—while motion is the more influenced, according as the central and basic parts of the brain are affected. Then it should not be forgotten that whilst a cerebral softening may occasionally lead to or be complicated with a hemorrhage, so a hemorrhage is one of the most common causes of softening. . . . . *Suddenness of attack*, whether of apoplexy or palsy, is (excluding external injury) the characteristic symptom of cerebral hemorrhage."

during their intervals, and especially if the mind and speech remain normal, the probabilities would be strongly in favor of the presence of a tumor.

Recamier has stated that where there is a dissonance among the symptoms they are due to softening, and, on the other hand, where there is a consonance in the paralytic phenomena, we must conclude that a hemorrhage exists. Vertigo, loss of consciousness, and paralysis of one of the sides of the body, occurring suddenly, is indicative of hemorrhage on the side of the brain opposite to that in which the paralysis has manifested itself. The continued presence of vertigo, formication, and cramps, with gradually progressing paralysis, is indicative of softening. Yet a sudden attack of paralysis, the general sensibility, the senses, and the intellect being unimpaired, is sometimes due to ramollissement, while gradual paralysis, following precursory symptoms, may arise from sanguineous apoplexy. (*Trousseau.*)

In a clinical lecture on hemiplegia due to atrophic cerebral softening, Dr. R. B. Todd observes, that in "all cases of hemiplegia the condition of the muscles of the paralyzed limbs should be noted. The forearm should be flexed upon the arm, or the thigh upon the leg, and any resistance to these movements offered by the muscles of the parts, as well as the degree of resistance, should be carefully ascertained. Sometimes the biceps will be the only muscle to oppose any resistance, at other times the triceps alone; while, with others, again, all the muscles of the limb will be in a state of intense rigidity. These different states of the paralyzed muscles,—flaccidity, slight resistance, or absolute rigidity,—are indications of different states of the brain. The perfectly flaccid condition of the muscles of the paralyzed limbs is indicative of a cerebral lesion distinctly atrophic in its nature—a lesion *the very opposite of inflammatory*, of a low kind, one in which there is a tendency to waste, and in which the vital powers are *below par*.

"The resistive state of the paralyzed muscles shows that the cerebral lesion, whatever it be, is of an irritative kind. A very frequent cause of this state of muscles is a small apoplectic clot with laceration by the effused blood of some of the healthy brain-substance immediately adjoining it. When the palsied muscles are hard and rigid, and almost in a tetanic condition, the brain lesion is of a more distinctly and decidedly irritative kind than in the last-mentioned class of cases, in which there is merely simple resistance, and is sometimes of an inflammatory nature."

Atrophic or *white softening*, he believes to be "seated in some part of the *center of volition*—that part of the brain which is immedi-

ately concerned in voluntary actions, as, the corpus striatus and optic thalamus on the left side, or parts in immediate connection with these ganglia. The softening is due, for the most part, to any condition which cuts off from the brain, or from a part of the brain, the normal supply of blood, as, for instance, ligation of the carotid artery, etc., and occurs chiefly in persons of fifty years of age and upward, depending upon a gradual change which takes place to a greater or less degree in the coats of all the arteries of the body, but especially in those of the brain. This change, which is generally known under the term *atheroma*, consists in the deposition of earthy and fatty matter in the walls of the vessels, causing a degeneration of their tunics. Sometimes the deposits are confined to the larger vessels; sometimes the capillaries are diseased, and their muscular fibers have undergone fatty degeneration. The effect of these deposits is, that the capillary circulation throughout the brain becomes more or less impeded, according to the degree of disease of the vessels, and the brain-substance gradually becoming less and less perfectly nourished, passes into a softened state, and at length melts down. The solution of continuity of nerve fibers which thus occurs, results in the effectual cutting off of all communication between the center of volition and the opposite half of the body, and induces a state of hemiplegia. . . . . It is in cases of this kind that true apoplexy most frequently occurs—that is to say, in which blood in greater or less quantity becomes effused into the brain—and the blood thus poured out often plows up the surrounding nervous substance, so as to form a considerable cavity, in which the clot is contained."

We may determine this apoplectic condition from simple softening, because, even a very small clot will almost invariably induce more or less of a lethargic or comatose condition, accompanied with more or less snoring. "In white softening causing hemiplegia, though the patient may for some time after the stroke be unconscious, lethargic, and inclined to gape, yet there will be no prolonged loss of consciousness, and the intellect will generally recover itself perfectly."

"If blood be effused into the brain, provided it encroaches on and more or less lacerates healthy brain, then there will be more or less resistance or rigidity of the palsied muscles; while if the clot be large the symptoms of coma will be very decided and prolonged—the patient will lie in a heavy sleep, from which he can be roused only with great difficulty, or, perhaps, not at all. On the other hand, a patient laboring under hemiplegia from simple white softening, will generally be found speaking, able to answer questions

readily and rationally, although in some cases the speech may be 'thick,' according to the extent to which certain muscles of articulation and deglutition may have been affected, or to which the center of emotion may have been involved either by shock or actual disease."

He says again: "It often happens in cases of hemiplegia, dependent on white softening, that the patient recovers perfectly from the first attack, and, after a longer or shorter interval, gets another stroke of palsy; and this second seizure is rarely on the same side as the first. The reason of this appears to be, that the affection depends upon a diseased state of the blood-vessels, and that this last morbid condition is the result of a symmetrical process affecting both sides of the brain alike, but as it does not generally proceed exactly *pari passu* on the two sides, it is usually found in a slightly more advanced stage on one than on the other."

The *morbid anatomy* of cerebral ramollissement presents the following conditions: the softening itself may exist in various degrees from the natural consistence of the brain-substance to that of thin cream. In its minor degrees it may be wholly overlooked, and can be recognized only when it is touched. In a more advanced degree in is distinguishable by the sight, as, the parts affected by it, especially the optic thalami, the corpora striata, and convolutions, sink down or become flattened by their own weight. In a still further advanced degree, the affected brain-substance is wholly disorganized and in a fluid condition which may be poured out. The softened part varies in color; it may be of the normal color of the brain-substance; it may be colorless; dull milky-white or brilliantly so; or it may present various shades of redness, from a rosy pink to an orange or deep red; mahogany brown; light or dark gray, etc. The color is more or less deeper than natural, or of a rose tint, as a general thing, when the softening is the result of inflammatory action; and it contains more or less pus infiltrated through the softened tissues. If the softening extends much beyond the redness, or the effused blood, or, if the redness occupies several portions only of the softened brain-substance, we may presume that the blood was extravasated subsequently to, and in consequence of, the softening. But when the redness can be traced for some distance beyond the softened part, the softening may be considered as the result of inflammation; and the same opinion may be held when a hardened, uniformly reddish cerebral substance is observed around the softened and disorganized pulp.

The softening may be confined to one part, or it may exist in several parts, or even both hemispheres of the brain may be affected

with it. The more generally affected parts are, the optic thalami, the striated bodies and adjacent parts, the eminences in the interior of the digitated cavities of the lateral ventricles, the commissures of the hemispheres, etc.

According to Dr. Bennett, the use of the microscope is an absolute necessity in determining the true character of ramollissement, and which will detect in inflammatory softening, in addition to the normal tubular and glandular structure, exudation granules and granule cells, in various stages of development, coating the vessels, or floating loose, either isolated or in the form of masses. The more pultaceous and diffluent the softening, the more numerous are the granules and cells, and the more disorganized are the nervous tubes and normal structures. In hemorrhagic softening, the nervous tubes are broken down, the blood coagulates, forming a solid mass, with the softened nerve tissue surrounding it, presenting circular, oval, or irregularly-formed globules with double outlines, being fragments of the nervous tubes. The serum is more or less tinged with coloring matter, infiltrated to a greater or less distance, and absorbed. No granule cells are seen except at a later period as the result of exudation from the cerebral vessels surrounding the clot. Hematine in various forms and tints, granules, granular masses, crystals of hematoidine or melanine, and colloid degenerations of various colors and shades, will also be present in greater or less number. In true fatty softening the vessels are not necessarily coated with granular exudation, but the nerve cells undergo fatty degeneration, primarily, enlarge, and many of them are dissolved, leaving triangular or crescentic-shaped granular masses between the nerve tubes; in addition to which the cerebral density is diminished, and the nerve tubes are easily separated and broken up.

The *treatment* of both the acute and chronic forms of softening of the brain has to be based on general principles, as there are no positive methods by which this affection can be accurately diagnosticated.

When, from the character of the presenting symptoms, the chronic form is strongly suspected as existing, great care must be taken to avoid all debilitating measures. Rubefacients should be daily applied along the whole length of the spinal column and to the extremities, the bowels should be kept regular, but not purged; the kidneys should also be kept in a normal condition, being careful in the paralytic cases to learn the condition of the bladder, daily; and the whole surface of the body should be bathed every day with a tepid, weak alkaline and stimulating solution, drying with friction. Internal medication should be of a tonic character,

as, Wine and Ferro-citrate of Quinia in rather large doses; Bordeaux, Claret, Rhine, or still Catawba Wines may be employed, avoiding the Wine, however, if it exerts a rapid, or strong action on the brain. Or, the following may be given with advantage in many instances: take of Sulphate of Quinia thirty grains, dissolve in Elixir of Vitriol one fluidrachm and a half, and then add Tincture of Black Cohosh two fluidounces and two fluidrachms, Tincture of Aconite Root three fluidrachms. The dose of this is from ten to twenty drops in a tablespoonful of water, to be repeated every three or four hours. From the effects of Bromide of Ammonium upon the system, causing absorption of fat and arresting atheromatous changes, this salt may be given in conjunction with the preceding tincture, as follows: take of Bromide of Ammonium two drachms, Distilled Water seven and a a half fluidounces, Solution of Perchloride of Iron four fluidrachms; mix. The dose is one fluidrachm, to be repeated three times daily.

The diet should be moderate, nourishing, easy of digestion, of a character agreeable to the stomach, calculated to improve the condition of the blood, enriching it with highly vitalized fibrin and albumen, and should not exert any positive action on the brain. Meats boiled or broiled should be used in preference to vegetables—of the latter, the succulent, the non-saccharine, and non-amylaceous are to be preferred. All articles containing much fat, as well as fermented liquors, must be avoided; the lean parts of meats only should be eaten. All excesses are dangerous. Change of air, traveling, cheerful companions, agreeable amusements, will be of great service, when these are not associated with any undue mental excitement. Active or violent exercise, strong emotions or passions, close study, watching, continued or exciting mental applications, sexual excitement, coition, and sudden exposures to changes of temperature, should all be avoided. The clothes should not be too tight, so as to interfere with the circulation, or favor cerebral congestion; and, in sleeping, the head should be somewhat elevated. A temperate situation is to be preferred to one either cold or warm.

Softening of the brain is frequently associated with cardiac, renal, or hepatic disease, either as a cause, or merely coexistent and aggravating the brain affection, and requiring the appropriate treatment for such disease. (*See Treatment of Apoplexy.*)

INDURATION OF THE BRAIN.

Induration or Hardening of the Brain is not so common an affection as softening. Three degrees of hardening have been described by writers, of which, the first is due to inflammatory action of the brain and its membranes, occurring either as a primary disease, or as a complication in some other acute affection. While the second and third degrees are considered a chronic malady, due to chronic or morbid irritation. The induration may affect the whole brain, involving all its functions and energies, in which case the chances of prolonged life are much less than when only a circumscribed portion of this organ is affected.

The *symptoms* of more general cerebral hardness, are, a greater or less confusion of ideas, a gradual loss of memory, mental derangement, followed by continuous insanity; as the affection advances in degree or in extent, there will be a complete loss of the mental faculties or dementia. When the induration is partial the symptoms will vary according to the extent of the disease and its location; there will be a gradual loss of memory, headache, difficulty of expressing ideas, want of mental concentrativeness, indifference to surrounding circumstances and events, confusion of ideas, muscular weakness, and gradual loss of the social, moral, and animal passions. Ultimately the difficulty of speech increases, paralysis, convulsions, epilepsy, or loss of muscular power comes on, with dementia, general or partial emaciation, and death. The disease is sometimes associated with induration of the spinal marrow, giving rise to a gradually progressive paralysis. Cerebral hardening is not easily *diagnosticated*, as there are no pathognomonic symptoms; and although an unfavorable disease, yet the chances of cure, especially with partial induration, are supposed, by some physiologists, to be greater than those of softening. The symptoms often continue for many weeks, then remit, and are again aggravated by paroxysms. Pains often exist at the extremities of peripheral nerves, or along their course. And cases occur in which there may be no suspicion of the hardening, until its presence has been established by dissection. The palsy is generally double-sided, commencing in the inferior extremities, and advancing upward.

Morbid anatomy reveals, in the first degree of induration, a condition resembling in consistence, portions of brain which have been macerated for some time in weak nitric acid; it is also often vascular and injected. The hardening is more manifest in the white than in the gray substance, especially in the central medul-

lary parts, and less manifest in the cortical structure and convolutions; it may affect the cerebro-spinal axis either wholly or partially.

In the second degree, the hardness has the consistence of cheese, and exposed to the fire becomes hard like horn, evolves a powerful odor, and leaves behind a dense blackish residue. The horny hardness is also imparted to it by the action of nitric acid.

The third degree is of waxy consistence or like the boiled white of egg, and contains but little blood, though it is sometimes possessed of considerable elasticity, resembling fibro-cartilage.

When there is only a partial hardness, it is more commonly found in the central parts of the brain, and, at times, in the convolutions, though any portion of the organ may be affected. It is frequently observed around old sanguineous effusions, as well as around other morbid conditions of the brain-substance.

The *treatment* of induration of the brain must be based upon general principles, administering remedies according to the symptoms or indications present. Of course, the treatment will vary considerably, when the induration is attended with hyperemia of the brain, from that pursued when there is an anemic condition of this organ. By keeping the stomach and bowels free from disorder, preserving regular action of the bowels, kidneys, skin, and lungs, preventing too great a determination of blood to the head, light nourishment, traveling, and cheerful society, together with the internal use of Iodide of Potassium, or Iodide of Ammonium, etc., much benefit may result. The Compound Tar Plaster applied over the sub-occipital portion of the head, and a discharge maintained for a long time, will be found of utility in those cases where it does not cause too much depression or debility.

CHRONIC MENINGITIS.

Chronic Meningitis, or Inflammation of the Meninges of the Brain, is a disease occasionally met with among adults. It may be present as a primary disease, or it may follow the acute form. The disease is more frequently met with among males than females, and those who are subject to insanity appear to be more liable to it, though it may be *caused* by strong emotions, immoderate use of alcoholic drinks, and masturbation.

The disease is usually met with after the thirtieth year of age, although it has been observed as early as at twenty. Its progress is slow, continuing from one to ten or twelve years; it may, how-

ever, terminate sooner from some peculiar exciting causes, which render it more active.

When the disease exists as a primary one, the early *symptoms* are those of cerebral hyperemia, with constant headache, sluggishness, both of body and mind, with more or less derangement of the intellect, sullenness, great irritability, and irregularity in the movements. Sometimes there will be more or less vomiting, epileptoid attacks, obstinate constipation, perhaps deafness, as well as an impairment of one or more of the other senses. After a longer or shorter time, the ideas become confused, the speech embarrassed, progressive delirium, difficulty in moving, although there is more or less desire for motion, the muscles twitch involuntarily, and finally the intellect becomes destroyed, an incapacity to move, and, in many cases, either partial or general paralysis. Sometimes the intellectual and locomotive powers remain undisturbed, until the disease has considerably advanced. In the last stage, in addition to the above, there will be an atrophied condition of the muscles, derangement of the nutritive system, gradual emaciation, irritation of the pulmonary tubes, and colliquative diarrhea. When the disease attacks children, as the result of blows, etc., there will frequently be, what are termed, inward convulsions, each attack being attended with an extensive and semi-rigid condition of the extremities, the eyes will remain half closed and perfectly passive to external objects, a mucoid film will form over both eyes, and which is a symptom of diminished nervous influence.

The *morbid appearances* observed after death are principally seated in the pia mater, the arachnoid, and the gray substance of the brain. There will be redness, effusion of blood, etc., in the pia mater, thickening, opacity of the arachnoid, effusion of serous, or sero-albuminous fluids, adhesions in various parts from the formation of false membranes, and occasionally morbid depositions of osseous, cartilaginous, or other matters. If the disease be complicated with apoplexy, softening, or active inflammation, the post-mortem will reveal their existence.

The *treatment* of chronic meningitis will be similar to that named for Induration of the Brain, on page 166 ; and, although we may not be enabled to remove the disease, its progress may be checked, and the patient's life be thereby prolonged.

CHRONIC TUBERCULAR MENINGITIS.

This affection, also known by the names *Chronic Hydrocephalus*, *Hydrocephalus Internus*, etc., is more commonly met with among children from birth and upward; sometimes it has been observed in adults. It frequently occurs before birth, causing the death of the fœtus. It is, however, of less frequent occurrence than the acute form of the disease.

Chronic Tubercular Meningitis may be due to some malformation or defective development of the organs comprising the brain, during fetal life; or, to some peculiarily-inherited constitution, especially rachitic, or scrofulous. The diseases of the mother, as well as strong, unhealthy mental emotions or passions, during pregnancy, also the advanced age of the father, drunkenness, etc., have all been supposed to exert an influence upon the fœtus in producing this disease. Likewise, tight-lacing during pregnancy, great debility of either parents from excessive masturbation, or from strumous disease.

Among the exciting causes have been named improper hygiene of the infant, cold, blows, falls, disordered or difficult dentition, especially when connected with derangements of the digestive functions, tumors of the brain, tubercles of the arachnoid, chronic inflammation of the membranes, severe and exhausting diseases of the abdominal or thoracic viscera, etc.

The *symptoms* vary somewhat according to the variety of the disease. The most common variety is that in which there is an increase in the size of the head, and which occurs only when the sutures and fontanelles are imperfectly united, the rapidity of the augmentation being greater when these are not united at all, or very slightly so. In another variety, which is congenital, the head appears lessened in size, is of canonical shape, and depressed laterally and anteriorly; the infants manifest no symptom of sense or intellect, and generally die in convulsions, soon after birth, or, they may live for a few years. A third variety, is that in which from perfect ossification and union of the sutures and fontanelles, there is hardly any enlargement of the head to be observed.

The more usual symptoms observed are, irritability of temper, great nervous excitability, brilliant appearance of the eyes, suffused countenance, eyes injected and acutely sensible to light, contraction of the pupils, morbidly acute hearing, dryness and itching of the nose, in the commencing stage, followed by headache, drowsiness, stupor, heaviness of the head, dullness of mind, irregular or vora-

cious appetite, inactivity, vertigo, pale countenance, with a look of bewilderment and confused intellect, grinding of the teeth during sleep, sudden starts during sleep, and when awakened the child frequently utters a piercing scream. The skin is generally natural, the pulse quick, and sometimes there will be slight convulsions occurring occasionally from the commencement. For a time, respiration, circulation, and digestion continue unchanged; but they soon become affected, the appetite diminishes, as well as the heat and moisture of the skin; the breathing is labored and difficult; the countenance becomes pale; constipation is obstinate; the urine diminishes in quantity; and emaciation occurs more or less rapidly. The limbs become debilitated, the walk uncertain and trembling, requiring assistance until, from atrophy of the muscles, the child becomes unable to walk; the head is seldom carried erect but is inclined to one side. Vomiting is very common among children. There is comparatively but little heat of the skin, and the pulse is quick, but in the latter stage the pulse becomes weak and small, with diminution of the heat of the skin.

In infants, owing to the separation of the sutures, the enlargement of the head commences soon and proceeds rapidly; but even when the sutures are ossified, this enlargement has been known to take place to a certain extent. This increase of size is confined to the vault of the cranium only, the base remaining unchanged.— The urine will be variable in color, quantity, and in alkalinity or acidity; it will contain phosphates, tubercular matter, albumen, cholesterine, cystine, etc.

As the disease progresses all the organs of sense become more or less affected, the pupils dilate, vision is frequently abolished, there is more or less strabismus, the hand is frequently raised to the head, the intellect becomes destroyed, with delirium, idiotcy, stupor, indifference, and coma. Frequently, convulsions take place, followed by paralysis, and causing difficulty in swallowing, retention of urine, or involuntary evacuations. The extremities become cold, damp, and œdematous.

The duration of this disease is very variable; it may prove fatal in a few days or weeks, especially during infancy; and cases are on record where the patients have lived twenty, thirty, and even fifty years. But these last favorable cases are extremely rare.

It is very difficult or almost impossible to *distinguish* the first two periods of this disease, that is, the period of tubercular deposition, and that of inflammation, during life; but the last or hydrocephalic stage is more readily recognized. When this latter condition occurs we have a difficulty of standing or balancing, an unsteadiness

of the voluntary muscles, or a loss of motion and sensation in the limbs, inclination of the head to one side, blindness, with an apparent projection of the eyeballs, and more or less complete stupor. As long as these symptoms are absent there is no cause for despair; even coma is not necessarily a fatal symptom, as it may occur independently of effusion.

Painful contractions of the cervical muscles is a constant and very characteristic symptom, and is no doubt to be attributed to the irritation of the nerves at the base of the brain. To ascertain the presence of this symptom, the patient's head should be moved from side to side, watching at the same time the expression of his countenance. In some instances these spasmodic contractions extend to various parts of the trunk, giving rise to tetanic or epileptic convulsions.

M. Trousseau has pointed out a sign in this disease, which he considers diagnostic, and which he has named the *cerebral* or *meningitic mark* or *stain*. It is the appearance of a peculiar red or raspberry-colored line or mark, remaining upon the skin of the forehead, or of the abdomen, after the finger has been drawn across it. It may also be observed upon the skin of the face or neck by the pressure or irritation of other substances, as, of the bedclothes, dress, etc. This spot or mark appears to be more commonly observed in the last stage or stage of effusion; it has also occasionally been observed in other diseases, but is more common in hydrocephalus.

Chronic tubercular meningitis may be determined from the *gastric* and *remittent fever* of children, if any fever be present, by the absence of remissions, the gradual increase of the cerebral symptoms, and the absence of the "meningitic mark."

Morbid anatomy shows the cranial vault considerably expanded, more anteriorly and laterally than posteriorly; the base of the cranium remaining unchanged. The sutures are more or less widely separated, and the bones feel loose. Generally, the cranial bones will be thin, weak, flexible, semi-transparent, and more like parchment, porous, and the osseous fibers imperfect, radiated, and visible. Within the cavity of the cranium will be found a quantity of serum varying from an ounce or two to ten or twelve pounds; this fluid is generally effused in the ventricles, and but seldom in the general cavity of the arachnoid. The fluid may, according to Breschet, be contained between the dura mater and the cranium; between the dura mater and the arachnoid; in the cavity of the arachnoid; in the ventricles; or in the laminæ of the pia mater. It will also be found in the spinal canal.

When much fluid is effused into the ventricles, the brain will be distended, its convolutions unfolded, and some difficulty will be

experienced in distinguishing its peculiar structure. Sometimes the corpus callosum will be found raised nearly to the skull, and thinned; the septum lucidum torn; the lateral ventricles communicating freely with the third, and this with the fourth, forming one cavity; and the nerves atrophied or softened. The cerebellum is seldom materially altered. But few morbid changes will be observed in the membranes; it is rare that the dura mater is altered, though, in some cases, the falx cerebri is absent. The arachnoid is occasionally whitish, opaque, infiltrated with serum, and, in some places, thickened. The pia mater is not destroyed, but is excessively thin, and small tubercular depositions will be observed in it. Small cysts are often contained in the choroid plexus; and the corpora striata and the thalami optici are small and compressed. Depositions of tuberculous lymph will almost always be found in the fissure of Sylvius.

As a general rule when tubercles are found in the membranes of the brain, even in the most minute proportions, they will also be found in the other cavities.

The *treatment* of this disease presents the following indications,—to overcome cerebral irritation in the earlier stages, when present; to prevent effusion into the ventricles; to excite the absorbents to remove effusion, when it has taken place; and, in every stage of the disease, to palliate urgent symptoms, and give tone to the general system, with a view to the removal or suspension of tubercular depositions. Unfortunately, much good is seldom accomplished in these cases, by treatment; yet, patients have been cured, and, according to many authors, the disease is susceptible of cure in a very great number of cases, hence, it is always advisable to attempt a cure by the judicious management of remedies.

The use of hydragogue cathartics, diuretics, and sudorifics, will prove of great utility in the first and second stages of this disease, aided by the internal exhibition of Solution of Iodide of Potassium, or Solution of Iodide of Ammonium, either alone or in combination with the Chloride of Gold and Soda. The head should be shaved, and afterward rubbed with an Ointment of Iodide of Ammonium, repeating the application two or three times every day; sometimes, advantage will be found from the addition of Extract of Stramonium to the ointment. A flannel or oil-silk cap should be worn constantly upon the shaven scalp. At the same time a discharge should be kept up from the nape of the neck, as long as the patient can bear it, by means of the Compound Tar Plaster.

The diet should be nutritious, but not stimulating; the surface of the body should be bathed frequently, and stimulating applica-

tions be applied along the spinal column, and the whole of the inferior extremities; the urinary organs should be kept as normal as possible; and gentle exercise be permitted in the open air, when this can be done. The patients should not be subjected to harsh usage, nor be made to task their brains in the least with study, and all measures calculated to irritate or wound their sensitiveness must be avoided. Above all things, no blows about the head should be permitted. Their sleep should be limited to about ten hours of the twenty-four, and instead of feather-beds they should lie upon those constructed of cotton, hair, etc.

As a hydragogue I have frequently derived benefit from the following: Take of Elaterium four grains, Alcohol a fluidounce, Nitric Acid six drops; mix. The dose is from five to ten drops in water, for a child a year or two old, and which may be repeated if necessary.

"From a belief that effusion might be the result of want of firm resistance by the unossified cranium, compression has been tried, and has proved successful in a number of instances, and in others has brought on convulsions. To produce any good effect, the compression must be gradually increased, and continued for a considerable time, loosening the bandages if symptoms of compression appear, or removing them if the skin be irritated.

"Puncturing of the cranium has occasionally proved successful, and in so hopeless a disease, when all other means have failed, we are justified in having recourse to an operation which has even occasionally saved life. In performing the operation, a fine lancet-shaped trocar is to be passed in the coronal suture perpendicularly to the surface, through the scalp and membranes, about an inch and a half below the anterior fontanelle, so as to avoid the sinus if possible, and the great veins. The fluid should be allowed to escape very slowly, the head being gently compressed in proportion, and the whole fluid should not be evacuated at once, only a few ounces at a time, and due pressure should be maintained both during and after the escape of the fluid. If the pulse becomes weak, the pupils contract, or the child faints, remove the canula and administer a stimulant,— if inflammation arise treat accordingly." (*Churchill.*)

Dr. Conquest states: "I have now tapped nineteen cases, and of these ten were living when last heard of. Several of the children before the operation were reduced to the most deplorable condition, having frequent convulsions, with loss of sight, emaciation, etc.; but the diminution or disappearance of the symptoms has been very remarkable." He adds, however:—"In no instance has clearly marked congenital disease been benefited, and those cases have

done best in which effusion manifestly resulted from inflammatory action, and in which cerebral excitement follows the operation."

Dr. Watson states that the above two mechanical measures "are opposite measures and adapted to opposite conditions of the brain, the one supplying a defect of pressure, and the other relieving its excess; and that the application of either requires a clear and cool judgment and a constant attention to the symptoms which may arise during the treatment employed." The internal medication with the iodides should not be omitted, when these last operative means are employed, unless contra-indicated.

ANEMIA OF THE BRAIN.

This is a disease which may be mistaken for hydrocephalus, and has, consequently, been termed, *spurious hydrocephalus*. It is due to a deficiency of blood in the brain, as well as a deficiency of red particles in this fluid. It may also be produced by long continued exhausting diseases, profuse hemorrhages, and whatever will impoverish the blood, or materially lessen its supply to the brain. It is occasionally met with among adults, but is much more frequent among children, with whom it is often the result of improper or imperfect feeding, protracted diarrhea, exhausting treatment, etc.

The *symptoms* of this disease, as, dilated pupils, palpitation of the heart, dyspnœa, coma, convulsions, etc., so closely resemble those that are induced by hyperemia, that it is of considerable importance to distinguish between their causes. The symptoms usually observed are, paleness of the face, the cheeks being cool or cold; heaviness of the head; languor; drowsiness, the child lying half asleep, with the eyelids half closed, the pupils dilated and motionless, the eyes not noticing any object placed before them; irregular and suspirious breathing; the feet and legs cold; clinching of the hands, or spasms of the fingers and toes; and, if the child be cutting teeth, there may be squinting, with partial convulsions, and rough or metallic inspirations. At the commencement of the disease, the tongue will be found white, the pulse quick and feeble, scanty urine, perhaps a dry, hacking cough and mucous diarrhea, and more or less emaciation, and increased irritability; these are followed by the symptoms named above, the pulse continuing weak and frequent. Coma comes on after a longer or shorter time, and death soon ensues. The urine is usually pale, slightly acid, of low specific gravity, and is deficient in urea and uric acid.

We may *determine* anemia of the brain from an opposite condi-

tion of this organ by the drowsiness, the unwillingness of the child to raise its head, the languor, the cool or cold condition of the skin, the feeble, quick pulse, and the absence of all febrile symptoms. In very young children the unclosed anterior fontanelle will be concave or natural, in anemia; while in a plethoric or hyperemic condition of the brain it will be prominent and convex.

The *morbid appearances* are paleness or less vascularity of the brain and membranes, and especially of the gray substance. More or less effused fluid may be found in the ventricles, or at the surface and base of the brain, and which may have occurred either just before or after death. The blood will be found deficient in red globules.

The *treatment* for an adult, or child of advanced years, will be gently stimulating and nourishing, as, for instance, Elixir of Cinchona and Iron, together with a moderate use of tender, properly cooked meats. At the same time making use of means to check any exhausting discharges, or causes of irritation that may be present. The sedative influence of opiates has been found very beneficial in removing symptoms occasioned by loss of blood; hence, Powdered Opium, a Pill of Opium, or Sulphate of Morphia, may be given in a rather larger dose than under ordinary circumstances, so as to occasion a prompt sedative effect.

With very young children, nourishment should promptly be given them, of a character in accordance with their age, as, breast milk, cow's milk, or goat's milk, together with ten or twelve drops of the Aromatic Spirit of Ammonia, in a little water or milk, to be repeated every three or four hours; or arrow-root with a few drops of brandy or wine in it; gum-arabic water with ether, etc., may also be administered. The limbs should be rubbed well, and be kept warm in flannel; the child should be placed in a horizontal position, and not be raised upright; small quantities of nourishing diet should be cautiously given from time to time; any irritation from dentition should be removed as soon as possible; and means taken to promptly restrain diarrhea, when it is present.

Other morbid conditions of the brain are occasionally met with, which it is extremely difficult, if not impossible to diagnosticate, which present analogous symptoms, and which are seldom benefited by treatment, as, *scrofulous*, *scirrhous*, *carcinomatous*, *fatty and encysted tumors*, *membranous adhesions*, *ossific and carbonaceous deposits*, *infiltrations of pus*, *abscess of the brain*, *cerebral hypertrophy*, as well as *atrophy*, *tubercles*, etc.; this reference is all that is necessary to these diseases, which are very equivocal in their symptoms and susceptibility to therapeutical measures, and can be positively

known to exist only by post-mortem examinations. All these affections, on account of the obscurity of diagnosis, and our want of correct knowledge concerning their origin and progress, require to be treated upon general principles, meeting the various symptoms as they arise, and keeping the patient constantly under the influence of solvents, alteratives, and tonics, together with the proper attention to hygiene.

Certain other conditions of the brain, giving rise to symptoms usually treated upon as diseases, as cerebral hemorrhage, etc., will be referred to under the heads of Apoplexy, Paralysis, Epilepsy, etc.

CHRONIC SPINAL MENINGITIS.

Chronic Inflammation of the Membranes of the Spinal Cord may occur as a primary affection, ultimately assuming a more active form, or, it may follow the acute form. It is frequently connected with chronic cerebral meningitis, as well as with more or less irritation or chronic inflammation of the cord itself.

The disease comes on very gradually, sometimes, existing for several years before much complaint is made; it is also frequently mistaken for some other malady, as many of the symptoms, and especially the more severe ones, are seated at distant points. Thus, it may be mistaken for weakness of the limbs, neuralgia, rheumatism, spinal irritation, chorea, etc. There is more or less tendency to an extension of the disease, both upward and downward; and, in feeble habits the disease progresses more rapidly than with the more robust, and passes much sooner into the acute state.

It may be *caused* by sedentary habits, want of exercise in the open air, intense mental application, improper, insufficient, or unwholesome food, and the various causes which determine spinal affections generally. However, among the more ordinary causes, are, injuries to the spinal column, from sprains, bruises, falls, blows, tight-lacing, etc.; sudden exposures to cold; abuse of alcoholic drinks; sleeping in cold or damp places; rheumatic disease; congestion of the membranes occurring in the course of certain fevers; sexual excesses; and especially self-pollution.

The *symptoms* of chronic spinal meningitis are numerous and varied, according to the seat and extent of the disease. At first an aching and more or less severe pain will be complained of in some part of the spinal column, which extends into the limbs, or nervous extremities in relation with the affected part; percussion over the affected part will increase the pain, but mere pressure will not;

more or less numbness of the inferior extremities, with sensations of tinglings, prickings, burnings, formication, etc. The pain may be continuous, remittent, or intermittent, and will often be increased by certain movements, or when the limbs or body are made to assume certain positions. After a longer or shorter period motion becomes uncertain and difficult, the patient often walking as if inebriated, and when the disease has extended to the superior portions of the cord, there will be likewise, a slow, irregular, jerking, vacillating motion of the arms and fingers, and which condition may continue for even several years. In connection with these symptoms there will be more or less derangement of the digestive organs, variable appetite, flatulency, constipation, or great alvine irregularity, together with a dry state of the skin, or some other disorder of its functions, incontinence of urine, the urine generally containing considerable phosphates, and, perhaps, a small amount of pus: The speech is generally affected; sometimes there will be a strabismus; and, especially in very severe cases, the mind will become more or less deranged. The pulse is, at first, not much affected, especially when the disease is confined to the inferior parts of the spinal cord; but in the later stages it becomes frequent, small, and irregular. When the superior parts of the cord are attacked, the pulse is commonly slow, at first, with more or less derangement of the action of the heart.

Finally, swallowing becomes difficult; the breathing becomes slow or irregular; more or less violent spasms of the muscles of the neck and back occur; rigidity or tetanic contraction; and these occur in the superior extremities when the dorsal or cervical parts of the cord are affected. A sense of constriction occurs, especially in the neck, back, and abdomen; suffocative feelings; paraplegia or general paralysis; coolness of the surface, emaciation, delirium, and coma. Or the disease may assume an acute form, and involve the base of the brain. Sometimes there will be no convulsions whatever, nor any paralysis.—These are the ordinary symptoms, which will be found to vary in number, in the order of their occurrence, in their intensity, etc.

Morbid anatomy reveals an effusion of coagulable lymph on the arachnoid of the dura mater, between this and the visceral layer of the arachnoid, and, sometimes, a coating of purulent matter will lie between the cord and its membranes, being more abundant at some parts than others. The lymph between the membranes may sometimes be partially converted into adipose matter, presenting a quantity of oil-globules. In some cases, there will be more or less vascularity of the cord and medulla oblongata, with effused lymph

and a turbid serum surrounding them. Occasionally the substance of the cord will be found softer than natural, and, at some part, separated into filaments. Adhesions between the membranes are also frequently met with. Thickening, induration, false membranes, cartilaginous, and ossific deposits, tubercles, tumors, etc., have all been observed on different occasions.

Discrimination. In chronic spinal meningitis the pain is more severe than in *chronic myelitis*, and extends more or less along the whole spinal column; and is but little, if any, aggravated by pressure. The disease has a greater tendency to extend itself, while chronic myelitis is confined to only one part of the cord; in meningitis the muscles of the back are contracted, from a mere rigid state to a violent spasm amounting to perfect opisthotonos, which is not the case in myelitis. In meningitis the pressure of the effused lymph upon the cord and roots of the nerves may cause paralysis, but sensibility continues; in myelitis not only is motion lost or impaired, but sensibility also. When both meningitis and myelitis are present, the discrimination will be much more difficult.

Chronic inflammation of the membranes of the spinal cord is a serious disease, sometimes progressing slowly for a number of years, at other times, rapidly passing into the acute form, and which may happen at almost any period during its course. The most favorable period for its treatment is before paralysis has occurred; after this, although a cure is seldom obtained, it may be considerably benefited by proper management. Much, however, will depend upon the cause of the disease, the constitution and habits of the patient, the complications of the disease, etc. When complicated with cerebral meningitis, or chronic myelitis, the chances for recovery are less favorable.

The *treatment* of chronic spinal meningitis consists in keeping the bowels, stomach, skin, and kidneys regular, making use of light nourishment, avoiding all sources of irritation, preserving cheerfulness, and affording the spinal column as much rest as possible, never fatiguing it, or augmenting the pain by exercise, or by remaining too long in an upright position. In addition to this, the Iodide of Potassium, or Iodide of Ammonium, should be used internally, as well as Oil of Turpentine, which has a powerful tendency to prevent lymph from being effused from these membranes. The whole length of the spinal column, as well as the inferior extremities, should be rubbed two or three times a day with the following liniment: Take of Oil of Amber one fluidounce, Tincture of Arnica two fluidounces, Oil of Turpentine six fluidounces; mix. Dry cupping

along the spinal column, frequently repeated, will be found useful in the commencement of the affection, but after it has somewhat advanced, the Compound Tar Plaster applied over the painful parts, and a constant discharge kept up therefrom will be found superior to anything else, except in those cases where it causes too much depression of the vital force, or debility, under which circumstances it should be applied intermittingly. To overcome the pain in chronic spinal meningitis, when very severe, the following will be found a very efficacious preparation: Take of Sulphate of Quinia two drachms, Elixir of Vitriol six fluidrachms, dissolve the Quinia, and then add Tincture of Aconite one and a half fluidounces, Tincture of Black Cohosh nine fluidounces; mix. The dose is from ten to twenty drops in a tablespoonful of water; to be repeated every hour or two for three or four months in succession. In some cases a combination of Tinctures of Aconite and Gelseminum will be found advantageous. The measures here indicated should be perseveringly persisted in for a number of months. (*See Treatment of Chronic Myelitis.*)

CHRONIC MYELITIS.

Chronic Inflammation of the Spinal Cord may exist as a primary disease, becoming more or less acute and rapidly fatal, or, it may follow the acute form. It is sometimes complicated with chronic spinal meningitis, as well as other affections of the cord or its membranes. The disease, when not the result of the acute form, usually comes on very slowly, and, when of limited extent, may remain for years before presenting any serious symptoms, or, may even terminate favorably. The disease is not so apt to extend itself as is the case with chronic spinal meningitis.

The *symptoms** vary considerably, according to the part affected,

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*Dr. C. E. Brown-Sequard gives the following list of symptoms as characterizing chronic inflammation of the middle or lower parts of the dorsal regions of the spinal cord, attended with paralysis of the lower limbs of long standing:—"1. A constant pain at the part of the spine corresponding with the upper limit of the inflammation of the cord.—2. Whether a constant pain exists in a marked degree or not, pressure upon the spinous process of the vertebræ, (sometimes even a slight one), when made at the upper limit of the inflammation, almost always causes an acute pain.—3. A sponge filled with warm water and passed along the spinal column, gives a normal sensation of heat in all the parts above the seat of the inflammation, but a burning sensation at its upper limit.—4. A small lump of ice passed along the spinal column gives the natural sensation of cold everywhere, except at the level of the inflammation, where it produces a burning sensation.—5. In all cases of myelitis there is a sensation as if

the extent of the disease, its complications, etc. The more common symptoms are, more or less continuous or intermittent pains, or a dull, heavy sensation, or a feeling of soreness, experienced in the head, and more commonly in the occipital portion; these will vary in severity at different times, becoming more painful as the disease progresses. There will also be more or less pain in some part of the spinal cord, together with pains or cramps in the corresponding muscles or limbs. The pain in the head will frequently dart down to the neck and along the back, in various erratic ways, and the muscles of the neck are apt to be more or less painful and rigid, which conditions are much increased by motion. The pain in the back may exist at any part, though more generally located in the dorsal vertebræ, and is not only aggravated by movements of the

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there were a cord, or other ligature around the body, at the limit of the paralysis; in some cases it is very slight. It is chiefly due to cramp of some part of the thoracic or abdominal muscles.—6. Sensations of pricking by pins and needles, formication, of burning or intense cold in the feet, legs and thighs, and sometimes in the abdominal walls. These are important indications of myelitis, and, although referred to the parts affected, are due to irritation of the gray matter of the spinal cord; they exist with as much severity, if not more, in parts deprived of sensibility, as in parts which are still sensitive.—7. Cramps in the feet or calf of the legs are frequent, with all patients, as well as in the large muscles of the abdomen. A cramp limited to one part, and continuing for several days, may form a kind of lump, which may be mistaken for a tumor.—8. Whether myelitis exists only in a small zone of the spinal cord, or occupies the whole of the dorso-lumbar enlargement, the paralysis of motion exists in all the parts of the body that receive their nerves from the portions of the spinal cord that are below the upper level of the inflammation. The degree of paralysis varies in different patients, but it is nearly the same in the various muscles in the lower limbs in the same patient.—9. When the lower part of the dorsal region of the cord is attacked, paralysis of the bladder and of the sphincter ani is almost always present; when the seat of the inflammation is higher up in the the dorsal region, there is rather a spasm than a paralysis in the sphincters of the bladder and anus. There is then often a retention of urine, owing to the paralysis of the bladder while the sphincter vesicæ is more or less in a spasmodic state.—10. The urine is always alkaline, or, should it become acid from the use of certain articles of food, the alkalinity will soon reappear.—11. Anæsthesia, or at least a diminution of sensibility, always exists in myelitis, except when the gray substance is not the seat of the disease, which is very rare. Usually, the inflammation begins in the central part of the gray substance, and then a diminution of sensibility is one of the first symptoms. That peculiar kind of muscular sensibility which serves to direct our movements is especially impaired in the very beginning.—12. When the dorso-lumbar enlargement is inflamed, reflex movements can hardly be excited in the lower limbs, and frequently it is impossible to excite any. On the contrary, energetic reflex movements can always be excited when the disease is in the middle of the dorsal region, or higher up."

body and limbs, but, also, in most cases, by pressure or percussion made over the seat of the pain, and by the application of a sponge wet with hot water upon the part. In connection with these symptoms, there will exist, according to the duration and extent of the affection, more or less derangement of the digestive organs; pale tongue coated with a thick white fur; impaired or morbid appetite; nausea; vomiting; costiveness; sometimes a deranged condition of the urinary organs, with more or less irritation at and around the neck of the bladder; sometimes presenting symptoms resembling those of stone in the bladder; the urine irregular, turbid, generally alkaline, and containing sulphates and phosphates; if the disease is seated in the lower part of the spinal cord, retention of urine, impotency, or even priapism may take place; the skin is often very sensitive to the touch; if the upper portion of the medulla is affected, there will be more or less disorder of the respiration; deglutition may be more or less difficult; and hiccough may be present; in most cases, sleep will be disturbed and unrefreshing; there will be a feverish, irritable mental condition, with despondency; a sense of weariness and an indisposition to move about; the slightest exertion produces considerable fatigue, with, sometimes, tremblings of the inferior limbs, and a peculiar feeling of weakness, especially at the knee; the mind is apt to wander, or become occasionally confused; memory is more or less impaired; mental concentration becomes difficult; and various other strange and unaccountable symptoms, many of them similar to those named under Spinal Irritation, and which are often confounded with rheumatism, neuralgia, laryngitis, hysteria, deranged intellect, hypochondria, monomania, etc.

After a time, there will be a numbness in the fingers and toes, or in the limbs, with formication; and sensibility, as well as the power of motion, gradually diminishes. These symptoms may be the first experienced,—those named above not having been observed, or only in a very slight degree. The numbness slowly advances; tremors occur; motion becomes vacillating and unsteady; spasms or cramps in one or several parts occur every now and then; involuntary startings of the muscles; paralysis and great diminution, if not entire loss of sensibility. The pulse, not affected at first, becomes slow or irregular, and feeble; the temperature of the surface diminishes; the body gradually emaciates; the limbs become wasted, flabby, cold, with œdema; sloughs form on parts which undergo continued pressure; dyspnœa, coma, and death either from exhaustion or asphyxia. In some cases the speech will be inarticulate; the voice may be lost; the heart's action will be irregular; the chest will feel constricted, and the abdomen, as if a

cord were tied round it; and, sometimes, there will be convulsions instead of paralysis, or the paralysis may follow the convulsions. Various hypotheses have been advanced for the diversity and multiplicity of the symptoms, but, as nothing positive has been advanced except in a few of them, it is deemed unnecessary to state them here; they would be more in place in a work on physiology and pathology of the brain and nervous system. The same *causes* that produce chronic spinal meningitis may also give rise to chronic myelitis. It may also follow spinal apoplexy when this is not fatal.

The *morbid appearances* are softening of the cord, suppuration, or induration; the softening is often yellowish, or in the more acute cases, slightly red or pinkish. Either one or more columns may be affected; and the morbid change may be confined to the white structure only, or to the gray, or it may involve both. The gray substance is more frequently affected. Softening, however, is more common with the acute form of the disease, and induration with the chronic; the hardening being more common to the white columns. The whole spinal marrow may be involved, and even the brain; but, more generally, the disease is located only at the cervical, dorsal, or lumbar portions, or, at two or more of these points at the same time. More commonly the spinal membranes will also be found involved to a greater or less extent.

The *discrimination* of this disease from *chronic spinal meningitis*, has already been named on page 177; it, as well as the spinal meningitis, may be determined from *rheumatism* or *neuralgia*, by observing that these diseases are unaccompanied by spasms, cramps, tonic contractions of the muscles of the back, numbness or prickings in the extremities, girding or constriction of the chest or abdomen, loss of sensibility, palsy, stupor, etc. In *spinal apoplexy*, the symptoms come on suddenly, with rapid paralysis and loss of sensibility.

The *prognosis* of chronic myelitis is more favorable in its early period than subsequently; though, it is often the case that the early stages may pass unnoticed, and the patient becomes aware of his disease only when too late for a cure. Chronic myelitis develops itself and advances toward its termination very slowly; in its early periods, it is susceptible of improvement, or even a perfect cure, provided the cord is free from any positive injury. The less severe and numerous the symptoms the more favorable is the case. When paralysis has occurred; when there is a persistent failure in the strength of the system; when the urine contains a great degree of abnormal elements; when, from loss of power over the sphincters

the excretions pass away involuntarily; or, when from continued pressure upon certain parts of the body, sloughs form,—these are unfavorable symptoms. The prognosis is also more unfavorable when the disease is located in the cervical or dorsal portions of the spinal cord, than when it is confined to the lumbar region. (*See note on page* 178.)

In the *treatment* of this disease, it should always be borne in mind, that when the symptoms indicate an active condition of it, the measures pursued should be entirely to overcome this active condition, and during which period, the remedies hereafter named should not be employed. But, as soon as the more active symptoms have been removed, the disease being, as it were, in a passive condition, then the measures hereafter recommended may be pursued. These consist in an employment of the remedies, etc., advised in the treatment of chronic spinal meningitis, aided by the internal use of Phosphorus, Ergot,* Arnica, Belladonna, Electro-Magnetism, Black Cohosh, douches of tepid or cold water, rest in the horizontal position, and perfect quietude of the mind. Great care should be taken that the bladder be emptied at proper periods, and in relation to this matter, the chronist† should personally ascertain the condition of this organ from time to time, especially in the more advanced stages. In this disease, coition must absolutely be prohibited, as well as sexual excitements.

Dr. C. E. Brown-Sequard has stated that from experiments instituted by him, he believes that Ergot and Belladonna diminish the quantity of blood in the spinal cord; while, on the other hand, Strychnia and Brucia increase it. The application of cold to the spinal column, produces a contraction of blood-vessels by a reflex action, but if this action be very powerful, it will be followed by exhaustion and dilatation of the blood-vessels, and an actual increase of the amount of blood circulated in the cord. Lying upon the back, with the arms, head, and legs upon high pillows, favors a determination of blood, or temporary congestion in the spinal cord; while, on the contrary, lying upon the abdomen, or upon one side of the body, with the limbs on a lower level than that of the spine favors a diminution of blood in the spinal cord, or a partially anemic condition of it. Therefore, as myelitis is accompanied by an increase of blood in the spinal cord, he advises the following

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* Or, its active constituent, *Ecbolina* (Wenzell) or *Ergotina* may be used; the first in doses of $\frac{1}{20}$th of a grain gradually increased to $\frac{1}{10}$th; the latter in doses of from $\frac{1}{4}$ of a grain to a grain; either, to be repeated twice a day.

† A physician who treats chronic diseases only.

treatment: The patient must keep in a horizonal position, so as to give rest to the spinal cord, but he must avoid those positions of the body in which by gravitation the amount of blood in the cord will be increased; hence, he must never lie on the back. Dry cupping daily on the various parts of the spinal column will prove of service. A plaster of Extract of Belladonna, at least four inches wide by six inches long, should be worn for several weeks upon the back, over the painful portion of the spinal column. Internally, Powdered Ergot is to be administered twice a day, in doses of two or three grains, gradually increasing the dose to six or even eight grains twice a day. If no amelioration of the symptoms occur after a few weeks of this treatment, the Extract of Belladonna should be given twice a day in doses of a quarter of a grain. If after two or three months treatment, the patient gets no better, the Iodide of Potassium should be given, in addition to the above, in doses of five or six grains twice a day. If chronic spinal meningitis is suspected together with the myelitis, the treatment should be at once commenced with the Iodide of Potassium, and the Ergot and Belladonna.

SPINAL IRRITATION.

By this term is meant pain or tenderness in some part of the spinal column, either with or without pressure, not being accompanied by symptoms of fever, inflammation, injury, or organic lesion of the several parts belonging to the vertebral system. It is a disease which has given rise to considerable discussion among medical men, and the true character of which is not yet positively determined. The affection has been called *Rhachialgia*, also "functional disorder of the spinal marrow." It is frequently connected with a chronic functional disease of some one or more organs of the body, with which it stands related, either as cause, or effect by reflex action; and it is a well-known fact that many of these chronic affections can be detected, located, and, of course, their ordinary symptoms be described, merely by ascertaining at what parts of the spinal column pressure causes tenderness, soreness, or severe pain—the activity or intensity of the disease detected in the organs being generally in proportion to the degree of soreness or pain produced by the pressure, as well as to the degree of presure required to occasion the pain, etc. The pressure is to be made upon the spinous processes, and upon the ganglions of the spinal nerves in the intervertebral spaces on each side of the column. If the original disease be in the organ, as, the liver, kid-

neys, or heart, etc., the pain on pressure will be experienced at that portion of the spinal column from which the diseased organ receives its supply of sensitive nervous force; because, if an organ is diseased, it can not receive or normally dispose of its supply of nerve-force; thus, deficient action must, to a greater or less extent, derange the perfect normal condition of its nerve-center, from which must result more or less irritation. But if the disease has its commencement in the sympathetic ganglia or spinal cord, then there will be more or less derangement of the organs in correspondence with the diseased or irritated portions of the spinal column,—because, a healthy supply of nerve-force can not be distributed to an organ whose nervous center is in a state of irritation, no matter from what cause.

Writers have generally considered that tenderness on pressure at some portion of the spinal column is an attendant on many neuralgic and hysteric affections; this is true,—but, it will frequently be found to exist as an attendant on functional lesions not accompanied by neuralgia or hysteria, and will often be found absent when these two maladies are present. The pain caused on pressure, when co-existent with diseased organs, is seldom present when their lesion is organic, and especially, when it is in its latter stages. In all maladies presented to the practitioner, he should invariably examine the condition of the spinal column, as to pain or tenderness on pressure,—because, whether this exists as a cause or an effect, its presence will be found in many instances to materially interfere with the efficacy of treatment; while on the other hand, its diminution or removal will be followed by speedy benefit to the affected organs under treatment.

Spinal irritation may arise from various *causes*, as, excessive labor, exposures to sudden changes of temperature, sprains, sudden muscular efforts, injuries to the spinal column, masturbation, excessive sexual intercourse, prolonged lactation, mental anxiety, too frequent child-bearing, intemperance, excessive sedentariness in a sitting and stooping position, etc.; it may also arise from uterine disorder, disease of any of the organs of the body, worms, piles, anemia, rheumatic or neuralgic diseases, intestinal irritation, etc., or, on the contrary, instead of being caused by these affections, it may even give rise to most of them. In many instances it will be almost, if not quite, impossible to attribute the irritation to any positive cause.

The *symptoms* of spinal irritation are, more or less tenderness, soreness, or pain, at one or more portions of the spinal column, and which may be constantly or remittingly present without pres-

sure being made; or which, may only be experienced when the thumb is made to press more or less firmly on the parts heretofore named. Sometimes, the pain will be very intense upon the slightest pressure, frequently darting inwardly toward affected organs, often aggravating or exciting unpleasant symptoms in them, which entirely disappear only after a night's rest; while, at other times, considerable pressure will only excite a dull sensation of tenderness at the part compressed. Between which two conditions there will be a multiplicity of modifications.

In connection with this symptom, will be associated many others, due to lesions of internal organs, which are more or less numerous and severe, according to the severity of the affection and its complications, and the characters of which are in accordance with the location of the spinal irritation and the functions of the corresponding affected organ or organs. Thus, we will have symptoms of gastric, or hepatic disease, when the pain is in the dorsal region; of uterine disease when it is in the lumbar; of renal disease, when between the dorsal and lumbar; of lung or heart disease, when in the cervical portion, and so on, or, several of these may be associated together. In addition to these, there may likewise be symptoms of neuralgia, hysteria, rheumatism, etc., more or less pain when lying upon the back, when walking, or even when merely standing erect; palpitations of the heart; sinking paroxysms; sense of suffocation; slight chills, etc. Indeed, it is unnecessary to name the numerous symptoms here, because, as already stated, they will usually be found of a character consistent with the functions and sympathies of the organs in correspondence with those portions of the spinal column which are affected.— A neglect of this spinal disease, whether it be primary or secondary, or, an improper treatment of it, may cause it to result in a chronic, and even an acute inflammation of the spinal membranes, ultimately followed by delirium, coma, and death.

The *diagnosis* of spinal irritation is generally considered an easy matter; but there are some points connected with it which are very difficult, if not impossible to determine. Thus, it is of the utmost importance to determine whether the pain produced is merely the result of an irritable condition, or, whether it is owing to inflammation or structural disease of the spinal cord or of its membranes. It is also important to determine whether the affection originated in the spinal cord, or in the diseased organs.

If the case be one of spinal irritation, without inflammatory or structural lesion, the patient will obtain relief by assuming the recumbent position; while, on the contrary, the pain in the various

organs affected, as well as in the back, will be increased by jumping, lifting heavy weights, or by placing the body in certain bent or contorted positions; there will also be a correspondence between the organs affected and the part of the spinal column at which the pain is manifest; there may be yawning or frequent paroxysms of sneezing; and, there will be no symptoms of gradually progressing loss of sensation and motion. Besides which, there will be a great disproportion between the severity of the symptoms, and the accompanying constitutional disturbance.

The determination, as to the origin of the affection, will be a difficult matter; the previous history of the case, and its symptoms, must be ascertained and carefully considered, as well as the peculiarities present at the time of the examination. The symptoms in the organs are often more severe when the disease commenced in them than otherwise; yet there are so many exceptions to this that it can not be regarded as a general or reliable rule. When our treatment for the removal of the spinal affection fails to produce any great amount of benefit, or, when with an improvement of the spinal symptoms, those of the organs continue without any amelioration, we may then believe that the organs were primarily affected.

Again, when in connection with the symptoms common to the diseased organs in correspondence with the affected part of the spinal column, there are certain symptoms unusual to them, as, prickling or tingling sensations in the skin, sinking sensations, chilly sensations along the back, sensations of suffocation, or of constriction, faintness, nervous irritability, extreme sensitiveness to changes of temperature, etc., the disease may be attributed to a spinal origin.

The *prognosis* of primary, uncomplicated spinal irritation is favorable; but when this irritation is the result of diseased organs, or occurs in connection with rheumatism, syphilis, gout, or active struma, etc., the prognosis is less favorable, and must be based upon the symptoms of the accompanying diseased organs. If the disease passes into some structural lesion of the cord, the prognosis will be still less favorable.

The exact seat and the correct nature of this disease still remains undetermined, as no opportunities for post-mortem investigations have been had, at least not until structural changes in the cord had followed the previous irritable condition.

The *treatment* to be pursued in spinal irritation, will be twofold in its object, viz.,—to remove the irritation or spinal tenderness, and to restore diseased organs to a normal condition. To fulfill

the first indication, counter-irritants must be applied over the affected parts of the spinal column, the action of which, as to severity, will vary according to the degree and activity of the disease. And among the preparations which I have found the best adapted for this purpose, are, the Compound Capsicum Liniment, the Compound Liniment of White Turpentine, or, the Compound Tincture of Camphor. Among these, I prefer the latter, which should be applied with considerable friction, and be repeated once or twice daily, so as to keep up a sense of heat or burning during the day, while the patient is moving about. Sometimes the Croton Oil Liniment will be found peculiarly beneficial; at others, Dry Cupping over the tender points will answer a most excellent purpose. The principal object is to produce an external irritation which will cause a favorable derivative influence upon the congested or irritable nervous center. As a general rule, it is only when the disease has been of long standing or is connected with inflammatory or structural lesion of the cord or its membranes, or with a neuralgic affection, that pustulation, as, by the Croton Oil Liniment, or, suppuration, as, by the Compound Tar Plaster, will be required. And the pustulation or suppuration should be allowed to heal, whenever either of them are followed by an increase of the nervous symptoms, or by severe constitutional irritation. In cases liable to be attacked by these symptoms, it will be better to make the applications over a limited surface only, at a time, changing them to another limited surface of the affected portion of the spinal column, as the first place is healing over, and thus keeping up a constant derivative action from one or other part of the backbone.

In many instances, counter-irritation will fail to effect any beneficial results, and may even aggravate the symptoms; in such cases, I have found an exactly opposite course to prove valuable. A Plaster of Belladonna, or of Stramonium, or of some other narcotic, worn over the tender points, will in these instances, afford prompt relief; and this will be found especially the case in many uterine affections, as well as in maladies of the generative organs generally, with which the spinal tenderness is apt to be associated.

Internally, I have derived benefit from the use of Belladonna, Gelseminum, Aconite, etc. But the preparation from which I have received the greatest service is composed as follows: Take of Sulphate of Quinia one drachm, Elixir Vitriol three fluidrachms; dissolve the Quinia, and then add four and a half fluidounces of Tincture of Black Cohosh, and six fluidrachms of Tincture of

Aconite Root. The dose is from fifteen to thirty drops, in a tablespoonful of water, every three hours; continuing its use persistently for three or four months. In one case where, with the spinal irritation, the patient was very sensitive to the touch in various parts, around the chest and back especially, where the slightest contact of the finger with the skin occasioned a great degree of a tickling sensation, with constipation, turbid urine, exceedingly sensitive prostate, and symptoms resembling vesical calculus, a cure was effected by the use of the following pills: Take of Sulphate of Quinia one scruple, Podophyllin eight grains, Alcoholic Extract of Nux Vomica one grain and a half, Alcoholic Extract of Black Cohosh, a sufficient quantity to form into a pill mass; mix, and divide into twenty pills, of which one was taken three times daily.

In addition to these means hygienic measures must be rigidly attended to, especially such as relates to keeping the bowels and kidneys regular, and the skin in as normal a condition as possible; the diet should be nutritious and easy of digestion; all spirituous liquors and tobacco must be avoided; sexual indulgences prohibited; changes of temperature guarded against; violent exercise, as well as standing too long in an erect position, late hours, and all mental and physical excitement, should also be carefully avoided,—and, during the day, the patient should once or twice take rest in the recumbent position, an hour or two each time. Traveling, change of air, of scene, cheerful society, etc., will be found of great advantage.

But, although we may remove the spinal tenderness, and thus terminate for a time all the painful and unpleasant symptoms, yet, if the irritation of the organs be allowed to continue, we may reasonably apprehend their renewal on the application of slight causes; and conversely, if by appropriate means we should correct the disordered action of the organs, without at the same time relieving these irritated points, our efforts would be alike unavailing. We must, therefore, in addition to the means adopted to remove the spinal irritation, at the same time employ those measures which are indicated for the removal and cure of the accompanying lesions of organs, the most common of which are, chronic laryngitis, prolapsus uteri, menstrual derangements, renal, hepatic, and gastric disorders, dyspepsia, asthma, cough, heart-affections, rheumatism, neuralgia, syphilis, scrofula, gout, anæmia, chlorosis, hysteria, etc.,—the particular treatment of which will be found described under their respective heads.

It may be proper to state that spinal irritation has recently been

described by Dr. T. Inman, of Liverpool, as having a muscular origin, and he has attributed all affections in which pain or tenderness of the spinal column, on pressure, are prominent symptoms, to some morbid condition of the muscles rather than of the nerves—considering that the so-called spinal disorders originate most commonly in a feeble and painful affection of the muscles of the back. That there are symptoms frequently met with, strongly resembling those of spinal irritation, but which are due to the causes named by Dr. Inman, is undoubtedly a fact—but he is in error when he attributes true spinal irritation to morbid muscular irritability. That spinal irritation exists without any affection of the muscles of the back, is undoubtedly true; and, vice versa, a painful and enfeebled condition of these muscles may exist independent of any spinal irritation. As this subject, although not included in the list of Diseases of the Nervous System, will not probably find a better place in the work for its consideration than the present, I will therefore devote a few pages to it. The muscular affection is termed by Dr. Inman,—to whom I am indebted for the following description,—

MYALGIA.

This is also known by the names of "weak back," "spinal disease," "stiffness of the back," "stiffness of the muscles," "tiresomeness of the muscles," etc. It is an affection frequently met with among both males and females, being, however, more common among the latter; and is often confounded with true spinal irritation. Sewing-women, milliners, hard-working females, writers, authors, and persons whose occupations require them to continue for a long time in one position, either erect or stooping, daily, are exceedingly liable to myalgia; and the weaker the person the greater will be the tendency to pain.

This disease is an irritable condition of the muscles which are inserted upon the spinous processes, as well as of various other muscles, and which irritability is *caused* by over-exertion, or over-straining of one or more portions of the muscular system in debilitated subjects; including, in the word muscle, tendon, fiber, or fascia, as the case may be. There is scarcely any part of the body which is absolutely free from these affections, for they are to be met with wherever there are voluntary muscles or their tendinous prolongations. Some parts are more frequently attacked than others; the trunk more commonly than the extremities; the abdominal walls oftener than the thoracic; and the legs more con-

stantly than the arms. The tendinous parts are more frequently the seat of pain than the fleshy, but when the affection is of a spasmodic nature, the fleshy parts alone are implicated.

When a healthy individual exposed to unusual and excessive muscular action, "laughs until his sides ache," while witnessing the pranks of a comic actor, it is by no means uncommon for him to feel some pain, soreness, or abdominal tenderness on the next day. Everybody is familiar with the stiffness, pain, or soreness that follows the first fencing, boxing, dancing, or other athletic lessons. The seaman remembers how his eyes have "burned" after many an hour's weary lookout for land, especially at night. The seamstress, too, often stitches till her eyes *ache* with watching her needle—*i. e.*, until the muscles that move the ball are thoroughly weary. Those who have occupied themselves for a length of time in a bent-over position, complain of pain and stiffness of the muscles of the back. As a general rule, when the sensation is referred to a tendinous part, it is spoken of as pain,—when to a fleshy part, as an ache. Now, in a feeble person, or when a long-continued strain or over-exertion is kept up with certain muscles, it will eventually result in myalgia. As long as the relation *between the work to be done and the power to do it*, remains the same, the exertion of the muscles is not *unusual*. But, *whenever muscles reduced in power are obliged to do the same work as when they were strong, the exertion they put forth is unusual, and the violence of the exertion is proportionate to the weakness of the muscles.* It costs us no suffering, while we are in good health, to walk erect, or to sit over our books and papers; but when sickness has reduced our powers, when a refractory stomach has refused the necessary supplies of food, or when we have been brought low by accidents and loss of blood, we find the exertion excessive, painful, or too great for our powers. As long as the school-girl is healthy and strong, she can sit erect for hours, and at the end feel *weary* only; but as the influence of sedentary life, mental exertion, deficient appetite and digestion, a crowded sleeping apartment, and school, begins to be felt, the weariness is changed to *painfulness;* she is no longer *fatigued*, she is suffering.

The predisposing causes, then, of these muscular affections are, a want of tone in the system, and a diminished strength in the muscles.

The *symptoms* of myalgia in some respects greatly resemble those of spinal irritation; there is more or less pain or tenderness along the spinal column, or at certain parts of it, which sometimes extends to other parts of the body, and is often increased by motion. In some cases no pains are experienced at all, excepting a soreness or

tenderness upon pressing upon the spinous processes along the spinal column,—in others, there is pain, which is aggravated by pressure at various points upon the spinal column, by bending, stooping, lifting heavy weights, etc. These pains, when extending to the body, are very variable in their character and position; sometimes they are described as aching, hot, or burning pain, in some instances as if a hot coal were at the part. At other times, instead of pain, there is a *tired* or *wearied sensation* of the affected parts. The pains are generally absent in the morning on getting up, but as the day advances they gradually appear, augmenting in severity until bedtime, when they cease or diminish considerably soon after lying down. They frequently come on suddenly, and are sometimes accompanied with spasms or cramp-like feelings. When they follow excessive exertion, they come on the first thing in the morning and gradually subside.

In connection with the above there will be other symptoms, varying with different patients, no two presenting exactly the same. These are, dizziness; tinnitus aurium; palpitation; quick, weak, or irritable pulse; a tendency to sigh frequently; a disposition to cry on the slightest occasion; a difficulty in restraining laughter; snoring during sleep, with heaviness on awakening; giddiness on getting out of bed; yawning while at the toilette; anorexia, or irregularity in appetite or digestion; torpid bowels; lithic or phosphatic urine, which speedily becomes ammoniacal; foul breath; bad taste in the mouth; headache; languor or lassitude during the day, and, perhaps, wakefulness, or nervous excitement at night. Pressing upon some portion of the spinal column will sometimes cause both pain and cough; and, in addition to the above-named symptoms, there may be loss of spirits; mental depression; a morbid appetite; vitiated taste; love of sympathy; feigning diseases; strange twitchings or jerkings and twistings of the body; dyspnœa; difficulty of swallowing; nausea after eating; optical fancies, as seeing specters, etc.; sometimes diarrhea, strange noises in the ears, etc.

Every part of the body is liable to muscular pains, but their most common seats are,—in the occipital and cervical region, occasioning more or less severe headache, the pain seeming to be prolonged from the occipital region, into the occipito-frontalis, or, causing the patient to imagine that he or she has contracted a cold in the head; in the neighborhood of the acromion process, with a sense of weariness and sometimes cramps; at the inferior extremity of the sternum; at the posterior-inferior portion of the upper arm; in the inframammary region; in the abdominal region, complained of as a "continual grasping" pain all over the abdomen, as if somebody

were drawing the patient up, and which pain becomes very severe on walking; in the sides, with tenderness on pressing upon the intercostal spaces, or "only a stitch in the side;" in the lumbar region; in the dorso-lumbar region; in the right and left hypochondria; in the pubic region; in the gluteal region; and in the inferior extremities.

The pain, in these places, is mostly referred to the insertion of the sterno-mastoid; the origin of the temporal; the occipital origin of the trapezius; the claviculo-scapular origin of the trapezius; the origin of the greater pectoral and deltoid; the ensiform cartilage; the triceps of the arm; the lower origin of the pectoral; the commencement of the linea semi-lunaris; the origins of serratus magnus and external oblique; in the origin, insertion, or along the course of the external and internal oblique, and the transversalis; in the intercostal muscles; in the rectus abdominis; the quadratus lumborum; the latissimus dorsi; the erector spinæ; the pubic insertion of the rectus; the gluteal and crural muscles; the biceps of the leg; the plantar fascia, etc.

It is of importance to form a *diagnosis* between myalgia and *spinal irritation*, the symptoms of which so closely resemble each other. Dr. Inman has given the following rules to guide us in our decision of this matter: The pains are more commonly described as hot and burning, are generally absent in the morning, but appear during the day, gradually increasing in severity until bed-time, when they cease. If they follow severe or unusual exercise, they come on the first thing in the morning, and subside gradually. The pain is referred to some muscle, or to some part where it is fibrous, and is aggravated by bringing the muscle into increased action. At first, generally, the pain is relieved by steady pressure, but after a time the pressure can not be borne, and the parts become tender to the touch. It is also relieved by relaxation, or artificial support; and, however severe it may be, the pulse remains unaffected, or is softer and weaker than natural. The pain can almost always be traced to unusual exertion in a strong person, or to a weak muscle having to do the work of a strong one; and when the patient is describing its location, he almost invariably moves the hand in the course of the fibers of the affected muscles. Cramp often comes on suddenly during the night while the patient is moving. A muscle which has been thoroughly fatigued should not become cramped until it has been rested to a greater or less extent by sleep. The cramp comes on suddenly, and is attended with apparent swelling and great hardness; the pain is severe, of variable duration, and passes off

slowly, with a vibrating, twitching, or creeping sensation, leaving more or less soreness after its disappearance. Cramp seldom comes on in a muscle until it has in some way become debilitated, and when once seized with cramp, the muscle is very liable to other similar attacks.

We must be very careful, also, to discriminate between myalgia and neuralgia, as well as diseases of internal organs, as, of the heart, lungs, liver, kidneys, bladder, intestines, uterus, etc., with which this malady is very apt to be confounded.

There have been but few opportunities for *post-mortem* investigations, but, as found to be the case with animals, we may conclude that there is paleness, atony or softness of the muscles, more or less rupture of muscular fiber, laceration of blood-vessels, and extravasation of blood between and around the broken fibers.

The *prognosis* is almost always favorable under correct treatment.

The *treatment* of myalgia consists in imparting tone and vigor to the system; allaying the pain and irritability of the affected parts; and allowing the tired, over-worn muscles a sufficient time to rest, that they may be enabled to repair fractured fibres, take up extravasated blood, and recover tone.

The strength of the system must be husbanded by diminishing the amount of labor undertaken, whether this be mental or bodily, or both. "Few persons, till they give their unbiased attention to it, have any definite idea of the amazing amount of work women get through with by day. From six or eight in the morning till nine or ten at night, they are incessantly at work: washing, dressing, scouring, carrying, cleaning, making beds, cooking, shaking carpets, sweeping floors, ironing, sewing, darning, knitting, nursing, teaching infants to walk, carrying them in their arms, etc. All these require muscular exertion, and this is sometimes excessive in degree—their very insignificance, and their daily occurrence, cause them to be ignored. The laborer, the farmer, the man of business, the doctor, know little of them, for they are performed out of their sight. They all see the rooms pretty nearly in the same condition, their linen, etc., in the proper state, and never care about, for they do not know, the trouble required even in these small details.

"A woman herself, knowing that some of her companions in sex get through their duties without suffering, imagines that the same duties can have no influence over her health or feelings, and she attributes her complaints not to what she has to do, but to something that prevents her doing them, and which may be

removed by art or skill; and as the abdominal muscles are commonly affected, the patient takes pills or other aperient medicines, and thus makes matters worse. The only way to lighten labor under these circumstances is to *insist on a rest every day* in the recumbent posture, for at least half an hour, and more, if necessary, in the middle of the day.

"It is much easier to know what must be done than to induce our patients to comply with our recommendations. For this we must be prepared. One can not take rest, for the household duties fall upon her, and she is unable to give them up, or too poor to provide a substitute. Another will continue to nurse until she is physically incapacitated,—putting, in her own estimation, present suffering against a probable future contingency, involving greater pain, and more expense. Another, (a very common occurrence), has formed her notions concerning her case from reading some newspaper paragraph, from some nurse, etc., while she has been in health. When she is in any way debilitated, she is too weak too think,—the mental labor required to take up a new train of thought, hopes, and confidence, is too great. In her own idea the patient is firm; in the opinion of the healthy lookers-on she is obstinate in her resolves, and actually prefers pain and quiet of mind to relief and mental violence."

But, it is absolutely impossible to effect a cure in this disease, unless rest be taken; lying upon the back in bed, or upon a sofa, for at least half an hour at a time, and repeating it, according to the degree of debility, one, two, or more times daily, and without any occupation of the mind in conversation, reading, writing, or other exertion. The use of an arm-chair during the day should be recommended in the more severe cases. Sleep at night must be promoted by Opium, Morphia, Infusion of Scullcap, Valerian, etc., and for immediate relief, especially to the muscles of the abdomen and extremities, they must have some rest or artificial support, by an elastic or other kind of bandage, strapping, and the like.

Change of air and scene operates in two ways; by removing the patient from exhausting labor, and by placing her or him in the most favorable condition for improving health. A change anywhere is serviceable, whenever it is attended with absence of excessive labor of body or mind, and the presence of pleasant associations and companions. Change of air is of little use when the patient carries with him all the habits, etc, of home. It is of small advantage for a worn-down mother to go to the sea-side, or elsewhere, for her own health, if she takes with her the most chargeable of her younger ones; or, for an author, editor, etc., to resort

to the country with his pens, ink, and paper, in undiminished array. Equally useless is it for the victims of hysteria to change the parties, concerts, etc., of the town, for the assemblies, balls, dinner parties, picnics, etc., of watering or country places.

Exercise, proportioned to the strength of the patient, must be taken every day *in the open air of the country;* but never to fatigue or to cause shortness of breath. But if the symptoms are aggravated, or do not mend under the exercise, it must be wholly prohibited. When exercise is advised, it must be invariably adapted to the condition of the patient, and where walking is too much, a carriage, quiet horse, or other passive exercise must be used. The diet must be ample and generous, nourishing and easy of digestion, with such intervals between the meals that, while there is sufficient time on the one hand for the stomach to rest, there is not sufficient to enfeeble it, on the other. Long fasts are injurious to the sick. When the body is exhausted by labor or illness, the stomach takes part in the debility, and is unable to digest the ordinary food employed; the want of appropriate nourishment, in its turn, increases the patient's weakness, and thus the two may go on gradually aggravating each other.

Wine alone is not strengthening, it is simply heating or stimulating, and it is given not as a substitute for food, but to assist the powers of nature. Rhine, Claret, Burgundy, Catawba, Port, Champagne, or Bordeaux wine, mixed with the yelk of an egg and a little sugar to aid in giving tone to the digestive power, is better than all the tonic medicines that can be given; but where wine can not be had, some simple tonic bitter made into a decoction, and sweetened, may be taken in tablespoonful doses three or four times a day; in some cases, tonic Wine Bitters will prove of service. If the wine gives rise to gastric acidity, a proportionate quantity of brandy and water, peach or apple brandy and water, etc., may be used instead. In anemic or very debilitated patients, a few drops of Wine of Iron, or other chalybeate preparation may be added to each dose; but it must not be made unpalatable. Tea and coffee must not be used; these are generally much craved by this class of patients, on account of the transient stimulus they impart; but this is at a great cost to the patient, ultimately. These articles are extremely prejudicial to the delicate stomach, especially when taken very hot and very strong. Milk and water, when it agrees, cocoa, or infusions of raspberry, peach, strawberry, or scullcap leaves, etc., not too hot, are much better beverages at meals. Solid food is always preferable to liquid nourishment.

Bathing the body with cool or tepid, not cold, water, by means of a sponge or otherwise is of immense value; it should be practiced every morning. Sea-bathing, or bathing with salt and water, is often serviceable. This bathing should not be carried beyond five minutes, for it is then abused and does positive harm. Sometimes the shower bath will be useful. The value of any bath is proportionate to the reaction it produces; it will improve constitutional power, but will not generate it. As to therapeutical treatment, medicines should not be given unless absolutely required. The bowels must be kept regular, but on no account must purgatives be administered.

Tonics are sometimes of service; the Tincture of Chloride of Iron, Wine of Iron, Cod Liver Oil, Hydrastis, Gentian, Colombo, Chamomile Flowers, Peruvian Bark, etc., may be employed singly, or in various combinations. The following will be found to form a pleasant and very useful tonic: Take of Sulphate of Quinia twenty grains, Sulphate of Morphia five grains, Elixir of Vitriol one fluidrachm and a half,—dissolve the two alkaloidal salts and add Tincture of Black Cohosh, Essence of Cinnamon, each, one fluidounce. The dose is thirty or forty drops in a tablespoonful of water, to be repeated three or four times daily. A teaspoonful of Linseed Oil and half a teaspoonful of Whisky mixed together, also forms a good tonic.

To remove the irritable condition of the muscles, local applications may be made over the painful parts, of Solutions, Plasters, or Liniments of Belladonna, Stramonium, Hyoscyamus, Conium, Morphia, etc. A Liniment of Chloroform, Camphor, Fluid Extract of Aconite Root, and Oil of Amber, of each, equal parts, will be of great value; it may be rubbed three or four times a day along the course of the spinal column, and over the painful and tired spots or muscles in other parts of the body.—When it is actually impossible for patients to take the required rest, they may find much relief, but not always a cure, from the proper employment of galvanism, which has, of itself, effected permanent cures where the patients suspended their mental and physical labors, and sought amusement and rest by change of air, scenery, etc.

Forcible extension of the affected muscles gives almost immediate relief if the cramp, which may be present, is recent; when the cramps are severe, Morphia internally and externally will be found of great benefit, as well as the measures hereafter advised under the head of Cramps. If cough, leucorrhea, laryngitis, uterine disorder, neuralgia, diarrhea, or menorrhagia, etc., be present, treat as hereafter named under the proper head of each.

APOPLEXY.

Apoplexy is a more or less sudden loss of consciousness, feeling, and voluntary motion, with a slow, labored, and stertorous respiration; or, in other words, a rapid attack of coma from cerebral compression, more commonly the result of effused blood.

It rarely occurs in young persons, being more frequent among those of advanced years. According to Dr. Bruckner, the first year of life presents the greatest danger from this disease; it goes on diminishing till the tenth year, and increases rapidly from fifteen to twenty. From this time it increases more slowly up to forty years, when it increases rapidly. About the sixtieth year the greatest increase of danger takes place; it only increases more slowly from this time to seventy-five; from this age, the danger gradually diminishes. The ages forty-eight, fifty-eight, and sixty-six years, are peculiarly dangerous. Males are more liable to the disease than females, though the latter are still more subject to it after sixty. Mountainous places and the country are safer, as a residence for persons disposed to apoplexy, than lowlands, towns, and cities. Winter is the most dangerous periods for these persons; summer the safest. Epidemic intermittents, sudden changes of weather, catarrhal fevers, appear to increase the danger.

It has, heretofore, been the impression that middle-aged and corpulent persons with short, thick necks, florid cheeks, and good-sized heads, were alone liable to apoplexy, but this is an error; the disease equally occurs among those whose necks are long and slender, and whose countenances are naturally pale or colorless.

The *cause* of apoplexy is cerebral congestion, with or without effusion of blood or serum; from pressure on the nervous fibers; division, or fatty degeneration of the nervous-substance; want of nervous energy; unhealthy blood; forcible impulsion of blood along the cerebral blood-vessels; interrupted supply, or deficient momentum of blood in the brain-substance; and the influence of narcotics. When these are followed or accompanied by cerebral hemorrhage or extravasation of blood, then the case may prove fatal or result in paralysis. The apoplexy being due to the congestion; the fatality or paralysis to the effusion of serum or blood in the brain. So that we may have apoplexy without effusion, and effusion without apoplexy.

The predisposing causes of apoplexy or of the conditions of the brain giving rise to it ultimately, are numerous; diseases of the heart may tend to prevent a free return of venous blood from the

brain, or may impel the blood to the brain with augmented force; hypertrophy of the left ventricle of the heart, has a most direct relation to apoplexy, constituting in many cases, the immediate cause of the attack, acting, probably, by causing structural changes from the continual over-distension and straining to which the cerebral arteries are subjected by the long-continued pressure and unwonted energy with which the hypertrophied heart propels the blood along them.

Indeed, hypertrophy of the heart is a change concomitant to that period of life when apoplexy is most prevalent; the same may be said of dilatation, and valvular diseases, which impede the reflux of the blood along the veins.

Chronic renal disease, as, a small, hard, shrunken, and granular condition of the kidneys, or, on the contrary, a large, soft, and greasy-looking state, is likewise apt to be present with the cardiac affection. It is a fact almost generally admitted by physiologists that when the functions of the kidneys are interfered with by structural disease, a hypertrophied condition of the left ventricle of the heart is a most frequent and prominent accompaniment.

Plethora, inanition, or anemia, dyspepsia, gout, diseases of the minute arteries or veins, or of the capillary vessels of the brain or its membranes, a morbid condition of the blood, disease of the liver, excessive hemorrhages, muscular straining, long and intense mental application, sedentary and luxurious living, excessive venery, intemperance, exposure to extremes of temperature, a more or less constantly depressed, or irritable condition of the mind, frequent indulgence in sleep after a full meal, tight neckcloths, use of narcotics, or anything that will tend to keep up a more or less constant determination of blood to the head, or, impede the reflux of the venous blood, or, favor a plethoric condition of the cerebral capillary vessels, at the same time diminishing the vital energy of the brain, may be considered as predisposing causes.

Among the exciting causes may be named, violent exercise: excessive venereal indulgences; masturbation; intoxication; powerful mental excitement, or depression; straining at stool or while urinating; an undue distention of the stomach from eating a hearty meal, while the system is exhausted or enfeebled from any cause whatever; exposure to the heat of the sun; lifting heavy weights; sleeping after meals; tight neckcloth; violent fits of coughing or sneezing; suddenly rising from a stooping position; turning the head suddenly to one side, which gives rise to cramp or tonic spasm in the muscles of the neck, and thus impedes the free flow of blood from the head; sudden changes of temperature; constipation; large

bleedings or hemorrhages; innutritious diet, or whatever will cause an anemic state of the system; injudicious employment of the warm bath; crowded or ill-ventilated rooms; suppression of customary discharges; epilepsy; noxious vapors; prolonged watchings, etc.

The *symptoms* of an attack of apoplexy vary; more generally the attack occurs suddenly, without any appreciable premonitory symptoms, the patient falling to the ground in a state of unconsciousness, from which he cannot be aroused, with his face much flushed, tumid, and sometimes livid; his breathing slow, laborious, and stertorous; the veins of the neck and head more or less swoln; the head hot, and often in a profuse perspiration; the eyes projecting, bloodshot, half open or closed; the pupils usually dilated, but occasionally much contracted; the pulse strong, full, and regular or slow, but soon becoming weak, rapid, and unequal or intermitting; a frothy saliva is often blown from the mouth with considerable force. The attack may last from a few minutes to four or twenty hours, or even to forty or more. Sometimes the patient will be insensible and motionless for several days, gradually recovering his intellect and strength; but, more commonly, the mental powers become impaired to a greater or less extent. Frequently the first attack terminates fatally, and it is very rare indeed that the patient survives the third attack.

Some persons fall down suddenly, with an entire suspension of sense and motion, flushed face, full pulse, and a stertorous respiration; occasionally, there will be spasmodic muscular contractions, or convulsions. The apoplectic seizure may terminate fatally; or, perfect recovery may take place; or, recovery with a transient or permanent hemiplegia. The preceding varieties are due to cerebral congestion, with or without effusion of blood or serum.

Again, the patient experiences a sudden attack of pain in the head, becomes pale, faint, sick, vomits, and falls down in a state resembling syncope,—the face being pale, the body cold, and the pulse feeble, perhaps a slight convulsion may ensue. Occasionally, there will be no falling down, but a slight and transient forgetfulness. From either of these, recovery generally takes place in a few minutes, but is followed soon after, in a few hours or several days, with a sense of oppression, forgetfulness, incoherency, coma, and death. This is due to an anemic condition of the brain, to feeble circulation through its vessels, or to cerebral hemorrhage.

Another mode of attack is that in which the loss of the powers of speech and of one side of the body occurs suddenly, without stupor, or at all events any long continuance of it, from which recovery may take place, or it may pass gradually into apoplexy in a few

hours. This is probably owing to more or less cerebral effusion, the apoplectic seizure being due to pressure from the formation of a clot. Sometimes paralysis occurs before the apoplectic attack, which may not manifest itself for an indefinite period.

It is rarely the case that an attack of apoplexy comes on without some premonitory symptoms, which may, however, be so slight as to escape notice entirely. They may exist singly, or several of them may be grouped together; and, if properly attended to, the attack may be warded off, and even the tendency to it be wholly removed. These premonitory symptoms are, dull pain in the head, with a sense of weight or heaviness, the pain may be located at any part, but mostly around the occipital region; giddiness; drowsiness at unaccustomed periods; frequent attacks of nightmare; unpleasant dreams; cramps or spasmodic action in various parts of the body, mostly in the calf of the legs and in the neck, (trachelismus); lividity or redness of the countenance; pulsation of the cerebral arteries; obscurity of vision; irritability of temper, or unusual serenity or apathy of mind; epistaxis; heavy sleep with deep, stertorous respiration; transient loss of memory; slight faintness or vertigo, with paleness of countenance, and momentary disturbed intellect or oblivium; ringing in the ears; faltering in speech or using one word for another; incoherent talking; suffusion of the conjunctiva; difficulty of writing, or inability to spell the words; a pricking sensation of the extremities; unsteady or tremulous gait, etc. The most important of these symptoms are giddiness, especially on stooping, on straining at stool, on coughing, or on pulling on a tight boot, and especially when conjoined with feebleness; heavy and unrefreshing sleep, with more or less drowsiness through the day; incompetence for any continued mental exertion; cramps of the legs at night; a constant sense of fulness or weight in the head; a constant inclination to sigh; a numbness or palsy of some part; and a thick, husky condition of the voice.

The *diagnosis* of apoplexy, as a general rule, is not difficult—the sudden attack, the coma, the laborious or stertorous respiration, the relaxation or rigidity of the limbs, the entire loss of consciousness, and the slow, full pulse, indicate the character of the disease; and more especially when we procure the previous history of the person attacked. There are, however, certain conditions which may be mistaken for apoplexy. Thus, the *dead drunk* person resembles one in a state of apoplexy, which may be determined by the odor of liquor in the breath, besides, the person may be partially aroused by shouting in his ear, or by applying a strong odoriferous stimulant to his nostrils. Yet drunkenness may excite a true apoplectic fit.—

When the coma is due to *concussion of the brain*, we can only determine it by learning the history of the case or by detecting the injury done to the head. In other cases, we may determine the case not to be apoplexy, when pinching the extremities, tickling the soles of the feet, etc., partly rouse the patient.

Apoplexy may be distinguished from *epilepsy* by the absence of convulsions in the former, or, if present, they are slight, and affect only a part of the body; in epilepsy, there is usually a strong convulsive paroxysm, a foaming at the mouth, and frequently a gnashing of the teeth, and a noise somewhat resembling the barking of a dog; but there is seldom any stertorous breathing, and the limbs are not so relaxed as in apoplexy. Apoplexy is more common to middle age—epilepsy to early age, and is a chronic disease, the attacks occurring more or less frequently; the fit is also of shorter duration, and the patient more readily aroused from it. When apoplexy is caused by *narcotics*, the respiration will be more tranquil, but not stertorous, the pulse will be more rapid, the face pale and calm, and, in most cases, the patient can be aroused by violent agitation. The vascular or anemic condition of the brain, has already been referred to among the symptoms.

According to M. Prus, the symptoms of meningeal apoplexy are as follows: paralysis of motion rarely follows subarachnoid hemorrhage; in intra-arachnoid hemorrhage, it occurred in six cases out of eight; in both forms, paralysis of sensation rarely exists, and when it does, it is very slight,—somnolency and coma also exist in both forms of hemorrhage. The drawing of the mouth to one side does not occur in meningeal apoplexy. Delirium, fever, and dryness of the tongue, frequently appear in intra-arachnoid hemorrhage toward the fourth or fifth day, or at the period when the existence of a false membrane may be verified; these symptoms are not met with in subarachnoid hemorrhage. Subarachnoid hemorrhage constantly proves fatal before the ninth day. In intra-arachnoid hemorrhage the patient sometimes survives a month or longer; at times, even recovery may ensue, the blood being absorbed by the surrounding cysts.

As to the *prognosis*, although apoplexy does not always immediately terminate fatally, nevertheless, it is always to be considered a serious disease. The second and third seizures are more fatal in their character than the first, or, if recovered from, are more apt to leave permanent impairment of the mental faculties, as well as paralysis. Some patients die immediately; others again not for two or three days after the attack, or death may ensue from reaction. Genuine apoplexy almost never causes instantaneous death;

when the case terminates fatally, it is usually after a lapse of some months, from paralysis—though it occasionally proves fatal in from a few minutes to several hours. In those cases where sudden deaths occur, it is more frequently due to some disease of the heart. We may look for an unfavorable termination, when the coma is profound, continues over twenty-four hours, with frequent or intermittent pulse, contracted pupils, cold and profuse perspiration, slow, laborious and stertorous respiration, and involuntary evacuations of the bladder and rectum. Frequent yawning, after the coma has partly passed off, frequently carrying the hand to the same part of the head, or the supervention of delirium, are also unfavorable symptoms. Complete hemiplegia, without coma, the mental faculties being unimpaired, and the non-affected side being possessed of perfect motion and sensibility is more favorable than a more partial paralysis with stupor or coma. Apoplexy occurring in the insane, or with epileptics, old persons, or those of enfeebled, broken-down constitutions, or after previous paralytic attacks, is likewise unfavorable.

The supervention of a gentle, warm perspiration, pulse full and natural, respiration not stertorous, or the stertor gradually diminishing, epistaxis, free alvine and urinary discharges, with a consciousness of the evacuations, are favorable indications. In all cases, no positive prognosis should be given until after the tenth day, as a renewal of the extravasation or other unfavorable change is apt to take place on the eighth day after the attack.

The *pathological appearances* vary; sometimes the evidence of lesion is very obscure, or, not sufficient to account for the fatal attack. In most cases, however, there will be more or less vascularity of the brain-substance; at times this will be absent; extravasation of blood, either liquid or coagulated, in the latter instance often being spread out in the form of a membranous layer; the infiltrated blood may vary from a drachm to an ounce or two. Generally there will be a softening of some part of the brain; with fatty degeneration of the arteries and capillary vessels, or, a yellowish white thickening and deposit within the coats of the vessels, from a degeneration of the natural textures of the arterial walls, and weakness of the parts where it occurs. One or two ounces of serum, more or less, may be detected in the ventricles, and in the subarachnoid cellular tissue. Other changes may be observed in various parts of the brain, but the above are the most common. Sometimes tumors, cysts, old clots, purulent collections, thickening, injection, or ossifications of the membranes, etc., may be noticed. Where death occurs from reaction, the effects of inflammation will be seen.

"In subarachnoid hemorrhage the blood issues from a rupture in an artery or vein, mingles with the cerebro-spinal fluid, and has a constant tendency to spread into the ventricles of the brain, and into the spinal cavity, and false membranes are never met with. In intra-arachnoid hemorrhage, the blood is always given out by exhalation, never extends far from the spot where it is effused, and, there is constantly found, toward the fourth or rather the fifth day, a false membrane entirely enveloping the coagulum." (*M. Prus.*)

In most cases of apoplexy among aged persons, evidences of cardiac, renal, or hepatic disease will also be present; sometimes, of gout.

In the *treatment* of apoplexy during the attack, prompt and energetic measures will be required. The patient should be removed to a cool, airy place, and all bandages or cravats around the neck be removed. He should then be placed in a sitting posture, holding his head between the knees or in some other convenient manner, and a stream of cold water should be poured upon the head and neck by one person, while another holding some common salt in his hand, rubs it on the head and temples, until the patient is sufficiently restored to swallow an active purgative, as, for instance, the Compound Powder of Jalap. At the same time the limbs should be ligated, allowing the ligatures to remain on a sufficient length of time, but not too long.

If recovery does not readily ensue from these means, other derivative measures must be adopted, as, stimulating purgative injections, bastinadoing the feet, a drop or two of Croton Oil on the tongue, and stimulating applications to the inferior extremities. In many cases, advantage will be derived from dry cupping along the spinal column, and wet cupping on the nape of the neck and the temples.

The above treatment is especially designed for congestive cases, known by flushed or livid face, head hot, evident pulsations of the carotids, and hard, full pulse. But when the case is one of cerebral anemia, or feeble circulation, known by the paleness of the face, coldness of the surface, feeble and flickering pulse, a different course will be required; warm water should be poured upon the head and neck, stimulating applications should be used along the spinal column, and, if possible, the patient should be made to swallow some active stimulant.

After an attack of apoplexy, the patient should endeavor to prevent a subsequent one by pursuing the hygienic and therapeutical course, hereafter named, for those predisposed to the disease.

He should not rise too soon from bed, or expose himself to much mental or physical exercise, or to immoderate diet; by neglecting these precautions, a fresh extravasation of blood in the brain may be induced, productive of irreparable mischief.

But the chronist will seldom be called to treat a patient in the apoplectic seizure; he will be more apt to prescribe for the patient, either to prevent the attack when there is a predisposition to it, or to ward off a second or third attack, both of which will require similar measures, and which treatment, to be successful, must be steadily persisted in for three or four years. The treatment will consist of a proper and judicious combination of the measures advised for hyperemia of the brain, and ramollissement.

"The best physician is he who *watches* his patient most carefully. The wisest patient is he who submits—*for the rest of his life* it may be—to his physician's injunctions; asking not 'how little may I do?' but, 'how much can I do in my perilous case?'"

The therapeutical measures will consist principally in tonics and alteratives; the tonics, consisting of Sulphate of Quinia, Muriate of Berberina, Valerian, Carbonate of Ammonia, Arnica, etc. A very excellent preparation may be made as follows: take of Sulphate of Quinia two drachms, Elixir of Vitrol six fluidrachms, dissolve the Quinia, and add Tincture of Arnica three fluidounces; the dose is twenty or thirty drops, three or four times a day.—If the patient be anemic, small quantities of Iron should be taken daily, either in powder, tincture, or in his food; one to three grains of any preparation of Iron per day, will be fully sufficient, as the system will be unable to dispose of any more. Or, the Elixir of Iron and Cinchona may be administered with benefit.

As alteratives, the Iodide of Potassium, Iodide of Ammonium, Bromide of Potassium, Bromide of Ammonium, may be administered in conjunction with antiscrofulous, antisyphilitic, or diuretic syrups. Indeed, diuretics should never be omitted; a Solution of Acetate of Potassa will be found an admirable diuretic in this disease.

For the first ten days following the recovery from the attack, active purgation is unnecessary and dangerous; after this period, an occasional cathartic, especially when symptoms of headache, fulness, flushed cheeks, etc., are present, will be found serviceable. But, at all times, a most important measure is to keep up a regular, healthy condition of the alvine discharges; the bowels should be moved once a day, either by natural or artificial means. The surface of the body should be kept in a normal condition by frequent washings and friction; the use of the bath, that is, the full length

bathing tub, with either cold or warm water is apt to prove injurious, either directly or from reaction. Sometimes a persistent discharge from the nape of the neck, by means of the Compound Tar Plaster will be beneficial; but it should be at once omitted if it causes paleness, feebleness of pulse, or depression of mind or body. Paralysis attending apoplexy will be treated upon hereafter. (*See Hemiplegia.*)

All persons disposed to apoplexy should rigidly adhere to certain hygienic measures, to aid in strengthening their systems in removing the cause of the disease and a tendency to fatty degeneration, etc., and thereby preventing an attack. The slightest gastric irritation or stimulation is transmitted sympathetically to the brain, hence, though the diet should be nutritious, it should be light, easy of digestion, used in moderation, and great care should be taken to have the meals at regular hours, and to masticate the food thoroughly; suppers, especially, should be very light; animal diet should be used very sparingly during the hot summer months. All high seasoned food, stimulants, and intoxicating liquors should be positively avoided. All excesses or excitements should be avoided as much as possible, as, long-continued mental exertions, anger, or other mental excitements, late hours at night, and exercise immediately after a meal. Moderate exercise should be taken daily at regular hours, and in the open air as much as possible, but not sufficient to hurry the respiration, or greatly augment the temperature of the body. Venery should be indulged in as little as possible, and not at all, if there has already been an apoplectic attack. The neck should be kept free from all tight cravats, or other compression which might obstruct the return of blood from the head, or induce spasms in the muscles of the neck: the feet should be kept warm and dry; exposures to cold, and especially to cold feet are dangerous. Flatulency and gastric acidity should be promptly removed as soon as their presence is known. The hours of sleep should be regulated not to exceed ten hours in summer, and twelve hours in winter, and the bed should be a hard mattress, having the head somewhat elevated; and for at least two hours previous to retiring to bed no food must be allowed to enter the stomach. Good, pure air in the rooms at home, as well as when abroad, is an important item; and the bedroom should always be well ventilated, or be so arranged as to permit a free circulation of air during the night. Direct exposure to the sun's rays in hot weather should invariably be shunned; neither should the head be exposed to the continued action of any kind of heat. Sudden turning of the head, or straining the muscles of the neck to look upward, sideways, or behind should

also be carefully avoided, as it is liable to induce spasm of the muscles of the neck, (*trachelismus*)—also straining at stool, lifting heavy weights, etc. During warm weather, and especially when there is giddiness, headache, flushed face, and other symptoms of a hyperemic disposition, cold water poured on the back of the head and along the spinal column, will be found a very pleasant, safe, and salutary measure; in winter, the water may be slightly warmed. If there be giddiness, faintness, headache, sickness at stomach, and paleness of the countenance, instead of being cold or blood-warm, the water employed should be as hot as can be borne by the patient, with some diffusive stimulant administered internally. Without the most rigid attention to the therapeutic means above recommended, and to the rules of hygiene generally, it will be a very difficult matter to prevent an attack of apoplexy in those predisposed to it; while, on the other hand, care and prudence in observing them, with a persistent use of them, will remove the tendency, and be productive of the most essential benefit.

The urine should be tested for albumen in all cases, and if any renal disease be detected, or if disease of the heart or liver, be present, affections which frequently cause or aggravate the conditions of the brain leading to apoplexy, they should be treated accordingly, in addition to the preceding measures named. (*See Treatment of Lesions of the Orifices and Valves of the Heart.*)

PARALYSIS.

Paralysis, or Palsy, is a diminution of mobility, or sensibility, or a partial loss of control or power over one or both of them; it may be confined to one part of the body, or be extended to several parts. It is not an actual disease itself, but is merely a symptom indicative of some more or less serious disease; which disease we should always endeavor to determine, as far as possible, before adopting treatment to remove or ameliorate the palsy. When the motion or sensation is wholly lost, the paralysis is said to be *complete;* when not entirely lost, it is *incomplete.* When only one function is affected, the paralysis is *imperfect;* when both the functions of motion and sensation are lost, it is *perfect.* And these conditions may exist together in several ways.

When paralysis is confined to a single limb, or to certain muscles of one part of the body, it is called *local* or *partial paralysis;* when one complete half of the body, from the head to the foot, is affected, it is termed *hemiplegia;* when the lower half of the body, from the hips downward, is affected in a transverse direction, it is called *para-*

plegia; and when there is a constant tremor attending a state of incomplete paralysis, it is termed *shaking palsy*, though this condition will frequently be found a symptom of chorea instead of paralysis.

As a general rule, the *prognosis* of paralysis is unfavorable; especially those forms due to disease of the brain,—though if we can excite reflex movements in the affected limbs, as, causing motion in them by applying a hot iron, tickling a foot, etc., there is some grounds for hope. A sudden attack of paralysis without coma, is not due to cerebral hemorrhage, and, therefore, is not apoplectic; it may be caused by softening of the brain, or by hemorrhage into the spinal column, in which case there is severe pain in the spinal column at some point, and the palsy is usually double-sided; and, if the effusion is in the meninges, tetanic tonic spasms occur.

Dr. R. B. Todd says, "Whatever interferes materially with the conducting power of nerve-fiber, or the generating power of nerve-vesicles (gray matter), will constitute a paralyzing lesion. Thus, in the first place, poisoning of the nerve-matter will operate in this way. Soak a portion of the nerve of a living animal in chloroform, or ether, or opium, and it will fail to propagate the nervous force as long as the influence of the poison lasts. In a similar way, the poison of lead in the living system may paralyze by weakening the conducting or generating power of the nervous matter. Poisons formed in the living system may operate in the same way; such as retained urinary or biliary principles, or the poison of rheumatism and gout. Secondly, any morbid process which greatly impairs the natural structure of nerve-matter will paralyze. Thus, inflammation will do this; so also will atrophy, or wasting from want of sufficient supplies of nutrient matter, as when the flow of blood is lessened or cut off. The opposite conditions of hardening and of softening of the nervous matter become paralyzing lesions for the same reason that they greatly impair or destroy the nerve-structure. Thirdly, a solution of continuity of nerve-fiber will paralyze. Cut a nerve across, and you have immediate palsy of the parts which the nerve supplies below the section. This solution of continuity from a melting down of the fibers, is, I have no doubt, the frequent cause of sudden paralysis in cases of softening, or in cases of sanguineous effusions. Fourthly, pressure on a nerve or nervous center will paralyze. Of this we have many proofs as regards nerves; a nerve, for instance, included in a ligature, or compressed by a tumor, is paralyzed thereby. A fracture of the skull, with depressed bone, will paralyze if the brain be sufficiently compressed; an apoplectic clot on the exterior of the brain paralyzes by compression; so also

does a tumor in its substance. It is probably by compression that congestion paralyzes; but you will, I think, find that this can not often be regarded as a paralyzing lesion.

"I would say that the center of volition is of very great extent; it reaches from the corpora striata, in the brain, down the entire length of the anterior horns of the gray matter of the spinal cord, and includes the locus niger in the crus cerebri, and much of the vesicular matter of the mesocephale, and of the medulla oblongata. Disease of any part of this center is capable of producing paralysis; but as the intracranial portion of it exercises the greatest and most extended influence in the production of voluntary movements, so disease of this portion gives rise to the most extended and complete paralysis. Another fact which I would impress upon you, is, one which anatomy in a great degree demonstrates, and which pathological research confirms, that the center of volition for either side of the body, is not altogether on the same side of the body. Of the center for the left side of the body for instance, the intra-cranial portion is on the right side, and these two portions are brought into connection with each other through certain oblique fibers from the anterior pyramidal columns of the medulla oblongata, which cross from right to left, decussating with similar fibers proceeding from left to right, which belong to the center of volition for the right side of the body."

Dr. Brown-Sequard advances the following views based upon the results of observations and experiments instituted by himself:

"1. The gray matter of the spinal cord is the principal channel by which sensitive impressions are conveyed to the brain.

"2. The anterior columns have a share in the transmission of sensitive impressions.

"3. Injury of one lateral half of the cerebro-spinal axis produces certain well-marked features, according to the following table:

"*a.* Injury of the brain produces—

On same side.	*On opposite side.*
Anæsthesia.	Normal sensation.
Paralysis.	Normal motor power.
Increased temperature.	Normal heat.

"*b.* Injury at any point from the tubercula quadrigemina, to the medulla oblongata above the decussation in the pyramids, produces—

On same side.	*On opposite side.*
Anæsthesia.	Hyperæsthesia.
Paralysis.	No paralysis.
Diminished temperature.	Increased temperature.

"*c.* Injury of the medulla oblongata at the crossing in the pyramids produces paralysis of motion on both sides; otherwise the symptoms are the same as in *b*, when the pons Varolii is injured.

"*d.* Injury of the spinal cord on one side produces—

On same side.	*On opposite side.*
Anæsthesia.	Hyperæsthesia.
No paralysis.	Paralysis.
Diminished temperature.	Increased temperature.

"Anæsthesia and diminished temperature almost always accompany each other; but an exception is observed in Class *a*—injury of the brain proper. This may possibly be explained by the fact that the nerves, with which the blood-vessels are supplied decussate, in the cerebro-spinal axis at a higher point than the ordinary sensitive nerves—apparently above the corpora quadrigemina. Hence, if the brain proper be divided on one side, dilatation of the blood-vessels on the opposite side will be produced. The occurrence of increased temperature on the paralyzed side in injuries of the brain has frequently escaped notice; though frequent, it can scarcely be said to be a constant phenomenon."

There are several varieties of paralysis, the most frequent and serious being 1st, those which arise from some interruption between the volitional centers and the muscles, from inflammation and its consequences, from pressure by tumors, depressed fractures, effusions, etc., and 2d, those in which no such interruption can be found, except as a result and not a determining cause. Among the latter may be named the following:

1. PARALYSIS FROM POISONS. The articles more commonly known as giving rise to paralysis, are, lead, mercury, arsenic, ergot, aconite, and stramonium. *Lead palsy* is commonly preceded by one or more attacks of colic, though it may occur without. Indeed, one of the worst cases I ever saw of lead colic, in which one arm and both legs below the knees were paralyzed, had never been preceded nor attended by any affection of the digestive organs, except an occasional obstinate constipation. Usually, however, the paralysis appears after an attack or two of colic, and constipation, colicky pains, and other derangements of the digestive organs are apt to manifest themselves at various times, both before and after paralysis has occurred. Both the extensor and flexor muscles are affected. More commonly the extensor muscles of the upper extremities are the most affected, so that the fingers are bent when the arm is raised, (*wrist drop*), and sometimes they can hardly be raised at all, the palsy being generally incomplete. When one arm is severely affected, the patient ordinarily raises it by the assistance of the other.

At times, one or more fingers are permanently flexed; when this is not the case, although the patient may not be able to move the arm, or extend the fingers, yet he may have a tolerable good grasp of whatever is put into his hand.

Pains in the limbs are usual attendants, and not unfrequently deafness. Gradual emaciation of the affected muscles almost invariably attends this affection. Sensibility is not ordinarily diminished; indeed, pains shooting through the affected limbs are common.

In lead palsy, as a *diagnosis*, in addition to the symptoms above named, there will be a morbid dead-like appearance of the gums, while the whole or some parts of their edges will exhibit a narrow leaden blue line, about the twentieth of an inch in width, and which symptom is peculiar to all persons whose systems have absorbed lead.—If galvanism be applied to the paralyzed parts—"if the excitability of the muscles, or, rather the polarity of the motor nerves, be *increased* in the paralyzed limb, the case is one of *cerebral paralysis*, connected with an irritative lesion within the cranium. If the excitability of the muscles be nearly or totally *lost*, we have, in all probability, either *lead palsy* or *traumatic paralysis*, (spinal); but it must be kept in mind that certain hysterical and rheumatic palsies of long standing present the same peculiarity; and that it may also be found in cases of disease of the brain and the cord. *If paralyzed muscles respond readily to the galvanic current*, there is no lead in the system, nor is the connection between the motor nerves of the paralyzed muscles and the cord interrupted; but if such cases are of *long standing*, they are due to *brain disease;* and if they are of *recent standing*, they are generally instances of *hysterical, rheumatic, or spontaneous* paralysis." (*Althaus.*)

Again, lead paralysis is common among those who work in lead mines, also among white lead manufacturers, house painters, card manufacturers, and workers in the metal generally.

The *prognosis* of lead palsy when recent is more favorable than when of long standing; it is also less favorable when the inferior extremities are affected.

The *pathological appearances* vary; the paralyzed muscles are usually pale, bloodless, and flaccid, and, in long-standing cases, fibrous. The nerves have also been found atrophied and more dense than natural. As an effect, softening of the pons Varolii, of the substance of the cord, injection of the pia mater, medulla oblongata, and medulla spinallis, dryness of the membranes of the cord, etc., have been observed. Lead has also been detected in the urine, blood, bile, liver, in the palsied parts, in the cerebellum, etc.

Paralysis from mercury may come on gradually or suddenly, with

slight convulsive agitations of the muscles of the arms, followed by tremors, and which extend gradually to the inferior extremities, and over the whole body. In connection with which there is an incapability of muscular exertion, as well as some of the symptoms peculiar to mercurial poisoning. This disease attacks those who are exposed to the fumes of mercury, or who are subjected to its influence either by internal administration or by external inunction. It resembles shaking palsy, and is termed by the French, *tremblement métallique.* The disease is considered curable, though sometimes it remains incurable; it is rarely fatal.

Paralysis from arsenic is occasionally met with, which may be limited or partial, which sometimes resembles lead palsy, with contractions of the joints, and in which both the functions of sensation and motion are affected. It is of difficult cure.—*Paralysis from narcotics* is also of rare occurrence, limited in its action, and usually curable.—*Paralysis from ergot*, a rare affection, more commonly involves the function of sensation.

In the *treatment* of this variety of paralysis, the patient should at once avoid the causes producing it; leaving off his trade, if he be a worker in lead, mercury, etc., and ceasing the use of the other agents referred to. Internally, the following may be given: Take of Iodide of Potassium eight scruples, Water four fluidounces; mix. The dose is a teaspoonful four times a day, and should be continued not only until lead can not be detected in the urine and saliva, but for some time afterward. If much pain be present, one-eighth of a grain of Sulphate of Morphia may be added to each dose. Any tendency to delirium, convulsions, epilepsy, or coma, may frequently be diminished or overcome by the internal administration of Extract of Belladonna.

To combat the paralysis, Strychnia should be used internally, and electro-magnetism be applied to the affected muscles, not the continuous current, but only induction currents. Strychnia will also be found useful when sprinkled upon a blistered surface made over the affected muscles; of course, this application should be made with great care, and over a limited portion only at a time.

Purgatives should be administered every day or two; and the body should be washed every day with soap and water. Sulphur, or Sulphur and Iodine baths may also be taken,* and in mercurial paralysis, Sulphur may be exhibited internally.

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*These baths are made by heating the sulphur, or sulphur and iodine, and exposing the naked body of the patient to the fumes arising therefrom, while seated in an air-tight bath-box, the head being free and protected from the vapors.

In the paralysis from narcotic poisons, the internal use of Iodide of Potassium may be dispensed with; though internal and external stimulants will be found advantageous.

2. WASTING PALSY, or *Progressive Atrophic Muscular Palsy*, also called "Cruveilhier's Atrophy," "Creeping Palsy," "Peripheric Palsy," etc., is a peculiar affection, the most striking characteristic of which is the wasting away of the muscles of the life of relation or of animal life—those that are under the control of the will—and to which it is strictly confined. This atrophy occurs independently of lead poisoning, or of any disease of the brain or cord. Sir Charles Bell remarks that the disease is a morbid affection of muscles acting under a law of election, that limits the progressive wasting to those muscles only that are naturally combined in action;—but by no means invariably so.

The *cause* of this affection is not well understood; it appears to be hereditary, in which case it is more common to males, and is of a more fatal form. The suspected causes are, undue muscular exertion, exposure to cold, protracted fatigue or straining of muscles, and bruises. It may occur in males or females who are apparently perfectly healthy, who have received no injury, nor been subject to any great exposure, coming on, as it were, without any assignable cause.

The *symptoms* of this disease are not readily recognized at first, as it comes on slowly and insidiously, creeping on unawares; and the patient only becomes aware of its presence from the sensible loss of muscular power—perhaps in many muscles. After the disease has made a certain progress, the affected muscles become atrophied, or soft and degenerated. As these muscles disappear, very notable changes of configuration occur, "the symmetrical contour gives place to a lean and withered aspect; the bony levers stand out in unaccustomed distinctness, and impart to the limb the appearance of a skeleton clothed in skin; but the skin itself, and the subcutaneous cellular tissue, have undergone no change, and can not be distinguished from the integument of healthy parts. But loss of substance is not the only anatomical change observed. The natural equilibrium of the muscular forces is overset by the unequal wasting of the muscles; those less atrophied overcoming the resistance of those more deeply diseased. Hence arise very considerable, and sometimes peculiar distortions of the head, trunk, and extremities."

"But, perhaps, the most remarkable of all the anatomical changes are seen in the face, when the muscles of expression are destroyed. The intelligent countenance is veiled, as it were, by an impenetrable mask; no emotion changes its unvarying aspect—

always solemn, stolid, and unmoved. The eyes, however, are spared, (their muscles as well as those of mastication being exempt from the disease), and by their movements alone, in the last periods, the immortal part holds some imperfect communion with the world around."

When the muscles of the interior are attacked, the tongue will be affected, known at an early period by a slight faltering in speech; mastication and deglutition become difficult; the tongue can not move about in the mouth, nor be protruded properly, and it has a soft feeling, and is often the seat of tremblings. The voice changes gradually to a single note, when the laryngeal muscles are affected; and when the diaphragm and intercostals become involved, violent, suffocative fits of coughing occur, and the play of the chest is reduced to a slight movement in the lower ribs.

With the loss of power and atrophy of the muscles there will be slight convulsive twitchings or quiverings in them, which impart no motion to the entire muscle, but undulate over its surface, beneath the skin, in quick momentary tremors, becoming more frequent and vivid when the skin is tickled, when active movements are attempted, when the affected muscle is raised, or upon the application of cold. These quiverings are not always present, but when they are, they indicate the advance of the disease, ceasing only when the disease is arrested, or the muscles are entirely destroyed. They are not constant, but come on at irregular periods, spontaneously, or when excited by cold air, pressure, or tickling, and cause no pain. Cramps and twitches may also be present, but they are not essential symptoms. The affected muscle gradually loses its contractility under electric action. As a general rule sensibility is not impaired, the special muscular sense surviving to the last. Pain is frequently present, it may be severe or dull, but gradually ceases as the atrophy progresses. The twitchings, cramps, contractions, pains, etc., are reflected phenomena. Sometimes singular positions are given to the body, the consequence of antagonism between the healthy and affected muscles. In every respect, except the muscular atrophy, the whole of the organic functions are performed with perfect regularity.

The more common complications of wasting palsy are neuralgic affections, tuberculosis, albuminaria, and mollities ossium.

The muscles of the extremities are more liable to be attacked by the disease than those of the trunk; and those of the superior more so than those of the inferior extremities; the right arm more frequently than the left, and the hands oftener than the shoulders. The fore-arm and hand, the upper arm and shoulders, are favorite

combinations. "When the hand and fore-arm are destroyed, the disease does not then pass up the arm, but starts away to the shoulder or to the opposite hand. In the same way when the shoulder is first attacked, the disease does not descend along the upper and fore-arm to the hand, but, passing over the elbow, it begins afresh in the ball of the thumb, and from that focus spreads up the limb, so that the parts latest reached are those about the elbow, especially the masses that take their rise from the humeral condyles."

General atrophy of the muscles may occur at any period from childhood to old age; the partial form is seldom observed except in persons between twenty and fifty years of age.

The *diagnosis* of wasting palsy is not very difficult. It may be discriminated from *paralysis caused by injury* or *pressure* on a motor nerve, by this being strictly limited to the parts supplied by the affected nerve; and, if the nerve be a mixed one, by an accompanying loss of sensation. From *cerebral hemiplegia*, by its more gradual appearance, by the rapid but irregular occurrence of the atrophy, and by the absence of those mental disturbances, and other symptoms, indicative of brain-lesion. From *general spinal palsy*, in which the muscles of the inferior extremities are affected before those of the superior. From *rheumatic paralysis*, in which certain groups of muscles are affected, instead of a muscle here and there as in wasting palsy; besides, electricity causes pain in the atrophied muscles of rheumatic paralysis, as well as contractions, both of which are usually absent in the disease under consideration. From *lead palsy*, by its more sudden invasion, its involving the exterior muscles more especially, the diminution of electric contractility, and the very slow diminution in size, if at all, of the affected muscle. Wasting palsy slowly extends itself, the affected muscles only gradually lose their electric contractility, and the atrophy of the muscle continues until it has wholly disappeared.

Wasting palsy is a formidable malady, and its *prognosis* is by no means favorable, even in the more recent cases; though the disease may terminate in recovery, with very slight, or perhaps no deformity; or in permanent *arrest* with more decided deformity, and death. "When the atrophy has extensively affected the muscles of the trunk, or has remained stationary for a lengthened period, the chance of recovery diminishes in an accelerated ratio." When the muscles of the trunk become affected, it is apt to quickly terminate fatally; when the palsy is present in a partial form, it is not necessarily fatal, unless the atrophy, by extension, passes into the more serious type, or general atrophy.

The *pathological appearances* are a greater or less wasting away of the muscles, which exhibit a pale-red, ochrey-red, pale-yellow, or buff color, with, occasionally, yellow streaks of fat between the redder bundles. Sometimes atrophy without fatty degeneration will be observed, and, again, masses of pure fat are present, with scarcely a trace of muscular fiber. The degeneration of the muscular fibrillæ is sometimes fatty, and at other times, entirely granular. The nerves may be healthy; but, frequently, the motor nerves may be atrophied with fatty degeneration, and perhaps softening, or some other change in the spinal cord,—these, however, are not invariably present, being secondary or reversed phenomena.

In the *treatment* of this disease, the principal object is to arrest or cure the atrophy of the muscles and combat the fatty or granular degeneration. For this reason all exciting causes should be avoided; patients must at once renounce their business pursuits, in order to relieve the muscles from strain or fatigue; and all exposures to cold and moisture should be especially guarded against. The muscles must be subjected to perfect repose and well-regulated stimulation, judiciously combined. As long as the muscles manifest the least signs of electric response, even if only by the smallest fibril wave or contraction, galvanism should be used daily, or every other day. Each muscle should be caused to contract as strongly as possible. Great power with very rapid vibrations should be employed, diminishing the intensity of the electro-magnetic current, as the sensibility of the muscles returns; and the current should be made to pass through the affected muscles, and not along the nerves leading to them, nor into the spinal cord. Ten or fifteen minutes at a time is enough, lest the muscles become exhausted. And this course should be perseveringly pursued for many months. The parts should be kept warm; no benefit can be expected to take place in any part kept cold. Moderate shampooing,—circular shampooing in particular—of the affected muscles, repeated daily, will also be of considerable service, care being taken not to fatigue or overwork them. And, in connection with these, stimulating liniments may be applied to the parts by gentle frictions; a very excellent liniment for this purpose is the following: Take of Tincture of Camphor, Tincture of Capsicum, each, one fluid ounce, Tincture of Nux Vomica two fluidrachms, Glycerin one fluidounce; mix and add to it a solution of Bromide of Ammonium twenty grains, in Distilled Water half a fluidounce. Shake thoroughly together before using. Warm saline or sulphureted baths may also be occasionally employed. Internally,

Bromide of Ammonium, or Iodide of Ammonium may be used, together with such other measures as are calculated to remove any existing derangements of the digestive and nutritive functions, as well as any local or general disease. The following solution will be found very advantageous: Take of Bromide of Ammonium one ounce, Water one pint, dissolve and add Citrate of Iron and Strychnia six hundred and forty grains. The dose is a teaspoonful three or four times a day. Arnica may also be beneficially employed in some cases, both as an internal and external medication.

To remove the pains, when severe, warm baths, and sedative liniments along the painful track will be of service, as the following preparation: Take of Chloroform, Tincture of Aconite, Laudanum, Tincture of Camphor, equal parts; mix.

3. REFLEX PARALYSIS. (White or Non-Inflammatory Softening of the Cord. (*Brown-Sequard.*) This includes paralysis following certain diseases, infantile paralysis, facial and certain other local paralyses, and hysterical paralysis. Thus, the endemic colic of hot countries, and zymotic diseases, as, dysentery, continued and eruptive fevers, cholera, diphtheria, etc., as well as diseases of the uterus, the urethra, bladder, prostate, kidneys, bowels, lungs, liver, etc., together with worms, dentition, neuralgia, and other painful affections, may all be followed by paralysis;—generally paraplegia.

Dr. T. Spencer Wells, says:—"When a patient comes to you with a tottering gait, complaining of weakness of the knees, a tendency to stumble in going up and down stairs, or on any uneven ground, and a certain loss of that muscular sense which enables us to walk without watching the feet to know where to place them at every step, your first impression will be very naturally that you have to deal with a case of spinal disease. Your first impression may be correct. As you proceed with your examination of the case you may obtain evidence of some injury to the spine, some distortion of the bones, some displacement from caries of the bodies of the vertebræ or ulceration of the intervertebral cartilages, some point at which pressure, or a sharp tap, or a hot sponge, causes pain—some history of inflammation of the cord—some indication of the pressure of a tumor, or of an aneurism of the cord—or possibly some proof that the disease is within the cranium. But you may find nothing of the kind. You have to exclude all these, and you are driven to assume a diseased condition of the lower portion of the cord, perhaps a simple atrophy, of the existence of which you have no other proofs than the paraplegic symptoms I have just enumerated. Let me convince you that you can have all these symptoms,

that they may go on to complete paraplegia, and the patient may die, and that then you may find the cord perfectly healthy, so far as our examination can teach us, while the kidneys and bladder" (uterus, urethra, prostate, seminal vessels, etc.), "are the seat of manifest disease."

Dr. Brown-Sequard, who has devoted much time and labor to the investigations of this class of diseases, and to whose writings I am considerably indebted in the subsequent remarks on the subject of paralysis, attributes reflex paralysis to what he terms an outside irritation starting from a sensitive nerve or nerves of the diseased organ or parts, which, being conveyed to the spinal nervous center, produces a paraplegia by a contraction rather of the blood-vessels of the spinal cord, than of those of the motor nerves and muscles; and, he adds, it is not rare, in reflex paraplegia, that a notable diminution of temperature of the paralyzed limbs shows that the blood-vessels of these parts are also contracted. This condition of the blood-vessels of the cord is followed by an insufficiency of nutrition, and hence, from these several causes, by the reflex paralysis; and, if this condition be allowed to continue, it may ultimately give rise to myelitis or some other affection of the cord.

There is, likewise, a second form of reflex paraplegia depending upon an alteration of nutrition in the muscles of the lower limbs, the result of pressure upon the blood-vessels supplying the limbs, or upon the nerves of the lumbo-sacral plexus. This form of paralysis may be determined from the preceding, by the existence of violent pains in the pelvis, and in many parts of the lower limbs, by the production of cramps, by a rapid atrophy of the muscles, etc.

Paraplegia connected with gout, rheumatism, or following serious fevers, cholera, diphtheria, etc., usually depends upon a serous effusion in the spinal canal, or a venous congestion, and, sometimes, it belongs to the group of reflex paralysis.

Whether the above causes named by Brown-Sequard are truly correct, has yet to be determined by still further investigations,—the reasons he gives for them are very strong and plausible, and have not yet been refuted.*

In the *diagnosis* of reflex paralysis, it is absolutely necessary to determine between it and those cases of paralysis which are due to

* Prof. Brown-Sequard has published the following works which contain much new and important information, principally the result of his own researches, and which volumes should find a place in the library of every medical man: "Researches on Epilepsy," "Lectures on the Diagnosis and Treatment of the Principal Forms of Paralysis in the Lower Extremities," "Course of Lectures on the Physiology and Pathology of the Central Nervous System."

disease of the spinal cord; as the medicines which are useful and efficacious in the one kind, are highly injurious in the other. Reflex paralysis may be detected by the absence of the special symptoms of an *organic disease of the spine* or its contents, such as, severe pain in some part of the spinal column, soreness or pain in some part of the spinal column when percussed, the inutility of all remedies applied to the spine, or to the general nervous system only, the presence of one or more of the following symptoms, viz., convulsions, cramp, twitchings, erections of the penis, formication, itching, diminution of temperature, wasting of muscles, œdema, bed-sores, and alkaline urine; and also by the existence of an incomplete paralysis of the lower limbs that has appeared somewhat *slowly after* a disease of the urinary or genital organs, or of some other abdominal viscus; *after* an inflammation of the lungs or pleura, or *after* some other kind of irritation of a nerve in its trunk or cutaneous ramifications. In reflex paraplegia there is no organic disease of the spinal cord; the paralysis will rapidly disappear when the source of reflex irritation is cut off; and the vascular supply of cord, of motor nerves, and of muscles is under the influence of reflex action. (*See Diagnosis of Paraplegia.*)

The *prognosis* of reflex paralysis depends in a great measure on the severity of the external disease which has induced it. If it does not arise from organic disease or other cause which is in itself generally fatal, it will often admit of cure, and that, perhaps, very rapidly. As a general rule, so long as the external morbid condition, which has produced it, lasts, the paralysis persists, and it ceases very quickly, and sometimes without any special treatment, after this morbid condition has been cured. In some cases, however, as when caused by cold, or disease of the bowels, the paralysis persists long after its external cause has been removed. When the paralysis depends upon a defect in the nutrition of the cord, it is almost always curable; but when it is due to an alteration of nutrition in the muscles of the lower limbs, recovery rarely takes place, even though the provoking cause of the paralysis be removed,—because, the muscles have become rapidly atrophied and altered.

In the *treatment* of reflex paralysis the first thing to be done is to ascertain the disease or irritation that has produced it, in order that means may be employed to cure or alleviate it. This necessarily involves the consideration of the treatment of nephritis, cystitis, morbid states of the uterus, enteritis, etc., which it is not required to enter upon here. While attempting the cure, a very important indication is, to allay irritation and pain, by diminishing the sensibility or interrupting the nervous influence which passes from the

diseased organ or nerve to the spinal cord, to paralyze the sensitive nerves. The agents that may be employed for this purpose are Belladonna, Chloroform, or Morphia, locally applied, or Morphia internally. Dr. Brown-Sequard states that to diminish pain, or to prevent reflex action, no narcotic is more powerful than Belladonna locally employed; it should be applied as much as possible to the organs from which starts the external cause of the paralysis.*

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* It may be serviceable to the practitioner, to name, at this place, the therapeutical action of certain agents, which the results of experiments have induced some physiologists to advance, especially Dr. Brown-Sequard.

Strychnia and *Brucia* have similar effects. Strychnia increases the quantity of the blood in the spinal cord, and hence is not useful when there is a congestion of the cord; it localizes its action entirely upon the sensitive nerves; it is injurious in epilepsy and paralysis arising from lesions of the encephalon, or congestion of the spinal cord; is useless in chorea and paralysis agitans; but, in small doses, is useful in slight paralysis due to white softening of the spinal cord, and in all cases of functional derangement from want of nervous power. It should be employed in paraplegia without irritation or without increase of the vital properties of the spinal cord, as in cases of reflex paraplegia, and white or non-inflammatory softening of the cord. It should be avoided in paralysis with symptoms of congestion, spinal meningitis or myelitis. (*B.-S.*) It is more useful in paraplegia than in hemiplegia.

Ergot (spurred rye), diminishes the blood in the spinal cord, by causing a contraction of its blood-vessels; dilates the pupil; acts more especially on the muscular fibers of the womb, and of the bladder and urethra, and appears to exert a more powerful influence on the inferior portion of the spinal cord. It should be used in the same forms of paralysis, and disease of the spinal cord, as Belladonna. (*B.-S.*)

Belladonna diminishes the blood in the spinal cord, and hence diminishes the vital properties of it and its nerves; dilates the pupil; causes the secretion of milk to cease; is useful in strangulated hernia, nocturnal incontinence of urine, etc. Belladonna, and its congeners, *Hyoscyamus*, *Stramonium*, *Indian Hemp*, etc., have a depressant influence on the pneumogastric nerve, excites the sympathetic, and depresses the cerebro-spinal system; they touch the secretions, and are slightly aperient; young children require proportionally larger doses to affect them. Belladonna imparts tone to most involuntary muscles, causes wakefulness, restlessness, is a powerful excitant of the blood-vessels, and, in large doses, causes delirium; it is useful in external neuralgia, in congestive headache, and coma with contracted pupil, in paraplegia with symptoms of irritation of the motor, sensitive, and vaso-motor, or nutritive nerve-fibers of the spinal cord, or of the roots of its nerves, as in spinal congestion, meningitis, myelitis, etc. It is a dangerous agent in paraplegia without symptoms of irritation, as in cases of white softening, or of the reflex paraplegia, in which cases it is likewise improper to administer its congeners and Ergot. In paraplegia, with symptoms of irritation of the spinal cord, where sleeplessness is present, Hyoscyamus should be used instead of Belladonna, or Opium. (*B.-S.*)

Sulphur is useful in cases of reflex paraplegia, or white softening of the cord without irritation. (*B.-S.*)

Iodide of Potassium (and probably also the *Bromide*, as well as the *Iodide* and

Thus, in disease of the urethra or of the prostate, a mixture of one grain of Extract of Belladonna in twenty drops of Laudanum should be injected into the urethra, and after half an hour or an hour's rest there, be washed away by some emollient injection. This should be repeated every two or three days; using in the interven-

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Bromide of Ammonium), may be employed without danger in the various forms of paraplegia; it is a powerful agent in promoting absorption of fluids effused in the cranio-vertebral cavity, either out of or in the substance of the nervous centers, and is not so depressing as other agents; it is especially useful in white softening of the spinal cord due to fatty degeneration of the blood-vessels of that organ; it has a rapid curative influence in syphilitic paraplegia. (*B.-S.*)

Sulphate of Quinia in large doses of 8 or 9 grains acts more on the ganglionic nerves, and subdues nervous action. In small doses of 1 or 2 grains, it elevates the principal vital actions, stimulating the circulation, respiration and nutrition; increases the resisting power of the nervous system to miasma; lessens the influence of opium, and exerts a tonic influence upon the vaso-motor or sympathetic nerves, without causing cerebral congestion. In paraplegia, it, as well as *Ammonia* and *Iron*, is useful in cases of insufficiency of the amount of blood in the spinal cord, as well as in deficiency of its nutrition; but they may also be used in chronic myelitis, or meningitis, or in spinal congestion, where the symptoms of irritation are not violent, and the pulse is weak and slow. (*B.-S.*)

Arsenic and the *Oxide of Carbon* acts upon the blood-globules.

Cod Liver Oil in conjunction with Belladonna and Ergot is very useful in chronic myelitis and meningitis. (*B.-S.*)

Bleeding or *Cupping* is not required in chronic inflammations of the spinal cord; *Dry Cupping* is useful in cases where there is congestion or inflammation, but would be unsafe in white softening or reflex paralysis. (*B.-S.*)

Compound Tar Plaster, *Actual Cautery*, *Issue*, *etc.*, are valuable in myelitis or meningitis, especially when the inflammation of the spinal cord or its membranes is limited to a small extent; they are useless in white softening and reflex paralysis. (*B.-S.*)

Cold Douche, *Cold Shower Bath*, *Sponging with Cold Water*, are useful in white softening and reflex paraplegia. (*B.-S.*)

Hot Douche, 100° F., applied on the spinal column over the painful part is very useful in congestion or inflammation of the cord, but is hurtful in white softening and reflex paraplegia. (*B.-S.*)

Ether is an expectorant; it dissolves as well as stimulates the bronchial epithelium.

Veratrum Viride, as well as *Veratria*, is an arterial sedative, or rather a nervous sedative, acting through the nerves, and especially the par vagum; it reduces the action of the heart, and exerts an influence primarily upon the cerebro-spinal system of voluntary nerves.

Bitartrate of Potassa is a diuretic; it dissolves the epithelial cells of the kidneys and liver.

Aconite moderates the force and frequency of the heart's action, and has a tendency to lessen pain and nervous irritation.

Hydrocyanic Acid is a prompt and efficient sedative; in appropriate doses it lowers the sensibility of the nervous system, moderates the force and frequency

ing days an injection of thirty drops of Laudanum only. In bladder disease, the aforesaid solution of Belladonna in Laudanum is to be injected every other day, immediately after evacuating the urine; using on the alternate days the Laudanum injection alone. Daily injections of cool or tepid water will also be found to relieve irritability of this organ in many instances.

When there is an enlarged prostate, a suppository covered with a Belladonna and Opium ointment, ought to be placed occasionally, or as often as required, in the rectum. If the irritation radiate from the vagina or uterus, then a pill of half a grain of Extract of Belladonna with one grain of Opium, surrounded by a thin piece of cotton-wool, may be introduced into the vagina as far up as possible; from which it may be removed, by means of a thread attached to the cotton, as soon as the pain has ceased, or much diminished. If dysentery, colitis, or other morbid irritations of the large intestine be the seat of the local trouble, injections of Opium alone should be used. If dentition, enteritis, neuralgia, gastric, hepatic, renal, or pleuritic affection be the seat of local irritation, Opium or Morphia should chiefly be employed to relieve the pain and irritation. Belladonna should never be used in reflex paraplegia, without employing at the same time Strychnia and Opium, or at least Strychnia; and when Belladonna is employed it should not be constant. The great object of this narcotic treatment is to effect a dilatation of the blood-vessels of the spinal cord, that the blood circulating in them may be increased in amount. Strychnia alone may be used in doses of one-twentieth of a grain daily; if united with Opium, in doses of one-thirtieth to one-fortieth of a grain; if with Belladonna, one-twelfth

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of the heart's action, and induces a sensation of quiet and calm throughout the whole system.

Digitalis depresses the circulation by hyperstimulation of the vaso-motor nerves; it reduces the heart's action.

Nitrate of Ammonia, in 15 grain does repeated three times a day, is a means of introducing an increased quantity of oxygen in the system, and may be found useful in fatty degenerations, diabetes, obesity, etc.

Opium in large doses produces congestion of the spinal cord, and unconsciousness; it is useful in reflex paraplegia; in delirium tremens with dilated pupils, but not when there is compression of the brain; all internal pains; checks all the secretions save that of the skin; lessens the tone of most involuntary muscles; constipates; and should not be employed in cases dependent on congestion, inflammation, or organic lesion of the nervous centers. It acts as a sedative, produces sleep, and lessens the intoxicating effect of quinia. It is considered a depressant to the cerebro-spinal and sympathetic systems.

Coffee and Tea increase nervous energy, and protract the metamorphosis of tissue; they, as well as *Cocoa*, lessen the elimination of urea.

Chloride of Sodium favors the formation and elimination of urea.

to one-fifteenth of a grain, this large dose being necessary to compete with the antagonistic action of Belladonna.

In addition to these measures, powerfully stimulating liniments, or excitants should be applied to the skin of the legs; galvanism to the paralyzed muscles, as well as shampooing; cold douche, thrown with great force for a minute or two, all along the dorsal and lumbar regions of the spinal column—the water should be at 40° or 50°, and be thrown in a small jet—and, immediately after its application, the spinal column must be rubbed with a hard, warm flannel. If patients can not bear a cold douche, use a warm one. In some cases alternate douches of ice-cold water followed by those of warm water, 100° F., will be of service.

To increase the blood in the spinal cord, three or four times a day, the patient should lie upon his back, having his head, arms, and legs on high pillows, so as to produce by gravitation a congestion in the spinal cord. All remedies used should be those which increase the amount of blood in the spinal cord, augmenting the vital properties of this nervous center, and also those remedies which render the blood richer in nutritive principles. The patients must exercise considerably in the open air, using the paralyzed muscles as much as possible, and make use of the most nutritious and easily digested food. The bowels must be kept regular daily.

Hysterical paralysis requires the Opium and Belladonna plug in the vagina, lying upon the back, with the limbs and head elevated, as stated above, and galvanism; at the same time employing uterine tonics, and ferruginous preparations if anemia be present. Frequently, proper mental influence will remove it. This form of paralysis presents symptoms of hysteria, with cramps, and uterine derangement; it may be located on one side, in the inferior limbs, or effect only a single muscle or joint.

Sometimes there will be an inability to speak above a whisper, which may continue for a longer or shorter time, the proper voice returning suddenly and unexpectedly. The face, and the tongue are not affected in this disease; but in walking, the leg will be drawn along, as if lifeless, sweeping the ground. There will be an absence of any signs of lesions of the nervous centers; the paralysis is incomplete; and the muscles are not wasted; frequently, in yawning or sighing, or under strong emotion, the paralyzed limb will be moved as well as the sound one. It is commonly brought on by exhausting or debilitating causes, as, leucorrhea, over-work, excessive menstruation, anxiety or excitement, etc.

Infantile paralysis, from dentition, and other sources of irritation, requires a treatment similar to that named for reflex paralysis.

Cutting the gums, if dentition be the cause, using counter-irritation, warm bath, keeping the bowels regular, the paralyzed limbs in warm flannels, and cupping repeatedly in the neighborhood of the origins of the nerves—sometimes dry cupping will answer, at other times wet cupping will be required. Sulphate of Quinia, Tincture of Arnica, and Tincture of Black Cohosh, combined, may be used internally with great advantage. If not promptly removed, it is apt to produce some form of club foot, especially when there is a lesion of the spinal cord, which may be the result of blows, falls, convulsions, acute diseases, or long-continued irritations; sometimes the cause is very obscure, the paralysis coming on when the child is in apparent robust health. It is apt to involve only single muscles or groups of muscles in the extremities, motion alone being affected, sensation remaining perfect or nearly so. Its most severe form is not attended with any danger to life.

Diphtheritic paralysis, or palsy following diphtheria, is another form of reflex paralysis. It usually commences in the pharynx and velum palati, as manifested by the nasal twang and dysphagia, and may extend to nearly all the motor muscles including those of speech and deglutition. Sometimes the voice, tongue, and faculty of swallowing, remain unimpaired. It may commence suddenly, or gradually, with loss of muscular power, formication, tenderness, a doughy, inelastic feel of the affected muscles, but not much atrophy. No apparent organic lesion of the cerebro-spinal or other organs exists, unless they were present before the diphtheria manifested itself. Sensation is ordinarily more or less perfect. The *prognosis* is usually favorable, though sometimes death has occurred suddenly from paralysis of the respiratory muscles, or sudden suffocation, or, perhaps, as a consequence of paralysis of the heart.

The *treatment* consists in frictions to the spinal column and affected muscles, when it can be accomplished without inducing fatigue or exhaustion; lying upon the back once or twice a day, as referred to above, in order to favor the gravitation of blood to the spinal cord; enveloping the body in warm flannels; bathing the surface with a warm Solution of Sulphuret of Potash to augment the action of the skin and capillaries; together with Strychnia in doses of from $\frac{1}{60}$th to $\frac{1}{30}$th of a grain, four, five, or six times a day; Pyrophosphate of Iron in doses of from two to five grains, three or four times a day; Xanthoxylin; Alcoholic Extract of Black Cohosh; Tincture of Arnica; Tincture of Rhus Toxicodendron; Tincture of Guaiacum; etc. When the paralysis has been on for some time, and not before, moderate currents of electro-magnetism may be passed every day through the paralyzed parts.

Rheumatic paralysis, like the hysterical, is usually confined to one locality, as the extensor muscles of the fore-arm; the deltoid, and trapezius; interfering with raising of the arm; as well as the interossei and lumbricales muscles. The portio dura may also be affected with the rheumatic disease, giving rise to facial palsy. It sometimes invades quite suddenly; at other times, gradually, commencing with a feeling of numbness in the fingers or toes, rendering their movements difficult and tiresome, which gradually proceeds until motion is rendered nearly, if not quite impossible. In some cases pain is present; in others it will be absent. Electricity is apt to occasion pain in a sudden attack, when the affected muscles are excited by it. Paraplegia is apt to be present when the muscles of the lower extremities are affected; and which must not be confounded with that occasioned by a lesion of the spinal cord. If the disease be allowed to progress without treatment, atrophy of the muscles occurs, the affected parts become cold, and the fingers or toes can hardly be separated from each other, the stiffness and numbness of which increase until the hand becomes useless. Sometimes, with these symptoms of atrophy and contractions, there will also be deposits and a somewhat anchylosed condition of certain joints.

The disease may be *diagnosed* by the previous history of the case, the pain attending the paralysis, and the absence of symptoms indicative of cerebral lesion.

The *treatment* is generally successful if undertaken at an early period; it consists of an energetic and long-continued course of electro-magnetism, aided by the internal use of Strychnia; and subsequently by remedies used in the treatment of chronic rheumatism. Should the muscular tissue become atrophied, there is not so much certainty of cure; still, electro-magnetism will be found of great service, aided by very powerful stimulating liniments over the atrophied muscles.

4. FACIAL PARALYSIS, and other local palsies, are usually due to compression or disease of nerves. The paralysis may be direct or reflex; and occasionally owing to some disease of the brain. Facial palsy is a more common form of local paralysis than any other. There are two different kinds of it; one arising from exposure to a draught of cold air, and generally caused by a rheumatic effusion, which takes place in the cellular tissue, between the facial muscles and the exterior branches of the portio dura, which compresses the muscular and nervous fibers, interfering with their functions. (The same result may arise from otitis or tumors, syphilitic or other deposits, caries, etc., existing some-

where along the course of the nerve, after its exit from the cavity of the cranium.) In this case there is no destruction or inflammation of the nerve, and the paralysis disappears in proportion as the effusion is absorbed; sometimes spontaneously, or by means of proper medicines, with electricity to excite the muscles. An Ointment of Iodide of Potassium frequently affords amelioration, by causing absorption of the rheumatic effusion. In all cases the bowels must be kept regular.

In facial palsy the physiognomical expressions of surprise, terror, hilarity, rage, etc., disappear on the affected side, and are exaggerated on the healthy side; the patient can not laugh, frown, or whistle, and the face will be drawn to one side, or other changes occur in the features, due to the want of equilibrium between the paralyzed and healthy muscles. If both sides of the face are paralyzed, the features are stoical, appearing as if covered by a mask, the eyeballs alone being moveable.

The portio dura or facial nerve being the motor nerve for a number of the muscles of the face, its simple or partial paralysis, (palsy of its superficial branches), may give rise to different results, according to the muscle or muscles affected. Thus, if the frontal portion of the *occipito-frontalis* muscle and the *corrugator supercilii* are paralyzed, wrinkles will disappear from the forehead, which will become smooth, and the patient will be unable to frown or move the scalp. The paralysis of the frontal muscle causes the transverse wrinkles to disappear; while that of the corrugator removes the perpendicular rugosities. In some cases a doleful, or even terrible expression is given to the face, in consequence of a dropping and hanging of the eyebrow over the eyeball.

If the *orbicularis palpebrarum* is paralyzed the eye can not be shut; and in consequence of its being thus constantly exposed to the air, even during sleep, the conjunctiva becomes irritated, giving rise to an abundant flow of tears, which may excoriate the skin of the cheek, over which they pass, from their acridity. The eye appears staring and protruded, and the eyelids are farther apart than natural; the dropping of the lower eyelid exposes a large portion of the sclerotica to view. The eyelids are kept apart, because the levator palpebræ superioris muscle, which is the antagonist of the orbicularis, retains its power, it being animated by the third pair and not by the portio dura. (When the third nerve is paralyzed, the eye remains closed, the patient not being able to open it.) Those changes in the nutrition of the cornea and of the conjunctiva, which occur in paralysis of the fifth pair, (tri-facial, almost wholly a nerve of sensation), are never observed. If the

patient is told to shut the eye, either no motion is observed, or the eyeball is carried upward and inward beneath the upper eyelid so as to partially or wholly conceal the cornea,—from the action of the rectus internus, rectus superior, and obliquus inferior muscles, which are animated by the third pair and not by the portio dura. As paralysis of the orbicularis never occurs in facial palsy arising from intra-cranial injury, when, in a case of facial paralysis, we observe that the eye can not be closed, we may be certain that the paralysis is of the portio dura, and not of cerebral origin.

If the *levator alæ nasi* and *pyramidalis nasi* are palsied, voluntary motion of the affected nostril is lost, and it is kept open only by the rigidity of the nasal cartilages. In respiration, the movements of the nostrils are opposite to those which they have in the healthy state; thus, the nostrils are dilated, during the normal state, while inspiration is going on, and constricted during expiration, but in facial palsy, they become constricted during inspiration by the air rushing into the lungs, and dilated during expiration by the air being driven out of the lungs.

When the *zygomatici* muscles and the *levator anguli oris* are palsied, the mouth is drawn to one side, and the angle of the mouth appears depressed and pendant, while that of the healthy side is higher and drawn toward the corresponding ear.

Paralysis of the deep and large *buccinator* muscle causes the face to have an aged appearance, the cheek appearing very flaccid, and hanging loosely. The cheek becomes depressed during inspiration, but during expiration, as it can not resist the pressure of air, it becomes distended and swoln, producing movements similar to those made in smoking a segar which "does not draw easily." As the temporal and masseter muscles are animated by the trigeminal nerve, and not by the portio dura, mastication is usually not much interfered with, though it is very annoying from the food accumulating between the jaw and the cheek. In drinking, some of the fluid escapes at the corner of the mouth; and the looseness of the cheek interferes more or less with the speech.

Paralysis of the *orbicularis oris* prevents the patient from "puckering" up his mouth, so that he can not whistle. The muscles on the sound side draw the lips toward their corresponding ear, causing them to appear longer, and giving more prominence to the naso-labial sulcus; an involuntary flow of saliva takes place, and the labials are pronounced with the greatest difficulty, if at all.

In addition to the measures recommended above for this form of facial palsy, the following have been frequently used with efficacy:

1. Take of Extract of Hyoscyamus half a drachm, Sulphate of

Morphia three grains, Strychnia two grains, Capsicum half a drachm, Sulphate of Zinc fifteen grains; mix; divide into thirty pills, and administer one for a dose, repeating it three times a day.

2. Extract of Hyoscyamus half a drachm, Valerianate of Zinc one scruple, Alcoholic Extract of Black Cohosh one drachm; mix; divide into thirty pills, and administer as the preceding.

3. Take of Phosphorus one grain, dissolve it in Dippell's Animal Oil one drachm, Oil of Cloves twenty grains; dose; three drops on a piece of sugar every night and morning, to be gradually increased to twenty drops. In addition to this rub the affected parts with the following: Take of Phosphorus two grains, Dippell's Animal Oil one drachm, Cajeput Oil half a drachm; dissolve together.

4. Take of Strychnia one scruple, Aconitina four grains, Alcohol, seventy per cent., half a fluidounce, Ointment of Iodide of Ammonium one ounce; dissolve the Strychnia and Aconitina in the Alcohol, and then triturate the solution thoroughly with the Ointment. Used as a local application over the affected muscles.

5. Compound Tar Plaster to the mastoid region of the affected side, and the internal and external use of Strychnia. Strychnia in small doses, combined with Belladonna and Alcoholic Extract of Black Cohosh, may be given internally; and as a local application the following: Take of Strychnia three grains, Alcohol one fluidounce; dissolve—apply from half a drachm to a drachm to the cuticle of the affected part, aiding its absorption by friction, and repeating it three times a day.

6. Steaming the affected part over the vapor from an infusion of stimulating herbs, has sometimes proved successful.

The other form of facial paralysis is due to injury of the intracranial portion of the facial nerve. In addition to the symptoms already named, but which are more general and uniform, there will be a loss of taste, numbness in the tongue caused by paralysis of the *chorda tympani;* difficulty of swallowing, caused by paralysis of those branches which animate the *digastricus* and *stylohyoideus* muscles; the hearing is more or less affected, and the uvula deviates toward the healthy side. In some cases the patient may move the tongue, but not so as to cover the upper lip with it, so as to have its tip touch the nasal septum. Paralytic affections of the tongue and the pharynx ought to arouse our suspicion, as they are generally due to cerebral disease. Double vision, ptosis, dilatation of the pupil, presbyopia, and strabismus may also be present, but these symptoms are not necessarily owing to brain

disease, as they are frequently the result of rheumatic, or syphilitic affections, improper use of the muscles of the eye, etc.

In this form of facial paralysis the intra-cranial cause of the disease must first be remedied, before any local measures be taken to remove it. The application of galvanism, or stimulants to the paralyzed parts, will not only be useless, but will be apt to increase the cerebral malady. In all cases which result from injury to the trunk of the portio dura, benefit can only be expected from galvanism or electro-magnetism, when the original lesion has nearly or wholly subsided; if the continuity of the fibers of the facial nerve has been quite destroyed the palsy is incurable—as well as when there is a permanent contraction of the paralyzed muscles. In advanced age a cure is doubtful, in both forms of facial paralysis. As soon as the nerve has nearly or fully regained its normal condition, by treatment directed to the intra-cranial difficulty, if this can be determined, then the palsy may be cured by a continuance of such treatment, aided by that advised under the preceding form of facial paralysis. Frequently facial palsy of intra-cranial origin will prove incurable.

5. SCRIBES' PALSY, also called "Writers' Cramp," "Scriveners' Cramp," "Sempstresses' Palsy," etc., is a peculiar affection, sometimes met with among writers, painters, cutters, carvers, sempstresses, sculptors, and those whose daily occupation requires the use of the fingers in a more or less flexed condition, with, at the same time, a greater or less degree of pressure upon the nervous filaments supplying the finger's ends, especially those of the thumb. It may also be occasioned by injuries of the radial or ulnar nerves, rheumatism, etc. Some cases appear to be wholly spasmodic, the fingers, and especially the thumb, being strongly flexed into the palm of the hand whenever the patient attempts to write, paint, etc. In other cases it is a paralysis of the short extensor muscle of the thumb, the adductor of the thumb, and abductor of the forefinger: the hand can not hold the pen, or brush, etc., steadily, and the fingers slip away from it. The muscles cease to obey the will.

The *symptoms* usually observed are, an entire or partial loss of sensation at the end of the thumb and index finger of the right and, with loss of power to hold the pen, brush, needle, etc. Occasionally the finger and thumb of the left hand are similarly affected, especially, when the disease is caused by an injury or rheumatism. Sometimes every other movement of the hand, save that of writing, sewing, etc., however minute, is perfectly retained. The fingers affected, frequently diminish in volume,

and more or less rapidly lose the power of contraction. The muscles especially affected are the opponens pollicis, the flexor brevis and adductor pollicis, the first two lumbricales, and the abductor indicis. At the same time the skin of the palmar surface of the thumb and index fingers, especially at their tips, becomes insensible; and the anæsthesia frequently also affects the middle finger. This paralysis rarely appears suddenly. There is first cutaneous anæsthesia; then the electro-cutaneous sensibility is diminished or abolished, and the electro-muscular contractibility more or less diminished. Most of the patients experience some uneasiness in the lower part of the cervical region, and in the upper part of the dorsal; and many medical men believe that the disease commences in the spinal cord.

Frictions and liniments are of no service in this disease. Mechanical support affords much relief, and may enable the patient to write, etc., but ultimately, even with this, the extensor muscles of the thumb become so weak that the support fails to continue its benefit. But mechanical support, aided by electro-magnetism will effect cures. M. Duchenne, has used the following apparatus with success: place over the affected thumb a finger of a glove, and on the fore-arm of the affected side lace a sleeve of copper. A loop attached to this glove finger at the level of the posterior extremity of the thumb, slides in a groove going along upon the posterior face of the articulation of the first and second phalanges, then it passes up again obliquely on the external side of the thenar eminence, in order to come out of the sheath at the level of the superior attachment of the abductor muscle of the thumb. In drawing upon this loop, the first metacarpal executes its motion of opposition, the last phalanx of the thumb becomes extended, and the first inclines laterally so that the thumb is opposed to the first two fingers. This is the proper action of the abductor muscle of the thumb. To put this artificial abductor muscle in operation, its free extremity is attached to a spiral spring, which is fixed to a button fastened on the anterior face of the copper sleeve, and by which the tension is graduated. This is especially useful where there is an atrophy of the muscles of the thenar eminence.

A still more simple apparatus has been devised by M. Duchenne; it consists of a tube of vulcanized caoutchouc, which embraces the superior extremity of the first metacarpal, in the fashion of a ring, and passes up again obliquely toward the internal border of the wrist around which it is rolled. The caoutchouc is stretched more or less, the fore-arm being preserved from compression by a copper sleeve. Its inconveniences are: it has a slight action of extension

on the last phalanx, and, by exerting a circular compression on a very limited point of the thumb, it interferes with the circulation. These are by no means expensive apparatus. "Perry's Orthodactylic Pen-holder," has proved serviceable in many cases where the patient was compelled to continue his writing.

When the disease is spasmodic, a constant continuous current of galvanism should be applied daily to the flexor muscles. Complete and absolute rest of the palsied hand for two or three months, upon the first appearance of the disease, should always be advised; after which period, electricity, strychnia, etc., will prove serviceable. If employed at too early a period, strychnia is apt to prove injurious. Sometimes the disease, in either form, is unyielding to any treatment.

6. PARALYSIS AGITANS, "Shaking Palsy," or "Trembling Palsy," is a disease frequently met with, and appears to be more common among males during middle and advanced age. It is characterized by a constant involuntary shaking or trembling of one or more parts of the body, with diminished muscular power. Its *causes* are not well understood, having been attributed to muscular exhaustion, feebleness of nerve power, chronic disease of the superior portion of the spinal cord, the tubercula quadrigemina, or of the medulla oblongata, etc. Sometimes it has followed chronic rheumatism, as well as severe exposure to cold and dampness.

The approach of this malady is generally so imperceptible that the precise period of its commencement is seldom recollected by the patient. A slight sense of weakness, with a proneness to trembling, sometimes in the head, but more commonly in the hands or arms, are the first symptoms noticed. These affections gradually increase, the patient bends himself forward, and, by degrees, the legs suffer similar agitations, and there is a loss of power with the hands and arms. As the disease advances, the limbs become less and less capable of executing the dictates of the will, while the patient seldom experiences even a few minutes suspension of the tremulous agitation; and should it be stopped in one limb by a sudden change of posture, it soon makes its appearance in another. This condition of symptoms may continue for years, but gradually augmenting in severity.

In the far-advanced stage, the tremulous motions of the limbs occur during sleep, and increase in violence until they waken the patient in much agitation and alarm; the power of conveying food to the mouth is impeded; the bowels are exceedingly torpid; the trunk is permanently bent forward; muscular power diminished; articulation at length becomes indistinct; mastication and swallow-

ing difficult; and the saliva constantly dribbles from the mouth. The mental faculties may remain unimpaired for some years, but at length, as the symptoms increase, drowsiness, delirium, and marks of exhaustion, or coma, precede death.

Shaking palsy, in some respects, resembles *chorea*, but may be distinguished from it by its peculiar symptoms, and by its attacking those in mature and advanced age. Chorea almost invariably attacks the young.

The *treatment* of paralysis agitans has occasionally been successful, especially in its earlier stage; but in its advanced period it is incurable. Any cerebral or spinal disease which may be suspected to exist, must be met with the Iodide or Bromide of Potassium, or Ammonium; Compound Tar Plaster; and the means advised for such diseases. Internally, to give tone to the nerves and muscles, the following may be administered: Take of Sulphate of Quinia twenty grains, Elixir of Vitriol two fluidrachms, dissolve, and add Tincture of Black Cohosh two fluidounces. The dose of this is forty drops, three or four times a day in a little water. Pyrophosphate of Iron, or Elixir of Iron and Cinchona may be used in addition. The continuous direct galvanic current should be carefully applied to the affected parts, for from half an hour to an hour at a time, daily; followed by soothing, gentle frictions with the hand; after which the parts should be kept warm by covering them with flannel or fur. The bowels, skin, kidneys, etc., should be attended to; diet be nutritious and easy of digestion; the mind should be kept as free from excitement as possible; coition must be avoided; and as little exercise as possible should be taken, and, always of a passive character.

7. Paralysis *affecting the co-ordinating power*, *Tabes Dorsalis*, *Ataxie Myelo-phthisis*, or *Ataxie Musculaire Locomotrice* of Duchenne. This is a peculiar affection, the characteristic features of which are, "progressive abolition of the co-ordination of movements and apparent paralysis, contrasting with the persistent integrity of the muscular forces."

Duchenne, in his work entitled "Electrization Localisée," Paris, 1861, gives the following description of the disease: "Persons affected with it present a group of phenomena which are identical; the commencement, the symptoms, the progress, and the termination of the disease are the same. Paralysis of the sixth pair or of the third pair, a feebleness, or even complete loss of sight, attended with inequality of the pupils, are the symptoms present in a majority of cases, either at the commencement, or are the forerunners to the derangement of the co-ordination of movement.

Very peculiar pains of a piercing character, shifting, erratic, quick as lightning but of slight duration, very similar to electric shocks, reappearing in paroxysms, and attacking all the regions of the body, are present with these paralyses, either accompanying them, or appearing subsequently; and these form the first stage of the disease. The second stage comes on after an interval of several months, or even several years; there is vertigo; difficulty of keeping the body in equilibrium; sooner or later there is a diminution or entire loss of the sense of touch, as well as of the sensibility to pain, especially in the inferior extremities, rarely in the superior; and in the third stage the disease becomes general.—During the progress of the affection, the rectum and the bladder are frequently deranged, but no sugar or albumen exists in the urine; the intellect is undisturbed; there is no embarrassment nor hesitation in speech; electro-muscular contractility remains undisturbed; there is no alteration of nutrition in the muscles, no morbid changes in their tissue; and the disease is not only liable to become general, but often proves fatal." (*Duchenne.*)

"The loss of power of co-ordinating the movements which is manifested in the lower extremities, consists in a difficulty of maintaining an erect position without trembling, or without support, or of performing certain movements in progression, such as lateral or gyratory movements. At such time the patients commonly feel giddy, and as if about to lose their balance, and sometimes think that their lower extremities have lost their power;" (if the patient close his eyes, it augments the uncertainty and unsteadiness of his gait, so that he can not stand erect with his feet together without immediately losing his balance, or, can not take a step forward without falling—*Trousseau*); the tactile sensibility of the sole of the foot becomes blunted or otherwise altered. They soon seem to be walking on soft substances when treading upon a pavement, or the ground appears to be elastic and to jerk them up. Subsequently they are unable to walk without throwing the legs forcibly forward and striking the ground violently with the heel. These movements are at times so violent and sudden that the body is shaken at every step, and the patient loses his balance; this irregularity increases to such an extent as to render standing and walking almost impossible. It is then necessary to support the individual on both sides, and in attempting to make a few steps, his limbs will be agitated in the most violent manner, without apparent object; the strength is speedily exhausted by these efforts, and he begs to be led back to his arm-chair. In this condition the patients pass their lives, sitting or lying down. At the same time,

with all these symptoms of paralysis, there is great force in individual movements, as shown by a dynamometer invented by Dr. Duchenne." (*Brit. and For. Med.-Chir. Rev., April*, 1859.) Upon attempting to flex the patient's leg or extend it against his will, he will be found to have a natural degree of muscular power, or, at all events, more than is met with in other forms of paralysis.

The *causes* of this disease are not understood; it has been attributed to sexual excesses, and there is no doubt but that this may give rise to it,—but then, it has occurred where the patients were extremely continent, or moderate in their sexual contacts. It affects both males and females, and may occur at any period of life from the development of puberty to the forty-fifth year; and, according to Trousseau, and Friedreich, it may be transmitted from parent to child, or rather, families of a strongly-marked tendency to nervous diseases are liable to it, several members of one family having been known to labor under it. A writer states that anatomically, the malady is "a chronic inflammatory process, resulting in the atrophy of the nerve elements, and which, being confined to the posterior column of the spinal cord, begins in its lumbar region and gradually extends thence both upward and downward. With this alteration is associated a spinal meningitis affecting the posterior face of the cord, and proportioned in its degree to that of alteration of the cord itself." I have recently witnessed a case of this disease in a confirmed onanist; the patient is still living, but is now constantly confined to his bed. Five years ago he called upon me, and from his gait, I at first considered him under the influence of liquor. I did not treat him, as I considered his case, even then, hopeless.

The *diagnosis* of the disease is not very difficult; it may be determined from any of the other forms of paralysis, not only by the staggering gait of the patient, or his inability to walk without support, from the muscles not being under the control of the will, but also by the presence of muscular power, which is not lost as in the other paralyses. There are no tremors, no thickness of speech, no loss of the power of muscular movement, no want of contractility under the electric stimulus, no fatty degeneration of the muscles, and no dementia, as is the case with general paralysis.

The *prognosis* of this disease is almost invariably unfavorable. The amaurosis, strabismus, piercing pains, in the lower extremities, etc., indicative of the first stage will frequently be found wanting, and the first symptom observed will be the peculiar characteristic of the disease, viz.—the imperfect power of co-ordination of the muscles of the inferior limbs, and occasionally of other

parts; and when this is present, the disease has passed far beyond its initial period. It may exist alone, or be complicated with morbid conditions of the gray matter, and of the lateral or of the anterior columns of the spinal cord, giving rise, in addition, to more or less hyperæsthesia, anæsthesia, and true paralysis. The disease is usually of long duration, lasting a number of years. Almost all remedial agents and compounds have been recommended and tried for this disease, but without the least benefit. Friedreich says: "It is indeed discouraging to observe, how, in spite of active remedies, the symptoms gradually but visibly grow worse, while an evident suspension of its rate of progress may be observed when all medicines are discarded and the patient is confined entirely to dietetic measures." Romberg, who has also given much attention to the malady, observes: "There is no prospect of recovery for patients of this class; the fatal issue is unavoidable; the only consolation that can be offered to those fond of existence is the long continuance of the disease. If, in any case, the busy activity of the physician increases the sufferings of his patient, it is in tabes dorsalis."

The *pathological appearances* in those who have died while laboring under this malady, are almost uniformly the same, viz.: a degeneration of the posterior columns of the spinal cord, and, in some cases, also of the cineritious substance, which exhibit a grayish-yellow and semi-transparent appearance; the posterior roots of the spinal nerves are atrophied, thinner, flatter, and harder than natural, and of a reddish-gray color, especially those in the lumbar region. Fluctuation may frequently be detected in the lumbar region, and if the membranes in this location be opened, there will be a discharge of clear, transparent fluid. The pia mater may be firmer than usual, more closely adherent to the substance of the cord, of a dirty-white appearance, and having many white bands of various sizes upon its external surface connecting it to the internal face of the dura mater. Thickening and milky opacity of the ligamentum denticulatum. Sometimes the optic nerve will be altered, and even the tubercula quadrigemina. Along the posterior surface of the spinal marrow a depression or groove, of varying depth will be found, being deepest in the lumbar and dorsal regions, and which depression corresponds to the atrophied posterior columns. The affection appears to commence at the lumbar region, where the greatest changes will be observed, and extend thence in either direction, up or down. The microscope will detect the atrophy wherever the posterior column presents a grayish color; no normal nerve fibers, or but few, can be found,

their place being occupied by slender empty tubes, surrounded by a substance composed of cells with one or more nuclei, and granular matter. Fatty degeneration is entirely absent. Brown-Sequard, who has closely investigated this disease, states that it may arise from many spinal affections; and this is, no doubt, correct.

Treatment in this disease has effected absolutely nothing. Wunderlich, Charcot and Vulpian, and Herschel, have related cases benefited by the internal use of Nitrate of Silver, in doses of one-fifth of a grain, given night and morning at first, and after a while, three times a day; its good effects are stated to manifest themselves in from six to twenty days. Probably, in the commencement of the disease, whenever it can be diagnosed, the use of the Hypophosphites, in conjunction with Bromide of Potassium, or, of Ammonium, and Extract of Conium, stimulants to the lumbar and dorsal region, moderate exercise in the open air unless the symptoms contraindicate it, and a moderate but nutritious and easily digestible diet, may prove beneficial; and Nitrate of Silver may also be tried. But after the symptoms of impairment of the co-ordinating faculty have appeared, it is doubtful whether confidence can be placed in any treatment. Dietetic measures appear to answer a better purpose than therapeutic; although I should perseveringly continue the use of Hypophosphites, Bromides, etc., above referred to, for several successive years.

M. Carre d'Avignon, who has presented the medical world with a very excellent monograph upon the anatomy, physiology, etc., of this disease, suggests a mode of treatment by subcutaneous injections of Solution of Nitrate of Silver along the vertebral column, and especially over the track of the painful nerves. This determines at such points a substitutive inflammation, the first effect of which is to calm the pain,—the second to diminish the incoordination. He believes that this agent produces a modification in the nerves in the vicinity of the solution, that this modification extends along the sensitive track of the nerves to the posterior columns, determining in their interior a particular perturbation which arouses its vitality, and favors the resorption of the morbid products and the reparation of the elements. He prefers to act upon the intercostal and sciatic nerves, and uses from ten to twenty drops at a time. Belladonna may be given internally at the same time.

8. HEMIPLEGIA is paralysis of one side, or of a lateral half of the body, and is generally due to disease of the brain. It may, however, be caused by an external irritation, and form a reflex paralysis; and it is not unfrequently a result of epilepsy, which may

produce an exhausted condition of the deep-seated white substance of the brain, as the optic thalami, and corpora striata, very much resembling the condition of white softening. Hemiplegia may also be congenital, or occur soon after birth, depending upon some cerebral deformity or deficiency; of course, it is then incurable.

Hemiplegia is the most common variety of paralysis met with, and is most commonly associated with apoplexy either following or preceding it; yet it often occurs without any loss of consciousness, either at the time of its supervention or afterward. It may attack at any period of life, but more commonly after the fortieth year of age. (*See Softening of the Brain, and Apoplexy.*)

The *cause* of hemiplegia, independent of injury and outside irritation, is the same as that of apoplexy; that is, tumors or softening of the brain, and cerebral hemorrhage, and an attack may be induced by the same exciting causes.

Spinal hemiplegia is of rare occurrence, and is commonly the result of lesion of the cord immediately below the decussation of the anterior pyramids, the lesion being confined to only one-half of the cord; a very prominent symptom in spinal hemiplegia is the implication of the intercostal or abdominal muscles, which is present in genuine hemiplegia only when the cerebral lesion is extensive. The paralysis is also apt to affect first a shoulder or an arm, and then more or less gradually extend itself. The mental faculties are rarely, if ever, impaired, unless a cerebral lesion be associated with the spinal. The limb first attacked, usually the leg, is more obstinately affected than the other one, or arm.

The *symptoms* of hemiplegia are readily made out; there is a want of motion of exactly one-half of the body, more commonly of the left side. The attack may occur gradually, at first appearing as a local palsy, either in the fingers or toes, which gradually extends itself until the whole of that side of the body is involved. Again, we frequently observe persons of advanced years attacked with hemiplegia, after having suffered for some time with symptoms indicative of cerebral disorder. When the attack is sudden there is at first, in nearly all cases, a loss of both motion and sensation, but the latter function returns, to a greater or less extent, after a longer or shorter period. In a severe attack, the muscles of the face are involved, the corner of the mouth being drawn toward the ear of the affected side, and the tongue is also paralyzed, rendering speech very imperfect and difficult, and when this organ is protruded its point is turned toward the affected side. There is often an appearance as if the cheeks were hang-

ing, and not supported properly by their muscles; but the face is not always palsied. Although the fifth pair is generally implicated in the paralysis, yet it is frequently the case that the portio dura remains free. The affected parts are often cold, and somewhat swoln, with more or less impairment of sensation; the circulation is slow, and the mind is more or less affected.

The paralysis, when due to cerebral disease, is on the side opposite to that of the mischief in the brain. Dr. Mayo gives the following explanation: "The fibers of the anterior pyramids pass through the pons Varolii. The pons Varolii consist in great part of filaments which issue from each hemisphere of the cerebellum. These filaments may easily be supposed to convey a depressing influence from the diseased hemisphere. But in their course they come immediately upon the filaments of the anterior pyramid of the same side; and they are so implicated with the latter, with such a singular closeness of reticulation, and often with so much that looks like an actual interchange of filament, that it is far from unlikely that they may transmit to the descending fasciculi of the pyramid, a shock which may thence be communicated to the same part at which a *cerebral* lesion exerts its paralyzing force."

Andral has observed that when the blood is effused into one side of the cerebellum, and no where else, the paralysis takes place in the limbs of the opposite side of the body. But if the effusion occur simultaneously on one side of the cerebellum, and on the other side of the cerebrum, instead of having a double palsy or general paralysis, more commonly the cerebral affection overcomes that of the cerebrum, and the paralysis occurs on the side opposite to the lesion in the brain proper. It, therefore, appears that a lesion above the decussation of the pyramidal columns gives rise to paralysis on the opposite side; if it be below the decussation, the paralysis is on the same side; and if it be on the same plane with the decussation, there will be paralysis on both sides. If motion be greatly palsied, the lesion has involved the corpus striatum; if sensation, the optic thalamus. Though frequently, both of these bodies may be involved in the disease, at the same time.

The premonitory *symptoms* of hemiplegia are the same as those in Apoplexy, and Softening of the Brain, *which see*.

The *diagnosis* of hemiplegia is readily made out; but the exact seat of the lesion giving rise to it is by no means easy of determination. In a practical view, however, it is of more importance to understand the probable nature than the exact seat of the lesion. There are, unfortunately, no very certain means of diagnosis

between hemiplegia from effusion of blood, and that from white or non-inflammatory softening.

When coma attends a sudden attack of paralysis, this is due to an apoplectic effusion; if no coma be present, it is generally indicative of a quick breaking down of a softened brain. If the paralysis comes on gradually, it is due to some chronic cerebral lesion, as, ramollissement, tumors, etc. When hemiplegia is complicated with disease of the heart, of the arteries, or of the kidneys, the palsy may be occasioned by softening, cerebral hemorrhage, or by a fibrinous clot plugging up a cerebral artery. (*See Diagnosis of Softening of the Brain.*)

According to Dr. Todd, early rigidity of the paralyzed muscles is evidence of irritative disease within the cranium; late rigidity following complete resolution of the muscles indicate that there has been loss of substance in the brain, and that the cicatrix is undergoing contraction. He also admits that galvanism or electromagnetism may serve as a test to distinguish between an irritant and a depressing lesion of the brain, but not as a means of distinguishing between cerebral and spinal palsy. If the muscles of a paralytic limb are, by a current of the same intensity, more powerfully convulsed than those of the sound side, we may fairly conclude that the paralysis is due to brain disease, and that the lesion is of an irritative character. But the excitability of the muscles is by no means augmented in *all* cases of paralysis resulting from a lesion of the brain; in some cases the galvanic stimulus produces an augmented excitability of the paralyzed muscles, greater than that produced in the opposite healthy muscles, together with some degree of rigidity. In a second class of cases, the stimulus produces little or no contraction; the muscles being more or less wasted, soft, and flaccid. In this class there appears to be no longer any intercranial irritation; the seat of the paralysis is no longer in the brain, but in the muscles which are impaired by the long rest they have necessarily taken after the attack,—paralysis from disuse,—and electric treatment will be useful. In a third class of cases, usually observed in cases of apoplexy occurring in persons previously healthy and not advanced in years, the paralysis may be almost complete, yet the galvanic stimulus will equally excite the muscles of the paralyzed and those of the healthy limbs.* (*See Diagnosis of Lead Paralysis.*)

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* The British Medical Journal, 1861, p. 230, gives the following abstract from one of Dr. Brown-Sequard's Lectures on Diseases of the Base of the Encephalon:

"A very important observation has been made—that all the nerves entering

Dr. Gull states that "if a disorganization of the brain exists, whether affecting the anterior or posterior cerebral lobe, involving the optic thalamus, or corpora striatum, singly or equally, then there will be a greater affection of the upper than of the lower extremity,

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the brain through the base of the skull decussate near their entrance into the encephalon; and after the decussation, most of them send fibers upward into the brain. Knowing this we may first determine theoretically what symptoms should be produced by injury of a given part; and then examine how far this theory of symptoms agrees with what is actually observed.

"With the exception of the auditory nerve, the cranial nerves springing from the *medulla oblongata* have their origin at the back rather than at the front of this part of the encephalon. All these nerves pass into the gray matter, and there undergo partial decussation. To illustrate the effects of disease on these, according to its seat, the lecturer selected the sixth nerve.

"Diseases affecting the medulla just at the origin of the sixth nerve on one side will produce paralysis of the external rectus on the same side as the injury; while there will be paralysis of the opposite side of the body. This agrees with what is observed in practice. But if it be inflammation that affects the origin of the sixth nerve, there will be convulsive action of the muscle supplied by it, and the eye will be drawn outward. Again, if this nerve be injured after its decussation in the pons Varolii, the external rectus of the other side is paralyzed; and the paralysis of the muscle of the eye here occurs on the same side as the general paralysis of the body and limbs. In another class of cases there may be an injury to one side, small in extent, yet near enough to the point of decussation to affect the nerves on both sides. Here there will be paralysis of both external recti, although one side of the body is paralyzed.

"Analogous phenomena are observed when other of the cranial nerves are affected. The phenomena of 'alternate paralysis,' (paralysis partly affecting one side of the body and partly the other), have lately been made the subject of a paper by M. Gubler. M. Brown-Sequard, however, had given an explanation of the fact ten years ago; and even then he did not think he was advancing any new doctrine. The phenomena had also been explained by Romberg and others prior to the appearance of M. Gubler's essay. M. Gubler has collected cases of injury at the *lower part of the pons Varolii*, affecting the facial and trigeminal nerves, and producing paralysis of the parts supplied by these nerves on the same side; while the opposite side of the body has been paralyzed. It would appear, however, that M. Gubler has drawn too general a conclusion from these facts; for if the injury be at the level of the decussation of the nerves, then the paralysis of the parts supplied by them occurs on both sides. Two cases of this kind have been recorded. Again, injury of the pons above the point of decussation of these nerves will produce paralysis of the face on the opposite side—on the same side as that on which the general paralysis of the body occurs.

"The effect of injury of the pons Varolii in producing paralysis of the cranial nerves then varies according to its situation. When the injury is below the point of decussation, the paralysis is on the same side; when it is above, the paralysis is on the opposite side; and when it is between these, so as to affect the nerves just where they decussate, the paralysis of the parts supplied by the nerves involved, occurs on both sides. Are, then, these signs sufficient for the positive

and a greater loss of motion than of sensation. If there is complete paralysis of both the upper and lower limbs, the lesion having been sudden, the leg will be the first to improve, so that the patient may even be enabled to walk, the muscles nearest the body taking on healthy action the first, and so descending toward the toes; and if sensation and intelligence have been lost, they will return after a few days. He also states that when the third nerve is involved in the hemiplegia, the nerve on the same side as the cerebral lesion is the one that is palsied, the greatest dilatation of the pupil being on that side, vision lost, eyes directed *from* the side affected with palsy, and ptosis on the side opposite to the hemiplegia."—When the.

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diagnosis of paralysis originating in injury of the pons Varolii? No; but there are other symptoms which aid in the diagnosis.

"If the injury of the pons be produced rapidly, as by effusion of blood, the *breathing* will soon be affected. Again, in the paralyzed parts there is a remarkable *diminution of temperature;* and, as a general rule, the presence of an irritation in the pons, and perhaps in some part of the medulla oblongata, is denoted by a considerable *loss of heat on one side of the body.* If, however, there be *no* irritation the temperature in the paralyzed limbs will be increased. Again, if there be *paralysis of the muscles of the eye*, attended with *constriction of the pupil*, there is an irritation somewhere; and, if there be no other obvious source for this, it must be located in the pons. Further, in most cases of simple injury of the pons, the intelligence remains *normal;* and there is *difficulty in deglutition*, and in the *motion* of the tongue. It is remarkable, however, that it is only when the lower part of the pons Varolii is injured, that the function of the hypoglossal nerve is much impaired.

"The small size of the *anterior pyramids* in the medulla oblongata at first sight renders it difficult to believe that they are the main channel of the motor fibers in their passage from the brain to the spinal cord. Yet injuries of the other parts of the medulla *do not paralyze;* while an injury of the anterior pyramid of one side produces complete paralysis of motion of the opposite side of the body. Pathological facts also show that these anterior pyramids are the continuation of the lateral columns of the cord, and that a decussation takes place in them; for injury of the anterior columns of the cord just below the pyramids does not produce paralysis, while an injury of one lateral column produces paralysis of the body on the same side. The fact of a decussation of motor fibers in the anterior pyramids is also shown in the result of injury of the pons Varolii. If decussation of the nervous fibers did not take place before their entrance into this part, then injury of one side of the pons ought to produce paralysis of the same side of the body; whereas the contrary occurs, as has been shown in sixty or seventy cases.

"The symptoms of irritation in the pons and medulla often manifest themselves in the form of convulsions. But it does not follow, because the convulsions may be epileptiform, that the actual seat of epilepsy is here. The medulla is only the starting point of an irritation; the seat of the epilepsy may vary. The first convulsions are observed to occur sometimes in one and sometimes in another muscle; and occasionally the first result of the irritation is contraction of the blood-vessels of the brain, producing loss of consciousness."

hemiplegia is due to an obstruction of the cerebral arteries, consciousness is usually present, and gangrene of the extremities, renal disturbance, or splenic lesion soon follow.

We must also distinguish cerebral hemiplegia from the hysterical, in which the face is seldom paralyzed, and the patient drags the leg along in walking, instead of bringing the foot in a more or less circular direction; hysteria, and symptoms of uterine derangement will also be present. Sometimes a painful and incomplete hemiplegia will be occasioned by rheumatism, though it must be remembered that brain disease may also be a cause.

In congenital hemiplegia and in perfect paralysis occurring after apoplexy, the *prognosis* is unfavorable, as an entire cure is impossible; the milder and the less sudden the attack, the more favorable is the case; although perfect recovery rarely takes place when the disease is due to organic cerebral lesions. Occasionally a return of motion and sensation, with a sense of warmth in the affected parts, a slight prickling pain, a slight stinging or crawling sensation, is a favorable indication—but not always. Atrophy of the muscles and coldness of the parts are unfavorable symptoms. All these indications are, however, more unfavorable when accompanied with mental disturbance, or some general derangement of the system. Usually, in paralytic attacks, there is a slow but gradual and imperfect amendment, in which the patient may remain for some months or even years, if proper care be adopted, and ultimately die suddenly from apoplexy, or from some other disease. In all cases of hemiplegia the physician should never give positive assurance of perfect recovery, for sudden deaths often occur, even when we believe the case is about to terminate favorably. And in cases where any benefit is expected from treatment, it can only be attained by regular, judicious, and well-conducted measures, faithfully persevered in for months and even years.

The *pathological appearances* met with in hemiplegia are similar to those observed in softening of the brain and apoplexy, as white softening of the optic thalamus and corpus striatum; softening of the convolutions of the anterior lobe; perhaps the blocking up of a cerebral artery, from a clot or chalky deposit, etc., as the mere deprivation of blood has been known to cause hemiplegia—often preceded by coma with more or less snoring; bloody or serous effusion; extravasation of blood into the pons Varolii, perhaps disintegrating the whole of it; more or less fatty degeneration of various parts of the brain, etc.

The *treatment* of hemiplegia, when not due to cerebral disease, will be similar to that of reflex paralysis; first removing the cause, or the external irritation, and then employing tonics and nervines to restore nervous and muscular power, aided by galvanism or electro-magnetism.

When the disease is of brain origin, and which is much more frequently the case, the treatment will greatly depend upon the peculiar characters of the affection, and the length of time that has elapsed since the commencement of the attack. If the hemiplegia is approaching in a gradual manner, the means named under softening of the brain and apoplexy, preventive, therapeutical, and hygienical, together with the application of electro-magnetism to the palsied muscles only, will be the proper ones to pursue; bearing in mind that the Compound Tar Plaster, which should be placed over the occiput and nape of the neck, must be omitted whenever it gives rise to any considerable depression.

In the early period of a sudden attack of this disease, and when symptoms of irritation or hyperemia are present, as known by pain, tenderness on pressure upon the occiput, flushed face, confusion of mind, great drowsiness, or excessive restlessness and wakefulness, and the muscular contractility referred to above, when speaking of the diagnosis,—the treatment must be prompt and energetic. The patient should be kept as quiet as possible in the horizontal position, when not pursuing any of the measures hereafter named, and measures should be adopted to lessen the frequency and force of the heart's action; in order to prevent the blood from escaping from the ruptured vessels, and at the same time not to obstruct the flow so as to interfere with the heart's action, the head should be somewhat elevated, but not too much so; and all cravats, or other ligatures presenting impediments to the free circulation of the blood, must be removed. A stream of warm water should be poured upon the back part of the head and neck of the patient, for about three or four minutes at a time, repeating it two or three times a day; to effect this, the patient's head, kept somewhat elevated, should be brought over the edge of the bed, and be held by an assistant while the warm douche is used, the water being caught in a tub placed on the floor below the head. In some cases, the patient may lie upon his abdomen while this is being done, but in most cases it will be preferable to have him lying upon his side—first one side and then the other—being careful not to worry or fatigue him too much in the operation. Of course, this must be at once omitted, if it gives rise to any unpleasant symptoms; it is superior to the cold douche, being

followed by less energetic reaction, while at the same time it invites a flow of blood into the capillaries of the parts exposed to its action, and also lessens vascular fullness of the internal vessels by its relaxing influence. This having been accomplished, an active purgative injection should be administered, using the same care not to fatigue the patient, and when the alvine discharge occurs, he should not be allowed to rise for its evacuation, but must positively make use of a bed-pan. This aids in removing accumulations in the lower bowel, and also acts as a derivative; and it should be repeated every day. Where the injection fails to act, and the patient is not too greatly prostrated, a purgative may be administered internally, as, a drop or two of Croton Oil placed upon the tongue, or a dose of Podophyllin and Bitartrate of Potassa. If the action of these agents gives rise to prostration, stimulants must be cautiously used, as, Ammonia, Ether, Camphor, etc.

Dry cups to the occipital portion of the cranium, and to the nape of the neck, or even cupping with scarification, when carefully put into use, will often prove advantageous.

Internally, Tincture of Gelseminum, of Aconite, of Veratrum, etc., may be used for the purpose of diminishing the heart's action and producing a tranquil state of the mental and physical system. The kidneys should be watched, employing diuretics should it become necessary, and being careful not to allow the bladder to retain the urine for too great a length of time. And this course should be pursued until the patient is relieved of all the irritating symptoms, varying them as the urgency of the case, or the symptoms may require. The diet should be light, nutritious, and easy of digestion. Galvanism or electro-magnetism is improper, and should never be employed in any case where there are symptoms of cerebral irritation, and augmented excitability of the paralyzed muscles.

But the chronist will rarely be called upon to treat these cases; it will more commonly be among those patients with whom there is a gradually-approaching hemiplegia, or with whom the hemiplegia is of long standing, that his services will be required. The gradual attack has already been referred to. It now remains to name the treatment of those cases in which the symptoms of irritation or augmented muscular excitability, described in the diagnosis, are not present; generally of long standing. And here, again the treatment will be nearly similar to that named for apoplexy and softening of the brain.

To promote absorption as well as to overcome, if possible, the

degenerate condition of the brain-structure, the Iodide or Bromide of Potassium, or of Ammonium, should be employed, changing them occasionally that the system may not become too much habituated to the influence of any one of them. And to each dose, should the patient be anemic, or present symptoms in which iron would be indicated, five drops of a Solution of the Perchloride, or the soluble Pyrophosphate of Iron may be added. With a view of still farther aiding in removing the lesions, and gently stimulating the coats of the blood-vessels, Tincture of Arnica may be administered internally, either alone or in conjunction with Tincture of St. John's Wort. The following will be found an excellent preparation: Take of the Ethereal Oil of Arnica Flowers four drops, St. John's Wort Flowers one drachm, Spirit of Nitric Ether half a fluidounce; mix, and macerate for seven days. The dose is from five to twelve drops, four times a day. The Rhus Toxicodendron has also proved serviceable in some cases, but great caution is required in its use. A very excellent preparation for long-standing cases, accompanied with much debility is: Take of Xanthoxylin, Iridin, each one drachm, Horseradish two ounces, Mustard one ounce, Sweet Flag one ounce, Whisky four pints; mix, macerrate for fourteen days and filter. The dose varies from a fluidrachm to half a fluidounce, alone or in sweetened water, three or four times a day.

Some active stimulating liniment should be applied to the affected muscles for the purpose of exciting them to action; and also to the spinal column to act as a derivative; and the flesh-brush should be used daily. As a liniment to the spinal column, I know of nothing superior to the Compound Tincture of Capsicum, which may be applied over the whole length of this column, by means of a flannel rag—repeating the application daily, or twice a day, as the case may require. As pointed out in the diagnosis, where there is no increased muscular excitability, electro-galvanism may be daily applied to the affected muscles only, in order to arouse them, if possible, into normal activity. Strong counter-irritation to the occiput and nape of the neck, or the Compound Tar Plaster, will frequently prove advantageous in cases where there is no anemia, and no marked debility or great loss of vital power. Nux Vomica or Strychnia, or Brucia, are absolutely inadmissible in this disease, most commonly effecting more injury than benefit. In fact, these agents, as a general rule, should not be used in cases of paralysis in any form, due to cerebral lesion or to irritation or augmentation of the vital properties of the spinal cord.

The bowels, skin, and kidneys must be kept in as normal condition as possible; the bladder be especially attended to, to ascertain that it is properly evacuated from time to time; the powers of the system must be supported by a generous diet, and non-stimulating tonics, as the Elixir of Iron and Cinchona, Phosphorated Oil, Cod Liver Oil, etc.; indeed, in all cases of paralysis, one of the most important points of treatment is, not only to stimulate the affected muscles to action, but also to keep up their nutrition as much as possible. Moderate exercise, and especially of the affected muscles, should be taken daily, active if possible—if not, passive; tight clothing, especially about the neck and superior extremities, must positively be avoided; the head should be kept cool all the time, and be moderately raised during sleep; the mind be kept calm and tranquil, and the sleeping apartments cool and well ventilated. The body of the patient should always be warmly clad, or maintained at a proper temperature both during the day and the night. Cool or warm douches to the head and along the spinal column will sometimes prove advantageous, but general warm or cold baths should be avoided; other means may prove useful as advised under the hygienical measures for Softening of the Brain, and Apoplexy, *which see.*

9. PARAPLEGIA is paralysis of the lower half of the body, which is deprived of motion, of sensation, or of both. It is exceedingly rare that this form of palsy is due to a cerebral lesion, but almost always to a disease of the spinal cord,—with the exception of those cases resulting from poisons or from reflex action, etc. These lesions of the spinal cord are myelitis, softening, or hemorrhage, and which conditions may be *caused* by concussion of the spinal cord; laceration or division of its substance; extravasation of blood; spinal congestion; inflammation; scrofula; tubercles; tumors; as well as the causes named under the head of Chronic Myelitis.

The *symptoms* of paraplegia, the same as with the other forms of paralysis, vary considerably, sometimes the attack coming on suddenly, and at other times gradually, depending, probably, upon the character and severity of the spinal lesion producing it. If this lesion be located in the inferior lumbar portion of the cord, the inferior extremities and muscles of the pelvis will be affected; if it be seated in the dorsal part, or in the entire lumbar region, the sphincters and abdominal muscles will be involved in addition to the above. If the superior part of the cord be affected, the paralysis will extend to the superior extremities, and there will be more or less difficulty in swallowing and in breathing, and the case

generally proves fatal, indeed, almost immediately so, if the lesion exists above the origin of the phrenic nerves. We commonly find the paraplegia to be less marked on one side than on the other; and with the loss of motion that of sensation may also be included, or, according to Brown-Sequard, we may have a loss of motion on the same side as the lesion, when this is confined to a lateral segment of the cord, at any point of it whatever, and, at the same time, a paralysis of sensation only on the other side. In some cases the affected muscles gradually become atrophied; while, in others, nutrition and circulation continue as usual, and the muscles respond to electric excitation. Sometimes the muscles contract, so as gradually to become hard and rigid, producing a greater or less degree of deformity.

Paraplegia from spinal lesion has been divided into two forms, one, arising from congestion, meningitis, myelitis, or hemorrhage in the gray matter of the spinal cord; the other, to white softening, or hemorrhage in the spinal cord. In the first, there is too great an amount of blood passing into the cord; in the latter, there is not enough.

Paraplegia due to *hemorrhage in the gray matter of the spinal cord*, is sudden in its attack, and is attended by pain at that part of the cord where the hemorrhage occurs, by pain after pressing upon the spine, as well as pain in those parts of the body receiving their distribution of nerves from the diseased part of the cord. From the very commencement of the attack the rectal and vesical sphincters are more or less palsied, so that the patient can not retain his urine or his feces. Sometimes, inflammation of the parts of the cord surrounding the clot occurs, with symptoms of myelitis. If the effused blood be small in quantity, the symptoms will not be very severe, and the patient may recover in a few months. But if the quantity effused be large, the fluid will pass downward along the central canal of the cord, and may rupture the gray cornua, more particularly the anterior ones. If the hemorrhage is limited to one lateral half of the gray matter, there will be a paralysis of motion on the side of the hemorrhage, and paralysis of sensation on the opposite side. One of the earliest symptoms of paraplegia from hemorrhage in the gray matter of the cord, is a diminution of sensation, which becomes perfect as soon as the whole of this gray substance is altered by the effused blood.

Hemorrhage between the spinal cord and the bony envelope, the blood being effused either between the pia mater and the arachnoid, or between the dura mater and the vertebræ, is manifested by pain

along the whole length of the cord from the seat of the hemorrhage to the inferior extremity of the vertebral canal. A complete paraplegia comes on immediately, with often, tetanic convulsions; and from its influence upon the circulation or respiration, the attack almost always proves fatal. Fortunately, it is a very rare affection.

In paraplegia, the result of *white or non-inflammatory softening of the cord*, the patient at first complains of weakness, which gradually increases, and is felt more especially at the knee and ankle joints; it becomes difficult for him to raise his leg, as in mounting a pair of stairs, etc.; the gait becomes tottering, or resembling that of an intoxicated person, more especially when he does not direct the motions of the legs with the aid of vision. In the recumbent position, he can move his legs, though feebly, provided he sees them. The paralysis progresses, motion, and finally sensation, become more or less diminished; voluntary power over the bladder and rectum is lost to a greater or less degree; no pain is complained of, or but very slight pain, in the spinal column or in the palsied parts; the urine is seldom changed; and the temperature of the limbs is often above the normal standard.

In the *diagnosis* of paraplegia, great care is required to discriminate, as much as possible, between the several kinds, in order to avoid an erroneous and injurious treatment. Some assistance may be derived from the remarks heretofore given concerning the symptoms and diagnosis of chronic meningitis, chronic myelitis, and reflex paraplegia, in connection with those that follow.

The symptoms of irritation, as convulsions, cramp, twitchings, erection of the penis, formication, and itching; diminution of temperature, wasting of muscles, œdema, bed-sores, and alkaline urine, are those accompanying paraplegia from inflammation, congestion, or irritation of the spinal cord, with increased amount of blood in it. In those cases where these symptoms are absent, the paraplegia is due to reflex action, or to white or non-inflammatory softening of the cord, in which there is an insufficiency of nutrition, and, in most cases, an insufficient amount of blood in the cord. (*Brown-Sequard.*)

When the paraplegia attacks suddenly, it is due to hemorrhage in the spinal cord (gray matter) when convulsions are absent, when there is a more marked anæsthesia, and when the pain is confined to that part of the spinal cord where the hemorrhage occurs. It is due to hemorrhage outside of the cord, in the vertebral canal, when tetanic convulsions are present, when the anæsthesia is less marked, and when the pain is of considerable extent along the

spinal column. Paraplegia from white softening comes on gradually; but should its attack be sudden, it may be discriminated from the preceding, by the entire absence of pain in the spinal column, and by the absence of the above-named symptoms of irritation. Sometimes softening and hemorrhage may exist together, the same as in the brain.

The following diagnostic remarks are borrowed from Brown-Sequard:

Urinary Paraplegia is preceded by an affection of the bladder, the kidneys, or the prostate; the lower limbs only are generally palsied; there is no gradual extension of the palsy upward; the paralysis is usually incomplete, some muscles being more affected than others; reflex power is not much augmented, nor wholly lost; the bladder and rectum are very slightly, if at all, paralyzed; spasms are rarely observed in the affected muscles; pains in the spine, spontaneous, or caused by pressure, application of warm water, hot sponge, ice, etc., are very rare; no sense of pain or constriction around the chest, or the abdomen; there is no formication, no pricking, no disagreeable sensation of heat or cold; anæsthesia is rare; obstinate gastric derangement is usually present; changes in the disease of the urinary organs effect corresponding changes in the degree of the paralysis; cures are frequently and rapidly obtained, and, sometimes spontaneously, following amelioration or cure of the urinary lesion.

Paraplegia from myelitis has no urinary disease except that resulting from the paralysis; the urine is almost always alkaline, while in cases of reflex paraplegia not due to lesion of the urinary organs, it is ordinarily acid, the same as in health; other parts are generally paralyzed besides the lower limbs; the palsy gradually advances upward, and is very often complete; the degree of paralysis in the various muscles of the inferior extremities is about equal; reflex power may be lost, or, in some cases, increased; complete paralysis, or nearly so, of the bladder and rectum; spasms or twitchings always present; more or less pain is always present, either spontaneous, or produced by external excitations; a sense of constriction, as if a cord were tightly bound around the body at the upper limit of the paralysis; formications, prickings, and sensations of heat and cold, are more or less constantly present; anæsthesia is often present, and, always, numbness; if the myelitis is not in the upper part of the cord, gastric digestion is good; ameliorations are extremely rare, and do not follow changes in the urinary lesions; a complete cure is seldom attained; frequently

the progress toward a fatal termination continues slowly and gradually.

Paraplegia due to *spinal meningitis* is attended by spontaneous acute pains, radiating from the spine to the lower extremities; cramps; pains when the inferior extremities or spinal column are moved, and rigid spasm of the muscles of the back. Paraplegia from a *diseased bone*, *tumor*, or *fibro-cartilage* pressing upon the cord, is accompanied with a pain somewhat resembling that of neuralgia, a sense of tightness, and some formication, which are confined to those parts of the body receiving their nerves from that portion of the cord pressed upon, unless there be a meningitis or myelitis, when these same symptoms may be present in any part of the body below the seat of the pressure, at which point there will be pain or tenderness. Paraplegia, due to a *tumor in the gray substance of the cord*, is attended at the commencement with loss of sensation which may be more marked than that of motion; reflex power becomes greatly increased in parts of the cord below the tumor, so that the slightest excitations will give rise to violent reflex movements. Paraplegia due to *hemorrhage in the spinal canal*, is preceded for some time by a vague pain along the spine; the paralysis occurs suddenly; convulsions or spasmodic twitchings are frequent, and sensibility is much diminished, when the blood is effused into the gray substance. In paraplegia due to *congestion of the cord and its membranes*, the paralysis is greater after a night's rest, or when the patient has been sitting for a length of time. In paraplegia due to *non-inflammatory softening of the cord*, there is no outside irritation as in reflex paraplegia; the paralysis comes on more or less gradually, and sometimes a chalky deposit in some of the superficial blood-vessels of the head or limbs may be observed, or the arcus senilis. Paraplegia due to an *obstruction in the aortal circulation*, or in its principal ramifications in the pelvis, is attended with alternations of nutrition and pains in the palsied muscles; by an increase of the paralysis on making much exertion of the inferior extremities, and by the diminution of the paralysis after some rest. Paraplegia due to *compression of the pelvic nerves* is attended with severe pains in the pelvis, as well as severe cramps in the legs. Paraplegia due to *atrophy of the cord*, is apt to be preceded by tremulousness, unsteadiness in walking, difficult urination, spasmodic contractions, or sudden jerkings of the muscles. Paraplegia, the consequence of *injuries*, of *poisons*, *hemorrhages*, *concussion*, or, occurring as the result of *exposure to wet and cold*, as frequently met with among soldiers whose camps or

tents are in damp grounds, may readily be determined by the history of the case.

Dr. Wm. Gull states that from *post-mortem* investigations made by himself, the spinal cord may have its functions not only impaired, but even suddenly lost, as far as motion is concerned, without any great anatomical lesion being present. Among a number of paraplegic cases he gives the following results of *post-mortem* examinations of some of them:—In one case, the most marked symptom was a complete inability to control the muscular contraction, with numbness and formication of the hands and feet; the autopsy revealed atrophy of the whole length of the posterior columns. Brown-Sequard found a diminution of sensation when the whole length of these columns was destroyed; and exalted sensation below the seat of the lesion when their destruction was of limited extent. In another case, attended with numbness and debility of the limbs for a number of months, sensibility being unimpaired, Dr. Gull found atrophy of the gray matter of the cord, and chronic inflammatory degeneration of the posterior columns. A third case, attended with paraplegic debility of the legs, an inability to regulate the muscular contractions, with atrophy of the voluntary muscles, gave, at the autopsy, a chronic inflammatory degeneration of the posterior columns. In another case, in which the attack commenced with acute symptoms, the arms being debilitated, the legs almost completely paraplegic; with paralysis of both seventh nerves, the cervical and dorsal portions of the cord were found to be somewhat softer than natural, and after hardening and making sections of the cord, recent exudation cells were observed, disseminated interstitially among the tissue in the anterior part of the commissure, throughout the length of the cord, chiefly in the lumbar and superior cervical portions, and, principally, in the upper part of the medulla oblongata. A fifth case was one of complete paraplegia from powerful efforts to lift a heavy weight, the only morbid changes observed, was a softening of the cord opposite to the fifth and sixth dorsal vertebræ, all the columns presenting a thick mucopuriform fluid, of a greenish color, slightly tinged with brown, and which consisted of dissociated nerve-substance and a few granules.—The next case was due to injury of the posterior cervical portion of the spinal column, in which there was paralysis of the left arm, the legs, and the sphincters, with loss of sensibility, followed in a few hours by exalted sensibility; the substance of the cord in the region of the fourth and fifth cervical was found in a contused state, there being an ecchymosed condition of the posterior horn of gray matter on the left side, as well as of the adjacent part of the

lateral and posterior columns; slight ecchymosis was also noticed on the right side, in the posterior column, and in the anterior cornua of the gray matter. A seventh case was paralysis of both the upper and lower extremities, with loss of sensibility in the palsied parts, the result of a fall backward from no great height; with these symptoms there appeared to be a paralysis of the intercostal muscles, and the skin became intensely hot; an effusion of blood was found external to the theca vertebralis in the neck, which came from a fracture of the lower part of the body of the fourth vertebræ, and the intervertebral substance was torn; no injury to the cord. (*Guy's Hospital Reports*, 3d Series, Vol. IV, 1858.)

The *prognosis* of paraplegia from hemorrhage in the gray matter of the spinal cord is very unfavorable, usually proving fatal in a few weeks, and occasionally in several months or even years; in some rare cases a degree of amelioration may be effected. These results, however, depend upon the character of the lesion, its location, and extent. A hemorrhage is always more serious than softening, not only because of the liability to a renewal of it, but also because of the morbid changes effected by the effused fluid in the substance of the cord. Paraplegia due to hemorrhage in the vertebral canal is rapidly fatal. When white or non-inflammatory softening occasions the palsy, a cure is seldom, if ever, effected, though, from an arrest of the spinal lesion, the paralysis may become much improved; if the softening be confined to the inferior dorsal portion of the cord, the patient may live for many years. Paraplegia may prove fatal by passing into a general palsy, or, by morbid changes effected in the urinary organs, by sloughing bed sores, exhaustion, epilepsy, or convulsions.

The *pathological appearances* will resemble, according to the cause of the paralysis, those of chronic myelitis, or of chronic meningitis. Softening of the cord, ecchymosed spots, engorgement of blood-vessels, vascularity of the membranes, atrophy and flaccidity of the spinal marrow, hemorrhage into its substance, or in the vertebral canal, and such other changes as named above in Dr. Gull's cases. Under the microscope the softened parts of the cord are found to consist of fragments of nerve tubes, globules with double outlines, granule cells, granules, fatty molecules, and, perhaps, blood corpuscles.

The *treatment* for paraplegia from white or non-inflammatory softening will be similar to that already named for chronic myelitis, reflex paralysis, or for hemiplegia due to non-inflammatory softening of the brain, viz.: Iodide of Potassium or of Ammonium, in doses of from three to five grains three times a day, in order to produce

absorption of effused fluids, and which should be taken about an hour before each meal to avoid disengagement of the Iodine from the action of the gastric juice. In conjunction with this, tonics should be used, as the Elixir of Cinchona and Iron, or a combination of Sulphate of Quinia, Prussiate of Iron, and Alcoholic Extract of Black Cohosh; it is better not to employ Strychnia, unless the paralysis be very slight. The cold douche to the spine, or the shower bath will also prove serviceable, improving the nutrition of the cord. Sea-bathing is also useful. The limbs should be frequently shampooed, and electro-magnetism be applied to the paralyzed limbs. Stimulating liniments and frictions may also be applied along the spinal column, for the purpose of inviting a gentle determination of blood to the part. The diet should be nutritious and easy of digestion; the bowels and bladder be kept regular; and at night, the patient should lie as much as possible upon his back. Sulphur, Carbonate of Ammonia, Cod Liver Oil, Rhus Toxicodendron, and Bryony, have been occasionally used with success in this affection. Phosphorus, three or four grains dissolved in Olive Oil, and given in doses of three drops a day, gradually increased to ten, provided it does not occasion nausea or vomiting, is occasionally beneficial. And the Iodate of Strychnia, in doses of one-eighth of a grain twice a day, carefully and gradually increasing the dose, has also proved of service.

In hemorrhage of the vertebral canal, the paraplegia proves fatal, and there is no successful treatment known.

In paraplegia from hemorrhage into the gray substance of the cord, or, attended with symptoms of irritation, there will be a slight variation in the treatment, from that pursued for cases of white softening. Iodide or Bromide of Potassium may be given in doses of five or six grains, repeated three times daily. A pill composed of Sulphate of Quinia, Prussiate of Iron, Extract of Belladonna, and Alcoholic Extract of Black Cohosh will be found very useful. Or, a pill may be composed of powdered Ergot, Extract of Belladonna, and Alcoholic Extract of Black Cohosh. The preparation of Arnica Flowers, named under Hemiplegia, on page 244, will frequently prove advantageous. The system should be supported by tonics and proper nourishment. In these cases of congestion or irritation of the cord, great advantage will be derived from the local application of the Compound Tar Plaster over the diseased part of the spine; or, in some cases, dry cupping, or firing along the whole course of the spinal column, from the commencement of the diseased region downward; and in very severe cases, the hot douche, setons, issues, or even moxæ or the actual cautery; of course, some

discrimination is required in the selection of cases in which any one of these may be used. As a general thing, the Compound Tar Plaster will be suitable in by far the greater number of cases; but its application should always be omitted when too much depression or exhaustion follows its employment.

The bowels and urinary organs should be kept regular; the skin should be attended to; the diet should be nutritious but light; the patient should at no time lie upon his back; and electro-magnetism should be applied to the paralyzed muscles only after the symptoms of irritation have passed away. It is a mistaken idea that electricity passed through a softened brain or spinal cord will aid in curing it; as far as my own observation goes, it only appears to aid in hastening the extension of the lesion. It will be useful, however, when applied to the paralyzed muscles themselves, or to hypertrophy, indurations, tumors, etc., of the brain or cord, not connected with softening or effusion of blood.

For the sloughing ulcers which are so often present with paralytic patients, the following preparation may be applied: Take of powdered Camphor half a drachm, Sulphate of Zinc half a drachm, Strychnia one grain, Glycerine Ointment one ounce; incorporate the articles thoroughly. This may be applied upon the part by means of lint, upon which a small portion has been spread. Electro-magnetism should also be applied upon and around the ulcerated part. Injury to the spinal cord is usually followed by these sloughs, for which Brown-Sequard recommends the application of morsels of ice to the parts threatened or affected, repeating it from six to ten times a day, so as to cause contraction in the blood-vessels of the parts, each time; then, removing the ice, and immediately applying a poultice or compress as hot as can be borne without injuring the tissues. By these alternations of contraction and relaxation, a change in the circulation and in the nutrition of the parts is produced.

10. GENERAL PARALYSIS is the term applied to that form of palsy which attacks both sides of the body; the patient's movements are more or less interfered with, speech is indistinct, the countenance assumes a peculiar inexpressive appearance, and the mental faculties become more or less gradually perverted with hallucinations. There appears to be a want of command over the co-ordinate action of the limbs, and the walking is of a peculiar character, a swaying from one side to the other. The muscular paralysis extends and becomes more severe until the patient can neither move, nor speak so as to be understood. Sometimes there is a lesion of the intellect from the commencement, or, at least, the

friends do not recognize the disease until symptoms of dementia are observed. Loss of memory is, however, a very early symptom, and may continue for some time before the manifestation of dementia; and, sometimes, the insanity will be the first recognized symptom of the disease.

General paralysis may commence as a hemiplegia, as a paraplegia, or, it may commence in the feet and lower legs, and gradually extend upward. The part first attacked is always more intensely paralyzed than parts subsequently affected, continuing so throughout the whole course of the disease.

Emaciation, marasmus, and gangrenous ulcerations occur at a later period of the disease. Impotency is one of the earliest symptoms. The appetite is usually good, sometimes voracious; pulse generally accelerated; pupils contracted, or unequal, occasionally natural; general sensibility impaired, or obtuse.

In some cases several years may elapse before the fatal period arrives; in others it may occur within a few weeks or months. Coma, convulsions, obstinate diarrhea, painful muscular contractions, or, some lung difficulty, frequently precedes death.

The disease may be *caused* by falls upon the head, masturbation, inordinate venery, intemperance, excessive irritation, or excitement of mind, etc.

In the *diagnosis* of general paralysis, it may be determined from Duchenne's "*ataxie locomotrice progressive*," by the tremors, difficulty in articulation, loss of memory, in the early stage, and the dementia in the latter stage; in *ataxie locomotrice* there is apt to be strabismus, amaurosis, sharp, characteristic pains, but the speech and intellect remain unimpaired.

It may be determined from general paralysis, the result of a spinal lesion (*tabes dorsalis*), by the following symptoms: In *tabes dorsalis* the disease commences with a numbness of the feet, sensation remaining normal, gradual feebleness of the muscles of the lower limbs, frequently a disturbance of vision, no impairment of intellect, more or less palsy of the bladder and intestines, great distress in the gastric region, sharp, shooting pains in the inferior limbs, atrophy and feebleness of the muscles, especially those of the back, legs, and nates, and their non-contractility under electro-magnetic influence. In general paralysis there is no gastric difficulty, no severe pains in the limbs, and no atrophy of the muscles, and the intellect is always more or less impaired.

The *prognosis* is unfavorable; recoveries seldom occur.

The *pathological appearances* vary; usually the dura mater ad-

heres to the skull, and to the subjacent membranes, at various places, by strong bridles; the pia mater may be much injected, and adhering to the neighboring tissues; there may also be adhesions of various parts of the brain by small filamentous cords; injection of blood-vessels of the brain, at one or several parts; arachnoid thickened, milky, opaque, or translucent; softening of various parts, or a general softening of the brain-substance; effusion of serum in the ventricles, or at the base of the brain, etc.; together with various other results of congestion or degeneration of the brain.

The pathological appearances in general paralysis from *tabes dorsalis* will depend entirely upon the nature of the change undergone by the spinal cord, as, softening, induration, atrophy, effusion of fluid between the membranes, injection of the venous sinuses, etc.

In the *treatment* of this disease, the same measures should be adopted as are advised for Hyperemia of the Brain, Softening of the Brain, Hemiplegia, and Apoplexy—according to the combination of symptoms, circumstances, and effects of the medication, remembering that tonics and nutritives form a very important part. Never having treated a case of this disease, I can say nothing from actual experience.

Tabes dorsalis is more commonly the result of excessive masturbation, or venery. The body is bent over from debility of the spinal column; the lumbar region is either straight or convex; the gait is unsteady, vacillating, like that of an intoxicated person; the knees bend under the weight of the body; the eyes are sunken; the face pale; the whole body emaciated; the genitals flaccid, soft, and wasted, together with hypochondria, mental depression, leucorrhea and hysteria in females, perhaps epilepsy, insanity, and the various strange symptoms frequently observed among masturbators. Ataxie musculaire locomotrice has also been termed tabes dorsalis, but it is not exactly the same disease as the one referred to at this place.

The *treatment* of tabes dorsalis consists, first, in an absolute and permanent relinquishment of the cause; and then, internal measures to overcome any spinal lesion, as, Iodide of Iron, Iodide of Ammonium, etc.; together with ferruginous or vegetable bitter tonics; cold or warm douches to spinal column, with frictions and stimulating liniments; nutritious diet; well-regulated exercise in the open air; and the usual therapeutical and hygienical measures advised for Impotency and Spermatorrhea. The disease, however, is not always curable, though much may be done to remove unpleasant symptoms, and prolong the patient's life. It is very

difficult to detect the peculiar character of the lesion which the spinal cord has undergone in this affection.

EPILEPSY.

Epilepsy or Falling Sickness is not a disease of itself, but is only the symptom of disease, or of certain obscure abnormal conditions of the nervous centers, being manifested by recurring attacks of a sudden deprivation of the senses, or insensibility, with or without spasmodic contraction of the voluntary muscles, quickly followed by more or less violent convulsive distortions, and, as the attack declines, the patient passes into a state of sopor which continues for an hour or two, or longer. All persons are liable to it, but it more commonly attacks the young, and those in early adult life; according to Sieveking, Andral, Esquirol, and other writers, females are more subject to it than males, especially after the tenth or twelfth year, though this is not in accordance with my own observations, in which male epileptics have a decided preponderance. The disease may commence at any period of life, but more commonly during infancy and childhood.

The *causes* of epilepsy are involved in great obscurity, notwithstanding the efforts made by physiologists to unravel them. The epilepsy is generally supposed to originate in some lesion of the brain, or of the spinal cord, and is then termed, idiopathic, centric, or intrinsic; or, from reflex action, and is then termed, secondary, excentric, or extrinsic. The morbid conditions which may give rise to the idiopathic form, are, lesions of the nervous centers, as, a cerebral or spinal tumor, chronic inflammation of the brain, ramollissement of the brain, or some other cerebral or cerebro-spinal disease.

Idiopathic epilepsy may be hereditary, and is apt to occur in the offspring of those who have weakened their nervous centers, and, perhaps, produced disease therein, by masturbation, excessive venery, or intoxication; it may also attack those whose parents were subject to apoplexy, paralysis, cerebro-spinal disease, or to sudden and violent fits of passion; indeed, it may be said that the offspring of those who have thus labored under nervous affections, receive that peculiar organization from their progenitors, which predisposes them to epilepsy and allied affections. Again, the disease of the brain occasioning the epileptic attacks may be the result of premature synostosis of the cranial sutures and fontanelles; masturbation; metastasis of gout or rheumatism to the brain; repeating hemorrhages; morbid state of the blood; inju-

ries to the cranium producing compression; continuous pressure upon the nerve-substance by osseous spicula; anemia, or want of nutrition; hyper-nutrition, etc. Masturbation is a most prolific source of this disease; among sixty-five patients, I ascertained that masturbation had been carried to a great extent in twenty-six, and moderately in sixteen.

The secondary form of epilepsy may arise from numerous causes, as, gastro-intestinal derangement, acid stomach, worms, improper food, etc.; painful dentition; blows; wounds; external violence to the head or spinal column; uterine irritation; calculi in the bladder or kidneys; gall-stones in the excretory duct of the liver; suppression of habitual or customary discharges; violent mental emotions, as, anger, fear, terror, distress, etc., intoxication; profuse hemorrhages; acute pains; repercussed eruptions; overpowering or peculiar odors; tickling the soles of the feet, or the sides; great fatigue; long protracted watching, etc.

Of course, it is not only difficult, but almost impossible to determine the true cause of any given epileptic seizure, though the exciting cause may frequently be ascertained by a careful study of the case.

In order to show the unsettled state of the etiology of idiopathic epilepsy, I will briefly refer to the views of several eminent physiologists. Dr. Prout maintained that persons whose urine contains an abnormal quantity of soda or potash, were especially liable to spasmodic diseases. Dr. Robert Hunt contends that an abnormal excess of alkali in the blood directly predisposes the nervous system to disease, and not only this, but, also, that it probably causes various chemical changes in the blood, which result in the generation or retention of noxious matters in the system, which excite a tendency to spasm and convulsions. From the uniform deficiency of organic principles in the urine, as urea, and the excess of mineral matters, especially chloride of sodium, he infers that they must have some connection with the state of the blood and the disease in question, as cause and effect. Dr. Robert Todd holds that the "peculiar features of an epileptic seizure are due to the gradual accumulation of a morbid material in the blood, until it reaches such an amount that it operates upon the brain, in, as it were, an explosive manner; in other words, the influence of this morbid matter, when in sufficient quantity, excites a polarized state of the brain, or of certain parts of it, and these discharge their nervous power upon other parts of the cerebro-spinal center in such a way as to give rise to the phenomena of the fit." Understand this whoever can. Dr. Marshal Hall considers that

no lesion of the cerebral system, limited to the cerebrum, *can* be attended by spasm or convulsion; while, on the other hand, no structural lesion, short of destruction, *can* occur *without* exciting spasm or convulsion. Disease of the cerebral center, may, by downward pressure, affect the spinal center. The convulsion is produced by this pressure or irritation upon this center; the cerebral anæsthesia, by spasmodic action of the muscles of the neck, (*trachelismus*) which, pressing upon the jugular and other veins of the neck, causes extra-cranial and intra-cranial venous congestion and its consequences. Dr. Sieveking, considers hereditary influence as a predisposing cause of epilepsy; he also believes that a derangement in the quantity or quality of the blood circulating in the brain, may produce an irritation giving rise to epilepsy, and which symptom is subsequently repeated from time to time by habit, and a peculiar susceptibility which renders the individual more liable to repetitions of the attack. He believes epilepsy to be an affection of the brain, particularly of the sensory ganglia, the spinal cord being involved secondarily. The immediate cause of the epileptic attack, is, in his opinion, an increased flow of blood upon the brain, though a general state of anemia may be present in most cases. Dr. Reynolds takes the ground that the immediate cause of convulsions generally, is the same in all cases, and consists in an unhealthy augmentation in the nutritive function of the nervous centers, and that the primary causes are those which give rise to this morbid augmentation. Hereditary tendency, as well as the commencing period of puberty, are very common predisposing causes to epilepsy. He says: "There appears no reason for doubting that the immediate cause of loss of consciousness is arrest of the cerebral circulation, owing to the contraction of the vessels, through irritation propagated along the vasomotor nerves from the medulla oblongata; and thus the latter is shown to be the organ wherein both elements of the epileptic paroxysm (convulsions and unconsciousness) have their origin." The nature of the morbid changes which occasion the attack in the first instance is thus stated by him: "Nutrition is affected dynamically and temporarily; there is no recognizable departure from textural integrity; there is merely the difference that exists in health and in all organs between action, over-action, and repose; after a time, and by frequent repetition of attacks, the changes induced temporarily, become permanent, and the texture, which is the product of foregone nutrition processes, is altered statically and persistently." These changes consist in increased action; we observe in the epileptic seizure evidence "not only of disturbed equilibrium, but of dis-

torted, misdirected, and exaggerated power."—Dr. Radcliffe considers all convulsive diseases to be due to deficient or disturbed innervation; and the predisposition to them may be caused by anything which prevents perfect hematosis, thereby impairing the normal activity of the nervous centers, either by lessening the power of their arterial circulation, or by producing an organic lesion in them. He does not think that the facts advanced by him would hardly warrant the idea that epilepsy is connected with anything like over-action of the nervous system. He also advances a hypothesis of muscular action, which is that *muscular contraction* is not due to the excitation or stimulation of any muscular contractile property, but is merely the natural result of the cessation of muscular elongation; and that *muscular elongation*, or relaxation, is occasioned by an active condition of the muscles, produced by nervous influence, galvanism, irritation, etc., and according to which hypothesis he considers the epileptic convulsions to be due to a deficient or deranged supply of nervous influence to the muscles convulsed, this cause being the result of a similar deficiency, etc., in the functions of the nervous centers. He considers the convulsions, therefore, due to a lack of circulatory energy, which occasions deficient nervous activity, and the state of unconsciousness to an inactive or comatose condition of the brain. He says: "From these previous investigations," (concerning the physiology of muscular action), "it was to be expected that coma and convulsions might go hand in hand together; for muscular contraction, according to these investigations, is to be looked for when a failure in the action of the nervous centers causes a failure in the amount of nervous influence distributed to the muscles."—Trousseau is disposed to attribute epilepsy to a diathetic state, which keeps the patient in such a condition that, with or without an occasional cause, he may be seized with a fit of epilepsy. A man may be termed epileptic even when the attacks are absent. "But it is always the diathetic condition that determines the form of the accidents. Thus, supposing two patients suffer from a syphilitic or tubercular cerebral affection, if one of these possesses the epileptic diathesis, the symptoms will be those of epilepsy, while the other will exhibit the ordinary symptoms of the cerebral affection."—Brown-Sequard, from the results of certain interesting experiments instituted by himself upon animals, is rather disposed to connect them with the etiology of epilepsy in man. Epilepsy is mostly generated by disease of the spinal cord. He says: "It can not be doubted that a disease of the spinal cord or of its membranes, as well as an affection of any centripetal nerve in the human body, may be the primitive origin of a real epilepsy quite similar to the

erroneously-called idiopathic epilepsy." Again, "in most cases of genuine and complete epilepsy, as well as in cases of simple vertigo, there is an irritation starting from some point of a centripetal nerve, especially from its peripheric parts in the skin or in the various mucous membranes;" . . . . . "but almost all the recent writers on epilepsy having considered those cases as quite special, I must insist on saying, that even in the so-called idiopathic epilepsy there may be found an irritation starting from some centripetal nerve and generating the convulsion; and I must add also, that there is no radical difference between the symptoms of the sympathetic epilepsy and those of the pretended idiopathic." He likewise remarks: "Epilepsy seems to consist essentially in an increased reflex excitability of certain parts of the cerebro-spinal axis, and in a loss of the control that, in normal conditions, the will possesses over the reflex faculty. The base of the encephalon, and especially the medulla oblongata, is the most frequent seat of the increase in the reflex excitability, so that this part of the nervous center is the ordinary seat of epilepsy. The disturbance in the functions of the cerebral lobes during and immediately after a fit, and in the interparoxysmal periods, is chiefly due to the alteration taking place in the brain during the fit. . . . . The same cause that produces the first convulsions, produces also a contraction of the blood-vessels of the brain proper, and which contraction is necessarily followed by the loss of consciousness."

These are briefly the views of some of our most eminent physiologists relative to the cause of epilepsy, and they are truly discordant, limited, and unsatisfactory; and, in our present imperfect knowledge of the etiology of this affection, we may probably give an equally satisfactory explanation, in the following general proposition, viz.; all convulsive affections, from the simplest agitation of a single muscle to the most violent convulsive paroxysms of all the voluntary muscles, are due to a peculiar morbid condition of the nervous centers, which predisposes to abnormal action of the nervous system, or to convulsive phenomena, when these centers are excited by certain irritations; the peculiar character of the convulsive phenomena depending upon the particular part or parts of the nervous centers that are morbidly affected, the degree and extent of the morbid condition, and also upon the location and degree of the abnormal irritation which acts as an exciting cause. Also, the morbid condition which gives rise to the predisposition to convulsive attacks, may be inherited from progenitors themselves similarly predisposed, or, whose nervous systems have been impaired by excesses or other influences; or it may be acquired by certain agen-

cies that will develop morbid nervous susceptibility, or even actual lesion of the nervous centers, as, by masturbation, venereal excesses, frequent intoxication, etc.

The *symptoms* of epilepsy vary with many persons; though, in a complete attack, the predominant symptoms are about the same. Persons apparently in good health may be attacked suddenly, without any premonitions; though many patients have clear intimations of the approaching convulsions, which may occur within a few seconds of the attack, and, in some cases, which manifest themselves for several days previous to it. Thus, there may be unpleasant and disturbed dreams; or spectral illusions; or a peculiar operation of the mind, incongruous ideas, great irritability of temper, or a remarkable intellectual activity, etc. The more common premonitory symptoms are, a heavy pain in the head, dazzling of the eyes, dimness of vision, tinnitus aurium, slight flushing of the face, dilatation of the pupils, palpitation of the heart, flatulency, weariness, coldness of the limbs, or chills and shiverings, one or more of which may precede the convulsive attack. Frequently, a peculiar sensation, it may be of cold, pain, heat, itching, or like the crawling of an insect, is developed suddenly in a toe, a limb, in the abdomen, or in the back, and passes gradually toward the head; as soon as it reaches the head, the epileptic seizure comes on, and the patient falls as if struck. This sensation is called the *aura epileptica*. Dr. Sieveking states that it appears to him that the patients become insensible when the aura has arrived at the throat. In some cases, the patient imagines he sees a specter coming toward him, and falls into a paroxysm as soon as this figure comes in contact with him. Sometimes very strange and unaccountable phenomena of some one or more of the senses precede the convulsive fit.

But whether there be premonitory symptoms or not, the patient, when attacked, either falls or is thrown to the ground with convulsions, and a deprivation of consciousness and voluntary motion. There is generally a short, piercing shriek, or a strange sound somewhat resembling the barking of a dog, or as if there were a painful, spasmodic gargling of the throat, accompanying the commencement of the attack, followed by the most fearful convulsive struggles. I have observed several patients who, while uttering this noise, were repeatedly turned round in a circle, falling to the ground upon the cessation of the noise. The convulsions are frequently so terrific in appearance, as even for a time to disturb the calmness and presence of mind of the physician; and, it has been the case, that persons, who never before had a paroxysm, have fallen into one upon witnessing a severe epileptic seizure. During the paroxysm the

head is violently rotated, or jerked in every direction; the face is thrown into very distressing and alarming contortions, while the blood-vessels of the head and neck become much swoln; the eyes are fixed and staring, or are convulsively rolled about, or turned out of their axis, so that the conjunctiva only can be seen; while the eyelids remain shut, half closed, or open and close very rapidly; and the pupils are generally contracted, sometimes dilated, and insensible to the action of light. The face becomes injected and livid; the muscles of the jaws contract and relax alternately, sometimes so forcibly as to break the teeth; the teeth gnash together; and the tongue, being forcibly thrust forward, is more or less severely bitten; deglutition being impossible, the saliva is forced out of the mouth in a foam; the muscles of the limbs are violently convulsed, and the limbs jerked in various directions; the breathing is unequal and difficult; the pulse usually small and contracted; the heart beating tumultuously; the urine and feces frequently voided involuntarily; and the sense of feeling entirely lost. Sometimes priapism, attended with a seminal or prostatic discharge, occurs.

After a time, varying from a few minutes to half an hour, or longer, the convulsion ceases, and the patient passes into an apparent deep sleep, from which he gradually recovers, having no distinct recollection of what has transpired from the commencement of the paroxysm. He remains more or less exhausted and sore, requiring one or more days for a restoration to usual health; sometimes headache, a sense of oppression in the head, or stupor, will remain for a time; and, occasionally, apoplexy, followed by death will be the result. At times, the rallying efforts being imperfect, paroxysm after paroxysm occurs, without any waking period or recovery from the convulsions for a long time; or the occurrence of death may precede any rallying attempts. Again, instead of sleep, the convulsions may be followed by more or less active delirium—or, after a long sleep, the delirium may come on and continue for several hours.

With others the attack is imperfect or abortive, constituting the *petit mal* of French writers; the patient may remain with his eyes fixed and open, pupils dilated, motionless, and, for a minute or two, be entirely deprived of consciousness, but without falling; or there may be a waving sensation of the head, a sense of oppression at the heart, with a feeling of intense alarm, which is strongly depicted on the countenance, consciousness, however, remaining, and the business engaged in at the time not being materially interfered with. These mild attacks may occur from time to time, gradually increasing in severity until the genuine epileptic convulsion is established.

In one patient, whom I successfully treated, the only symptom noticed was a sudden cessation of motion, the eyes staring, and the pupils largely dilated, but no loss of consciousness, and while in this condition, which seldom lasted over a minute, he complained of seeing an exact vertical half of a specter, or, as he said, "of a man dressed in white."

The epileptic paroxysm may occur at any time, but it more commonly manifests itself during the night, and these nocturnal seizures may exist for months, or even years, without attracting observation, until the general health as well as the mental faculties have become more or less seriously impaired. Patients suffering from these night attacks labor under more or less debility of the vital, nervous, and muscular systems, have headache, especially on first waking in the morning, and sometimes will notice a laceration of the tongue, and that the urine has been unconsciously voided in the bed; their spirits are depressed, their sleep is not refreshing, they become indifferent to all the important concerns and business of life, and temporary delirium is by no means unfrequent.

Epilepsy sometimes occurs periodically, depending upon its exciting cause; but, more frequently its attacks are very irregular. A paroxysm may occur, and not be followed by another for months, or even years; at other times, it will occur regularly once in every month; and again, it may take place daily, one or more fits occurring every twenty-four hours. When the attacks are of frequent occurrence, the constitution becomes impaired, the mental powers decay, and sooner or later apoplexy, paralysis, mania, or idiotcy are the consequences.

Dr. Radcliffe remarks: "As time goes on, the mental faculties recover more and more imperfectly, and more and more tardily, and at last their habitual state may be one of pitiful fatuity, from which no single ray of the divine principle beams forth. Or the moodiness and irritability which follow the attack may become more and more marked, until at last they merge into attacks of downright mania. Or symptoms of paralysis make their appearance; or death may happen in a fit, or shortly afterward. The natural tendency of epilepsy is assuredly toward dementia; and dementia is the final doom of the epileptic, if his disorder be unchecked, and life be prolonged sufficiently; and this equally, whether symptoms of insanity have or have not been developed; but, at the same time, it is possible for an epileptic to have many fits and live many years, without ever losing the powers which are necessary to render him an agreeable and serviceable member of society. If death happens, it hap-

pens most generally from exhaustion in the period of prostration immediately following the paroxysm."

The patient, during the intervals between the fits will present symptoms demonstrating a morbid state of health; he will be more or less irritable; the eyes will be restless and the pupils dilated; there will be more or less difficulty in collecting the thoughts, and a slowness of comprehension; more or less headache, with or without vertigo; constipation; flatulency; eructations; in some cases, a temporary delirium; an inattention to surrounding circumstances, etc.

The *diagnosis* of epilepsy is generally very easy; though it is not always easy to determine its exciting cause. Convulsions alone do not constitute epilepsy, unless attended with a loss of consciousness, indicative of some morbid cerebral condition, and which is the principal feature of the affection. The pupils are insensible to the influence of light or darkness, which is not the case with feigned epilepsy. Hysteria and apoplexy are the affections for which it is more apt to be mistaken. It may be distinguished from *hysteria* by consciousness not being fully suspended; by the foaming at the mouth, the gnashing of the teeth, the biting of the tongue, the hissing respiration, the livid appearance of the face, the distortion of countenance, etc., which are common to epilepsy, and by the absence of those symptoms common to hysteria, as, the globus hystericus, the involuntary fits of weeping and laughing, the absence of distortion of the features; the flushed face; the fixed state of the eyeballs, and, when the hysterical convulsions are severe, the presence of opisthotonos. It may be distinguished from *apoplexy* by this being more usually met with during middle age, while epilepsy is more common at a much earlier period of life, except where the patient is subject to its attacks; in apoplexy, the respiration is stertorous, the muscles are flaccid and powerless, or, if any convulsive action is manifested at the commencement, it is slight and is not repeated, and the pulse is slow and laborious; in epilepsy, respiration is hissing, the muscles are violently and continually convulsed, and the pulse is usually small and contracted.

Epilepsy may be feigned by impostors in nearly every manifestation, except one, and that is, they can not overcome the sensibility of the iris; hence, a strong light held before the eyes will cause pupillary contraction, and when the light is removed, dilatation ensues. In genuine epilepsy the iris is wholly insensible.

It is very important, on account of the treatment, to determine whether the epilepsy is due to some chronic cerebral affection, or to some external cause, and which will frequently prove a difficult mat-

ter. If the seizure be due to an outside exciting cause, and this be removed before the epilepsy effects any cerebral organic lesion, the convulsions cease. An attentive observation of the symptoms during the inter-paroxysmal condition of the patient, will enable the practitioner to determine, in most cases, whether the attack is centric or excentric.

The urine in epilepsy is variable; immediately after the fit, it usually passes in large quantity, is pale, feebly acid, and has been said to contain sugar, and sometimes albumen; urea is present in increased quantity. During the intervals between the attacks the urine is generally alkaline with an abundance of chloride of sodium or phosphates, and a deficiency, or even entire absence, of urea or urates.

The *prognosis* of epilepsy is favorable when the affection is of recent date, and is not associated with cerebral lesion; children who are liable to its attacks, frequently have them to cease with the manifestations of the peculiar changes which the system undergoes at the period of puberty; and females often have them to disappear on the birth of their first child. When the epilepsy is due to severe frights, or other powerful mental emotions, when it is hereditary, when it has affected the mind injuriously, or when it is due to deformity or disease of the cranial bones, to lesions or morbid growths of the brain, the prognosis is unfavorable.

The *pathological appearances* met with in epilepsy differ very much; indeed, it may be said that not one uniform lesion having a satisfactory relation to the convulsive affection, has been detected. Lesions of the brain similar to those observed after softening, or hyperemia of this organ, or, after paralysis, apoplexy, etc., have been observed, together with foreign growths, abscesses, etc. Similar conditions of the spinal cord have also been met with. The most frequent lesion that has been observed is hypertrophy and increased density of the brain, which Ferrus states are always present. Van der Kolk states that he has found an enlargement of the capillary vessels, and a granular degeneration of the medulla oblongata almost invariably present. Dr. S. Jackson concludes that the brain is indubitably the seat of epilepsy. Dr. Wright, of Baltimore, observes,—"From the result of all the dissections I have hitherto prosecuted, to discover the cause or condition predisposing to epilepsy, or the kind of lesion by which that form of disease had involved a fatal issue, I am led to the inference that the sensorial irritations exciting epileptic phenomena, are more frequently dependent on organic degenerations of the brain or its membranes, than is generally supposed or admitted." Dr. Boyd, of England,

has found as an almost constant lesion, an inequality in the weight of the brain, one cerebral hemisphere being heavier than the other. Dr. Wenzel, of Mayence, has also found almost invariably a lesion of the pituitary body and pineal gland. Various morbid conditions of the spinal cord have also been recorded.—When the affection is reflex, no cerebral or spinal lesion may be present, unless the severity of the convulsions, their frequency, and long duration have ultimately induced them.

The *treatment* of epilepsy is based entirely upon general principles, there being no specific for it, and is of two kinds, viz.:—to arrest the convulsions, and to prevent their return by removing their cause, or, by curing the affection giving rise to them. During the attack the patient should be placed as speedily as possible in a position calculated to protect him from injury, and, if possible, a cork, or wedge-shaped piece of soft wood, or a small roll of leather should be placed between the molar teeth, in order to prevent the tongue from being bitten,—but there is no necessity for interfering with the movements of the patient, further than to prevent him from injuring himself. All cravats, cloths, or ligatures around the neck should be removed or loosened. A cloth moistened with cold water may be laid upon the neck and upper part of the chest, being frequently renewed, or, in its stead, cold water may be poured upon these parts. To give medicines at this time, will, as a general rule, be useless; but, in very violent cases, a finger may be placed in one corner of the patient's mouth, and the lips be drawn outwardly so as to enable the practitioner to gradually pour a dose of the Compound Tincture of Lobelia therein, and the greater part of which will be certain to reach the stomach. The dose should be according to the age of the patient, a tablespoonful for an adult and half a teaspoonful for a child a year old; and, if the convulsions continue, the dose may be repeated every ten or fifteen minutes. When the attacks happen in the night, the application to the neck of a cloth wet with cold water, either through the whole night, or just before the period when the attack occurs, will frequently prevent a paroxysm. When premonitory symptoms are present, the fit may often be prevented by compressing the carotids for a minute or so; the compression should be circumscribed so that the return current in the jugular vein be not interfered with.

But the chronist will be called upon more frequently to treat the patient during the inter-paroxysmal condition, with a view to effecting a permanent cure, if possible. Before attempting the treatment, he must first endeavor to ascertain whether the case be

centric or reflex; if the first, what is the peculiar character of the lesion; and if the latter, from what source the external irritation proceeds.

If the epilepsy be due to depression of the skull from injury, to a spicula of bone pressing upon the brain, or, to bony excrescences the only mode of cure is to trephine and remove the obnoxious portion of bone; subsequently strengthening the brain and nervous system by tonics and nutrients. Instances are on record where an operation of this kind has at once removed epilepsies which had existed for several years. In one case, where the epilepsy was connected with gastric derangement, but remained obstinate under all treatment, a constant headache being present—a piece of bone taken from that part of the head where the pain was the most acute, effected a cure; the portion of bone removed, was carious, spongy, and thickened.

If the epilepsy be produced by worms, dentition, uterine derangements, etc., these must first be removed, and, if the epilepsy still continues, then employ the means hereafter named for the convulsive affection. In every case, indeed, when the external cause of the epilepsy can be ascertained, this should be removed if possible, by appropriate measures, in connection with means to allay nervous irritability, and to strengthen the nervous centers. If from a persistence of the cause of the fits, as, masturbation, or, if from repeated and violent seizures, we discover symptoms of cerebral disorder, the proper means must be pursued to cure this, using such means, as have been heretofore recommended in chronic cerebral and spinal diseases, in conjunction with the treatment for the convulsive affection. And similar measures will be required if the epilepsy has its origin in some cerebro-spinal lesion. If anemia be present, iron will be indicated; if hyperemia, or arterial excitement, sedatives, as, Digitalis Gelseminum, etc., will be required.

Dr. Brown-Sequard is of the opinion that among epileptic patients there exists a certain peripheral spot, which may or may not be the point of departure of an aura, and which spot, when irritated, gives rise to an epileptic attack; he adduces a number of facts in support of this opinion, and then observes:—"On one side, therefore, we find that an irritation coming from the skin or a mucous membrane may produce fits without being felt; whereas, on another side, when there is the feeling of aura epileptica, the variety of the sensations, and their feebleness, often show that it is not they which cause the fit, so that we must admit that even then it is a peculiar, unfelt irritation which produces the attack.

In many animals, as I have tried to prove, it is not the pain caused by pinching the skin of a part of the face and neck which produces the fit, but a *peculiar kind of irritation*. Perhaps the special irritation which generates a fit gives sometimes a sensation quite special also, and which can not be described. If we take notice of these three sets of facts—first, that there are cases of epilepsy in which an irritation arising from the skin, or from the neighboring parts, may cause fits without being felt; secondly, that by pressure or galvanism we may produce in a part the kind of unfelt irritation which causes fits; thirdly, that such a part being found, epilepsy may be cured by either the application of ligatures, the section of a nerve, or cauterizations, etc., it becomes evident that it is of the greatest importance to try to find out in epileptics who have no aura epileptica, if there is not a part of the skin or muscle from which arises an unfelt irritation causing the fits. To ascertain the state of things in this respect, various means may be employed. If the fits are frequent, and if they come at regular times, it will be found, by placing tight ligatures around the limbs, whether the attacks are due to an irritation coming from these parts or not. (We may apply ligatures to all the limbs, alternately and successively, beginning at the upper part of each limb, and then by degrees shifting the compression downward, if necessary, even to the fingers and toes.) Among other means of detecting the existence or absence of a peripheric irritating cause of the fits, are the following: pressure upon various parts of the body; the application of localized and powerful galvanic currents; the application of ice, and of a wet and warm sponge, etc. If any part is the seat of a pain, even if this pain seems to have no relation with the fits, it will be necessary to ascertain whether pressure, galvanism, etc., applied upon this part produces an attack. If it is in a limb that a pain exists, a ligature will decide the relation of the painful spot with the fits. In cases where there is a cramp in some of the muscles, or in one only, at the beginning of the fit, the inducement of a cramp by galvanism might decide if the attack is due to the irritation of the sensitive nerve of the contracted muscle, or if the cramp is nothing but a manifestation of the attack. If the initial cramp exists in a limb, an elongation of the contracted muscle, or a ligature might lead to the solution of the question."

In these cases, the application of a ligature around the limb from which the aura arises, is recommended; the ligature should be worn constantly around the limb, and tightened immediately as soon as the warning aura is felt,—this frequently prevents the fit,

and prolongs the intervals between them. When there exists a pain, or a peculiar sensation proceeding from some part of the body, just before the fit, or when the peculiar spots of irritation have been discovered, he advises destruction of the sensitive portion of the surface by actual cautery, and, if this does not succeed, a cure may still be effected by a section of the nerve or nerves going to the sensitive part of the skin. He thinks the best means of treating epilepsy is by the application of a series of moxas along the spine, and particularly to the nape of the neck.

When the epilepsy remains after having removed the external irritation or the disease accompanying the convulsive affection; when symptoms of cerebral lesion are present; or when the epilepsy is obstinate, or, its causes obscure, in addition to the treatment for accompanying symptoms, when required, I have derived the most advantage from the following course: Take of Iodine forty-eight grains, Extract of Belladonna twenty-four grains, Sulphate of Quinia three drachms, Alcoholic Extract of Black Cohosh three drachms; mix thoroughly together, and divide into ninety-six pills, of which one is to be taken every night and morning. These pills should produce a slight pain in the head, a heaviness, or giddiness, and which should be kept up constantly, but not too severe, regulating the dose according to the effects. During the day the following may be taken: Take of Bromide of Potassium one ounce, Water six fluidounces; dissolve. The dose is a teaspoonful, to be repeated three times a day, about two hours after each meal. In conjunction with these remedies a Compound Tar Plaster should be worn alternately upon the nape of the neck and the sub-occipital region, and then upon the lumbo-sacral region, and so on, continuing it in one place for several weeks before changing it to the other. But should this increase the attacks or cause much depression, the plaster will have to be omitted, and in its stead employ Firing, or the application of stimulating and rubefacient applications along the whole course of the spinal column.

In many instances, instead of the internal measures recommended above, I have found the following more beneficial: Take of bruised Stramonium Seed, Assafetida, Powdered Black Cohosh Root, Lupulin, each, one ounce, Spirits or Whisky one quart. Macerate for fourteen days and filter; the dose for an adult is a tablespoonful three or four times a day, about an hour after each meal. In connection with this use the following pills: Take of Prussiate of Iron, Sulphate of Quinia, Alcoholic Extract of Black Cohosh, each, four scruples; mix thoroughly together, and divide

into forty-eight pills, of which one may be given for a dose, repeating it three times a day, about an hour previous to each meal. Of course, this will not answer where there is any organic cerebro-spinal lesion, unless measures be at the same time adopted to remove such lesion.

Many other remedies have occasionally proved successful in the reflex variety of epilepsy, and also, sometimes, when it arises from functional cerebral lesion; some of them I will name: The Compound Pills of Valerian; the Compound Tincture of High Cranberry; Tincture of Poison Oak; Ice-plant; Peony; Blue Cohosh; Skunk Cabbage; Rue; Masterwort; Round-leaved Pyrola; Lady's-slipper; Gelseminum; Mugwort Root, in doses of from fifty to seventy grains, in some warm drink; Extract of Scutellaria Geniculata; Extract of Cotyledon Umbilicus (Napplewort), in doses of five or six grains night and morning; Acetate of Strychnia, one-fiftieth of a grain, repeated three times a day; Oxide of Zinc in large doses; Valerianate of Zinc one-half grain, repeated two, three, or four times a day; Digitalis, when much arterial excitement is present; Sulphate of Zinc, two grains daily, in solution; Glonoine; Lactate of Zinc, four to eight grains repeated three times a day; Oxalate of Cerium, in those cases only where an aura is present; Ammoniacal Sulphate of Copper, one-half grain twice a day, increasing the dose one-sixth grain every other day, in cases of purely nervous epilepsy without complication; Oxide of Silver; Nitrate of Silver; Chloride of Silver, etc. The objection to the Nitrate of Silver is that it is very apt to effect a permanent discoloration of the skin. Atropia and the Valerianate of Atropia, the latter in doses of $\frac{1}{132}$ of a grain every twenty-four hours, and very gradually increased not to exceed $\frac{1}{33}$ of a grain in twenty-four hours, suspending its use as soon as the vision is disturbed, and resuming it when this symptom has disappeared for a few days, has likewise been highly spoken of.

Dr. Radcliffe recommends Phosphorus twelve grains, dissolved in Almond Oil one ounce, by the aid of heat or warm water; the dose is from five to ten minims, and may be given in Cod Liver Oil, Elixir of Bark, etc. He also advises a continuous current of galvanism to be kept up along the spinal cord by means of a Pulvermacher's galvanic belt. The following has also been recommended: Take of Phosphate of Zinc four grains, Diluted Phosphoric Acid twenty minims, Tincture of Cinchona, of Valerian, or of Conium, etc., half a fluidrachm; mix for a dose; to be repeated twice or three times a day.

The following pills have also been found very serviceable in

simple, uncomplicated epilepsy: Take of Phosphate of Zinc two drachms, Prussiate of Iron forty grains, Sulphate of Morphia five grains, Alcoholic Extract of Black Cohosh, a sufficient quantity to form a pill mass; divide into sixty pills. The dose is one pill, to be repeated three times a day. Also, Oxide of Zinc one drachm, Extract of Conium, one scruple; mix, and divide into twenty-four pills—to be taken the same as the preceding. Likewise, Citrate of Iron and Strychnia one drachm, Syrup of Black Cohosh six fluidounces; mix. Dose, a teaspoonful three times a day.

Tracheotomy has been proposed, but its necessity is very doubtful; ligature of the common carotid has been tried and proposed, but this is apt to give rise to softening of the brain; cauterizations with caustic potassa on each side of the dorsal and cervical vertebræ, and repeated every five or six weeks, have proved very successful; and so has, likewise, the actual cautery applied to the top of the head along the sagittal suture, five or six applications effecting a cure—the cauterizing iron was about two lines in diameter, and the whole thickness of the skin was implicated.

The bowels should be kept regular in epilepsy, but never purged, except under extraordinary circumstances; and instead of ordinary laxatives, Sulphate of Quinia, Extract of Nux Vomica, Strychnia, and even Opium will be found to act the most beneficially, especially in anemic cases. In some cases, these agents will be rendered still more efficient by the addition of Rhubarb, or small quantities of Podophyllin. Extract of Nux Vomica half a grain, combined with Extract of Gentian one grain, for a dose, and repeated three times a day, will often rectify the sluggish state of the bowels. The skin should be attended to daily, by bathing, friction, etc., and in many cases, the use of the cold shower bath daily will be very serviceable. Everything should be adopted in the hygienical treatment to allay irritation, and to promote the health and vigor of the entire system. The diet should be moderate, (for epileptics are generally great eaters), nourishing, and easy of digestion, avoiding fats, acids, liquors, and food disposed to cause gastric acidity, constipation, or flatulency. Animal food may be used in moderation; coffee and tea should positively be abstained from, and in their place make a beverage of the following: Take of Skullcap, Peony, Valerian, Peach Leaves, each one ounce, Sassafras Bark three ounces; mix together. A teaspoonful of this may be infused in half a pint of boiling water, sweetened, if desired, and be made use of as a common drink, either warm or cold. All sources of mental irritation must be avoided, and, for this reason it will frequently prove advantageous to remove the

patient from his ordinary business, or his daily associations. Sexual intercourse must positively be prohibited. Regular, but moderate exercise of the voluntary muscles will be very beneficial, yet the patient should be careful to avoid dangerous places, lest a fit should come on, and he be precipitated to the ground—as, standing or working upon houses, ladders, precipices, or near deep ponds, rivers, wells, etc. An inactive, sedentary life, increases the morbid predisposition, and renders the consequences of the fits more deplorable. Out-door work, as agriculture and gardening, will especially be found of great utility. The hours should be properly regulated for sleeping and rising; exposures to cold, or sudden changes, violent passions, should be carefully guarded against. The head should be kept cool; the neck be kept free from tight cravats or other ligatures; late suppers should be dispensed with, at least three hours being allowed to intervene between the supper and bed-time; and during sleep the patient should always lie with his head high, to assist the circulation of the blood through the brain, and should as much as possible avoid lying upon his back. Intellectual employment requiring deep thought is injurious. Moderate reading, drawing, music, light composition, and the elements of chemistry, botany, physics, etc., afford great satisfaction, and sustain the moral powers instead of exhausting them. Variety of occupation, intermingled with cheerful society, and amusing relaxations, will prove very serviceable.

CHOREA.

St. Vitus's Dance, or Chorea Sancti Viti, is an affection characterized by a singular mixture of convulsive motions, partial paralysis, and tremors of the limbs, which produce the most whimsical and varied contortions, and which occur without pain. It may come on at any period of life, from one year old and upward, and is more common among females than males, in the proportion of about two and a half to one, generally manifesting itself between the fifth and sixteenth year. Although a disagreeable affection, it is seldom attended with danger, unless it be complicated with epilepsy, paralysis, cardiac disease, or some other serious malady. It may affect only one part of the system, or more frequently, several. The disease, if not checked by proper treatment, may continue for years.

The *causes* of Chorea are not satisfactorily understood, and, as with epilepsy, authors disagree in relation thereto. The most

recent hypothesis is probably as near being correct as any; it is, that the nervous system is in a state of morbid susceptibility or irritability connected with imperfect nutrition of the nervous centers, which susceptibility is either hereditary or acquired, and that, in consequence of it, a peripheral irritation may produce such a functional disturbance in the nervous center as to develop the choreic movements. This peculiar delicacy of nervous organization is frequently met with among the offspring of consanguineous marriages, and is likewise common among persons subject to erysipelas, or those of strumous diathesis. Indeed, I have never yet met with a case of chorea, in which there were not some indications of struma.

From the recurring character of the convulsive motions, Dr. Elam states that there must be a stimulus acting upon the extremities of a morbidly irritable excito-motor nerve, and the influence of which is reflected from the motor centers, which respond in a more vigorous and irregular manner upon the muscular system. When the stimulus is in excess the spasms are tonic, giving rise to cramp; but when the excitability of the nervous extremities is increased, they are clonic. He notices a great similarity between chorea and neuralgia; one attacks the motor and the other the sentient nerves; both are chiefly due to external irritation, as of the intestinal or uterine systems; both are usually diseases of debility; both are relieved by tonics, and are almost incapable of relief by narcotics.

Among the exciting causes, by far the most frequent, is an affection of the mind, arising from any depressing passions, as grief, horror, and especially fright; although some writers consider that the tendency to be readily alarmed, etc., is due to the predisposition to the chorea, and that the chorea is not the result of the mental shock. However this may be, the affection may develop itself immediately, or may not be observed until weeks or even months have passed. Rheumatism is the next in order among the exciting causes, especially when it affects the heart and pericardium, giving rise to irritation of the plexus and ganglia. I have only in a few cases observed chorea to be in any way associated with rheumatic disease; and as to the bellows murmur supposed to be indicative of mitral disease, although present in many instances, it is not persistent, and may, as is well known, be due to anemia, or spasmodic action of the columnæ carnæ and the chordæ tendineæ. Irritation is another exciting cause, the result of constipation, intestinal worms, dentition, repression of cutaneous diseases, suddenly suppressed perspiration, suppression of customary

discharges, a peculiar morbid condition of the blood, uterine irritation, ovarian irritation, uterine prolapsus, the condition of pregnancy, falls, blows, excessive venery, or masturbation, as well other causes that may give rise to nervous debility or extreme irritability.

The *symptoms* of chorea are readily known. It is frequently preceded by a changeable, and often a voracious appetite, loss of sportiveness and spirits, a hard, tumid condition of the abdomen, with more or less obstinate constipation. Spasmodic movements or rather twitches of the fingers, muscles of the face, or other parts of the body, are observed, being at first very slight, but gradually increasing, and extending themselves so as to interfere with walking, speaking, and even mastication. These movements are involuntary and irregular, varying much in different individuals, sometimes affecting one complete half of the body; they frequently border upon the ludicrous, especially when the disease is limited to the facial muscles, and are very mortifying to the patient. The face may be contorted into various shapes, looking as if the individual were making "wry faces" on purpose; the head may be constantly in a state of motion, trembling, moving up and down, or occasionally drawn suddenly and momentarily to the right or left; the gait will be unsteady, or the leg may be awkwardly dragged along; the hand or arm can not be steady for a moment, but moves convulsively from one position to another, although the patient strives to prevent it. In some cases, the movements are so violent that the patient can neither sit, stand, nor lie down. Pain in the head is very common in these instances of excessive motion, and palpitations of the heart, if the affection be associated with rheumatism. In a few cases, there will be observed a difficulty in respiration, as well as in deglutition.

Dr. R. B. Todd observes as a pathognomonic symptom of chorea, protrusion of the tongue with a peculiar thrust to the fullest extent of which it will admit, frequently this is done by one effort; at other times, it requires two or three attempts before it can be accomplished. The retraction of the tongue is also peculiar; it is drawn back, supported and guided by the pressure of the teeth, and often very slowly, and with great caution. This symptom frequently precedes an attack of chorea. One side of the body is always more affected with the choreic movements than the other, and he considers those nuisances, fidgety, uneasy, ever-in-motion children, as being predisposed to chorea. A tendency to fall forward in descending a pair of stairs, has also been noticed as a symptom.

As the disease advances, the general health becomes more or less impaired as manifested by pallid countenance, pulse regular but feeble, impaired appetite and digestion, flaccidity and wasting of the muscles, and sometimes a debility of the intellectual powers to such a degree as to threaten idiotcy; this last, however, is not necessarily present, as I have met with cases, where the disease had been in existence for twelve and eighteen years, the only mental affection being extreme irritability, the intellect remaining unimpaired. Occasionally, there may be some pain or distress present, but not as a general rule. Children laboring under chorea are very apt to be capricious, fretful, and easily alarmed; the motions becoming much more severe when they meet with any opposition or contradiction. The choreic motions are less marked, and frequently entirely suspended during sleep, while the brain is occupied in its own acts. Dilatation of the pupils is a common symptom in chorea. The urine is usually high-colored, acid, with an abundance of urates, and uric acid.

There is a form of this disease termed "Electrical or Acute Chorea" by Dr. Dubini, generally produced by fear, and characterzed by movements, strikingly resembling those resulting from electrical shocks, which are always identical, constantly affecting the same muscles as at the commencement, gradually, however, implicating others of the same side also, usually the right side, the contractions of which are followed insensibly, and sometimes suddenly, by paralysis,—apoplectic stupor supervenes, and the case terminates fatally, recovery being the exception. The patient has from the first a presentiment of the gravity of the disease. No lesions explicable of the symptoms have been observed.

The *diagnosis* of chorea is not difficult; it differs from other convulsive diseases, in the spasms being clonic, continuous, and not accompanied with fever, delirium, unconsciousness, or coma. In *shaking palsy* the movements are due more to weakness and loss of muscular control than to spasmodic action. In *writer's cramp* the fingers can perform every other movement properly, except the one which has produced the affection, as writing, sewing, painting, etc. In *facial spasm*, the convulsive movements are limited to the same set of muscles, usually on one side only of the face, and are equal in degree.

A peculiar form of this affection, or, at all events, one closely related to it, consists in more or less violent bobbings of the head, repeated at intervals varying from a few seconds to an hour or two. There is a convulsive jerk of the extremities forward, and a bowing of the head with instantaneous relaxation, which may continue for

several minutes, the spasms sometimes increasing in intensity. The mind is not apt to be affected in the slightest degree. I have seen but two cases of it, both girls, one about seven, and the other eighteen years of age. Dr. West named the disease *salaam convulsions;* as far as observed children are more generally liable to it. The treatment of this singular affection consists in the administration of a purgative or vermifuge, to obviate irritation from costiveness or worms, or, if other sources of irritation be detected, to make use of the proper measures to remove them, and, at the same time, to apply counter-irritation along the whole course of the spinal column, as vesication, firing, etc., in order to subdue any meningeal or other irritation or chronic inflammation of the spinal marrow, or of the roots of the nerves, that may be present. In conjunction with this, Belladonna, Conium, or Hyoscyamus, etc., may be administered internally, with Iodide or Bromide of Potassium, or of Iron, according to the strumous, rheumatic, or anemic condition present.

The *prognosis* of chorea, as a general rule, is favorable. When the pupils dilate or contract normally in response to light or its diminution, it is indicative of returning health. When complicated with other affections of a serious and extensive character, or when the mind has become impaired, the prognosis is unfavorable. It may be proper to remark here, that when chorea is complicated with other diseases, as chlorosis, hysteria, menstrual derangements, rheumatism, erysipelas, cerebral affections, etc., these maladies must be treated in precisely the same manner as if the chorea were not present; and, after their removal or amendment, if the chorea does not disappear, it may then be more directly attended to.

The *pathological appearances* observed in chorea vary; indeed, no one organ has yet been discovered the lesion of which can be considered as decidedly characteristic of chorea. Anemic conditions are evidenced by softness, paleness, and flaccidity of the tissues; and disease of one or more organs, perhaps those giving rise to the choreic irritation has also been discovered. Cerebral softening, tubercles, softening of the spinal cord, adhesions of its membranes, etc., have also been observed, but these have been regarded as mere coincidences. M. Serres has found fatty tumor on the tubercula quadrigemina, or inflammation of the corpora quadrigemina, sometimes extending to the roof of the fourth ventricle, with blood effusion at the base of the quadrigeminal bodies.

There is no specific *treatment* for chorea; the indications are to remove all sources of irritation, as well as any existing complications, and then if the chorea still remains, adopt measures to over-

come the nervous affection. If the disorder be due to sudden mental emotion, as to fright, for instance, producing a strong impression upon a weak and excitable nervous system, the most benefit will be derived from those remedies which improve the general health, and give vigor and tone to the muscular systems, as well directed gymnastic exercises, aided by vegetable or mineral tonics, and a nourishing diet. If dentition be the exciting cause, the proper remedy is understood by every one. If worms, or accumulated feces be the source of the external irritation, vermifuges and purgatives may be administered; yet, it must be borne in mind, that continued purgation is injurious. If constipation be habitual, Nux Vomica or Strychnia will impart tone to the debilitated muscles. If the disease be connected in any way with the reproductive organs, we must select our remedies according to the nature of the functional or organic lesion of these organs. And the same measures will be required, that is, according to the indications present, and the nature of the disease, whether it be rheumatic, or be due to repressed cutaneous affections, renal disease, morbid conditions of the blood, too rapid growth, sexual excesses, exhausting discharges, etc. If it occur during pregnancy, anodyne injections will prove very serviceable.

The remedies which I more commonly employ in the treatment of chorea, for the purpose of overcoming the nervous affection, as well as any anemia, or tuberculous or strumous disease that may be present, are as follows: Take of Iodine fourteen grains, Iron by Hydrogen forty grains, Sulphate of Morphia four grains, Alcoholic Extract of Black Cohosh forty grains; mix well together, and divide into forty pills, of which the dose is one pill, to be repeated three times a day.

Counter-irritation, vesication, or the Compound Tar Plaster, applied to the nape of the neck and sub-occipital region, will almost always prove serviceable, especially in cases where pain exists in the neighborhood of this region. The counter-irritation with liniments, etc., should always be applied along the whole course of the spinal column, and be repeated at least twice a day. The Tar Plaster will, at first, cause an increase of the movements, but they will subside after a few days; but if it causes great depression its use must be omitted. It may likewise be placed over other parts of the spinal column where there is pain with or without pressure or percussion.

Other compounds, however, will also be found successful, and may be administered according to the indications present, as anemia, nervous irritability, vascular excitement, restlessness, etc., as follows:

1. The Compound Pill of Black Cohosh. 2. The Compound Pill of Valerian. 3. The Compound Tincture of High Cranberry Bark. 4. In cases where there is a tendency to numbness or paralysis, a pill, to be repeated three times a day, composed of Extract of Belladonna one-eighth of a grain, Strychnia from one-twentieth to one-fiftieth of a grain, Alcoholic Extract of Black Cohosh two grains; mix, and make a pill. 5. Sulphate of Zinc two grains, Extract of Indian Hemp three-fourths of a grain, Alcoholic Extract of Black Cohosh half a grain; mix, and form one pill. To be given in doses of one pill, and repeated three times a day. 6. Take of Horse-radish Root, White Mustard Seed, each, four ounces, hard Cider two quarts; mix, and let the mixture stand several days before using. The dose is from half a wineglassful to a wineglassful three times a day. In conjunction with this, give from half a teaspoonful to a teaspoonful of a preparation of Port Wine one pint, in which has been macerated Russian Castor one ounce; repeat the dose three or four times a day. This has effected many cures.*

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* Miss Sarah H——, aged 19, was afflicted with chorea of sixteen years standing, during which time, as her friends informed me, she had been under the care of several eminent physicians of this country and Europe, had been bled, cupped, blistered, mercurialized, taken nitrate of silver, ammoniated copper, etc.; cold shower baths had been used until they caused convulsions; and music, so highly recommended by some writers, was of no avail; in fact, I was informed that the invariable result of treatment which she had undergone was an aggravation of the symptoms, and they were almost fearful to subject her to any new treatment. I found her excessively debilitated, the mental energies somewhat impaired, the thumbs and fingers incessantly in motion, the head constantly shaking about, and every two or three minutes the mouth would be rapidly and convulsively drawn to one side, accompanied with an audible noise, somewhat resembling that produced by sucking in air. When seated, her feet were not in motion, but while walking they were involuntarily thrown in various directions, yet not to interfere with locomotion, and the toes of one foot dragged upon the ground, so that she required a new pair of shoes every week. In addition, she labored under chronic erysipelas, had an almost insurmountable repugnance to anything like medicine, and much persuasion was required to induce her to try a new course of treatment.

To relieve gastric acidity and constipation, the Compound Syrup of Rhubarb and Potassa was given, three times a day; and she was placed upon the following treatment: A pill was given every two hours, composed of Alcoholic Extract of Skullcap two scruples, Alcoholic Extract of Black Cohosh one scruple, Alcoholic Extract of Nux Vomica one and a half grains; mix, and divide into forty pills. The Nux Vomica was gradually increased in this prescription to four or five grains, then decreased, and so on alternately. Fats, acids, coffee, and tea were prohibited, a warm infusion of Peach Leaves and Skullcap being substituted for the latter. The surface was bathed weekly with a warm, weak alkaline solu-

Among the host of remedies which have been used in this disease, the following seem to rank the highest among old school and other physicians: Strychnia, but it often aggravates the convulsive motions, and requires great care in its administration; Precipitated Carbonate of Iron in drachm doses, repeated three times a day, given alone or in Port Wine; Arsenic, or Fowler's Solution is, by some, considered almost a specific; it is at best a doubtful remedy, and is not employed by physicians of the school to which I belong. Prussiate of Iron, which may be combined with some antispasmodic vegetable extract; inhalation of Chloroform, repeated once or twice a day,—when first used the movements are increased, but as the inhalation goes on, a calm succeeds; Veratrum Viride is said to have effected most decidedly beneficial results; Sulphate of Aniline, in doses varying from half a grain to two grains a day, has been highly spoken of,—the dose is given in solution with a drop or two of Sulphuric Acid, and should be repeated three times a day; Iodide of Zinc is advised in strumous cases; Ammonio-Sulphate of Copper in doses of from half a grain to a grain, repeated three times a day; Hypodermic injections of Sulphate of Morphia, Sulphate of Atropia, Sulphate of Quinia, or other tonics and anodynes; the root of Artemisia Vulgaris; Sanicle Root, or Sanicula Marylandica, is frequently very valuable, it may be used in powder, infusion, fluid extract, or alcoholic extract; faradization of the skin over the affected parts, but not of the muscles themselves, etc.

The bowels should be kept regular; the urinary secretion be properly attended to; every night and morning friction with a coarse towel or flesh-brush, so as to produce an agreeable glow on

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tion; a spirit-vapor bath used every two or three weeks; and exercise in the open air advised, with an avoidance of crowded assemblies.

In about ten months, under this treatment, all involuntary movement ceased, save that of the thumbs. The following pill was now ordered, in addition: Take of Red Oxide of Iron twenty-four grains, Iodine six grains, Sulphate of Quinia twelve grains, Extract of Liquorice a sufficient quantity; mix, and divide into twelve pills, of which the dose was one, to be repeated three times daily, for three weeks; after which, one pill night and morning.

Soon after the use of these pills, she commenced improving rapidly, her appetite became regular, as well as the bowels; her strength gradually returned, and her mental improvement was very marked; and the erysipelatous affection, which appeared from time to time, did not again manifest itself. In two years this treatment was followed by a permanent cure. I believe she would have recovered much sooner, were it not that during the treatment she was attacked at one time with pneumonia, and again with inflammatory rheumatism, accompanied with severe pain in the head and delirium, and, shortly after this, with an obstinate acute hepatitis. Twenty-four years have now passed since the cure, and there has been no return of the chorea.

the surface of the body, should be performed by a second person; the body should be bathed once or twice a week with a weak alkaline solution. In some cases the shower bath may be useful, but care must be observed in its employment, as I have seen the disease very much aggravated by it. The diet should be full, nutritious, and easy of digestion, avoiding acids, grease, and the use of coffee, tea, or liquors in excess. Moderate exercise should be regularly taken every day, and the patient should avoid all circumstances or assemblies calculated to mortify or excite, and thus increase and perpetuate the convulsive motions. And all excesses, masturbation, etc., must positively be prohibited.

There is one thing to which I would especially call attention; and that is, a white coat upon the tongue, with paleness of the body of the tongue, indicative of gastric acidity and anemia; this is very frequently met with in chorea, and for which I have found the Compound Powder of Charcoal, with a few grains of Ginger to each dose, to be a most excellent remedy. Indeed, until this symptom becomes materially improved, not much benefit will be derived from the other treatment employed.

CATALEPSY.

Catalepsy is a rare affection; it consists of a sudden suspension of sense, intelligence, and voluntary motion, without any fever necessarily; the muscles being sometimes rigid, and at others movable, keeping the position in which they were at the moment of attack, or in which they may subsequently be placed. The condition of unconsciousness continues for a longer or shorter time, from a few minutes to several hours, rarely for several days, and when it subsides the patient presents the condition of health usual to him, but has no recollection of events that transpired around him during the cataleptic state. Some cases have, however, retained consciousness during the seizure, and have had a perfect cognizance and recollection of what was going on around them. Some forms of catalepsy are termed "trance," and others "ecstacy." The disease is more common among hysterical females, and at the age of puberty.

The *causes* of catalepsy are not well understood, though, from the character of the symptoms, it appears to be an affection of the cerebral lobes and spinal cord. It is excited into action by painful mental emotions, gastric or menstrual derangements, worms, excesses, intense study, etc., as well as by certain injuries.

In a few instances premonitory *symptoms* are present, as, cephalalgia, vertigo, flushed face, pain in the chest, lassitude, yawning,

forgetfulness, depressed spirits, etc. More commonly, however, the attack is sudden, the patient remaining in the position he held at the time, being unable to move, and if a limb be moved by another person into any position, or if an eye be opened, etc., it remains so, fixedly. I have, however, witnessed instances where patients would move about and converse with others, having no recollection of the events upon recovering from the cataleptic condition. There is almost always a partial or complete suspension of the senses. Should the patient be occupied in conversation, for instance, or any other continuous act, when the attack occurs, he may finish the interrupted sentence, or continue his acts, as soon as restoration happens, without being apparently aware that any interruption has taken place.

As to the *prognosis*, catalepsy is seldom dangerous, and is occasionally followed by the cure of previously existing disease of the brain and nervous system, as, epilepsy, hysteria, etc. In a few instances, it has terminated in epilepsy, apoplexy, melancholy, etc., and proved fatal ultimately. Any violent efforts made to recover the patient from the cataleptic state, is improper, and apt to induce serious results.

The *diagnosis* of catalepsy is not difficult. It may be determined from *apoplexy* by the stertorous respiration, the relaxed and flexible condition of the limbs, the congestion of the head and face, and the paralysis, which are common to apoplexy, but are absent in catalepsy. From *asphyxia*, by the total suspension of respiration and circulation, and the livid color of the face and lips in this affection. From *death*, by the application of the stethoscope over the region of the heart, by detecting pulsation at some part, by the temperature of the body, the unrelaxed state of the sphincters, and by the condition of the cornea.

Catalepsy rarely requires *treatment* during the attack, unless certain symptoms demand it, as, determination to the head, feeble pulse, cardiac palpitation, etc. Ordinarily, it will be better to allow the patient to recover from the paroxysm spontaneously. I have seen mesmerizers make their mesmeric passes for a few minutes over cataleptic patients, and immediately after, either awaken them, or be able to converse with them freely, the paroxysm still remaining; and I have seen the habit of night-somnambulism wholly destroyed by the same means—but I do not profess to understand how or why this peculiar influence was effected.

When catalepsy occurs frequently, the treatment during the intervals between the paroxysms should be directed toward strengthening the nervous centers and restoring them to a normal condition

by the means heretofore advised. Congestive or irritative symptoms existing in any of the organs, and especially of the uterus, should be promptly removed by the proper treatment; functional uterine derangement will require uterine tonics; and anemia must be met with chalybeates. It will also be proper to take into consideration the diathesis of the patient, as, predisposing to scrofula, rheumatism, extreme nervous susceptibility, etc., and adopt remedies in accordance therewith. The bowels, kidneys, and skin must be maintained in as normal a condition as possible, moderate exercise should be taken daily, and the diet should be adapted to the wants and condition of the system. All exciting causes must positively be avoided, and those that are present, as, worms, suppressed eruptions, etc., must be removed by appropriate means.

Should any soreness or tenderness be discovered along the vertebral column, Croton Oil Liniment, or other strong counter-irritant should be kept applied over the tender points, in connection with the other treatment. Half-grain doses of Nitrate of Silver, repeated three times daily, are stated to have cured catalepsy.

NEURALGIA.

Neuralgia is the term applied to a paroxysmal painful affection of the nerves, which more commonly has its location in one nerve, and which is not due to inflammation, nor to any appreciable structural change of the nerves. The pain is more or less violent, most generally occurring in the cerebro-spinal nerves, in paroxysms of irregular duration, and after irregular or regular intervals. The pain may be seated either in the trunk of a nerve, or along its branch; according to Valleix, the "focal points," or points more especially liable to neuralgia, and from which the severe pains radiate, spontaneously, or from exciting causes, are, 1, at the place where the nervous trunk emerges from its bony sheath, as, at the supra-orbital foramen, the infra-orbital foramen, the ischiatic notch, the crural arch, etc. At this point, wherever it may be situated, the affected nerve will be found tender to pressure, whether the neuralgic pain be felt here by the patient, or at some other point along the course of the nerve.

2. The second focal point or center of pain, is where a nervous branch passes out through a muscle, for the purpose of being superficially distributed in the integuments; as, for instance, behind the mastoid process, at the place of the posterior branch of the second cervical nerve, or at the superficial points of the inferior spinal nerves.

3. At the point where the terminal nerve-twigs or branches expand to be lost in the integuments.

4. At the point where the trunk of the nerve suddenly becomes more superficial in its course, running along near the integument; as, at the superficial point of the ulnar nerve as it passes the inner condyle.

This knowledge, although imperfect, is of considerable importance, as it enables us to ascertain in most instances the exact location where moderate pressure gives rise to tenderness.—Not unfrequently we may have a neuralgia of the ganglionic or sympathetic nerves, which may acquire an abnormal sensitiveness from certain irritating causes, as, vascular excitement, functional derangement, etc.; but the pain is not so well marked as in true neuralgia, and does not present, as an accompaniment, a proportionate degree of constitutional disturbance.—Neuralgia may be located in any part of the body, though more frequently in the region of the head. It affects males and females equally, the former being more liable to the sciatic and the crural forms, and the latter to the dorso-intercostal and the lumbar. It rarely proves fatal, though it may ultimately be followed by some serious disease, yet this is not common; though when severe and of long duration, the patient eventually dies, worn out from the oft-repeated shocks, and the more or less constant nervous irritation. Its duration is very uncertain, and a person once attacked by it is liable to subsequent attacks at any time when exposed to the exciting causes, even though the original affection may have been removed by proper treatment.*

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*M. Valleix has indicated the following points as neuralgic centers, much suffering being produced spontaneously or by pressing upon them, sometimes the slightest pressure occasioning a violent paroxysm:

In *facial neuralgia*, the points are, the supra-orbital foramen; the eyelid and edge of the orbit; within and below the internal canthus; the eyeball; the infra-orbital foramen; the malar bone; the teeth and gums; the upper lip; the palate; the temple; the temporo-maxillary articulation; the mental foramen; the tongue; the lower lip; behind the mastoid process at some point between it and the vertebral column; and at the anastomosis of the branches of the trigeminus, above the parietal protuberance, from which point the pain radiates over the occiput and face.

In *cervo-occipital neuralgia*, the painful points on pressure are, between the mastoid apophysis and the first cervical vertebra; near the parietal protuberance; at the emergence of the superficial cervical nerve; upon the mastoid process; and upon the concha.

In *cervico-brachial neuralgia*, the most important focal points are, at the emergence of the posterior branches from the muscles at the sides of the inferior cervical vertebræ; at the superficial point of the axillary plexus; upon the spine of the scapula; around the neck of the humerus, and between the integuments and

The *causes* of neuralgia are not well understood; in many instances no attributable cause for the attack can be discovered. The long-continued action of cold, of cold and moisture, sudden exposures to cold, wearing damp clothes, continued exposures to excessive heat, or to irritating vapors, which derange the capillary circulation, mechanical injuries, pressure upon nerves from tumors or other causes, cutaneous irritations, uterine irritation, inflammation of mucous membranes, cerebral or spinal affections, gastro-intestinal

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the deltoid muscle; along the course of the internal cutaneous nerve on the inner side of the arm, especially between its anterior and posterior branches; between the two heads of the pronator radii teres where the median nerve passes, and at the lower part of the fore-arm where the median nerve furnishes the palmar cutaneous branch; behind the inner condyle, at the wrist, where the ulnar nerve or its branches are superficial; and, upon the musculo-spiral nerve as it winds round the spiral groove, and furnishes its cutaneous branches. Behind the internal condyle is the most common center of pain, the other usual points being in front of the wrist, in front of the elbow, and in the axilla, and more frequently in the course of the ulnar nerve.

In *dorso-intercostal neuralgia*, the principal points are, over one or more of the intervertebral foramina; at the center of one or more of the intercostal spaces; and near the margin of the sternum, or of the upper edge of the rectus abdominis, or of the external oblique.

In *lumbo-abdominal neuralgia*, the focal points are, at the superficial parts of the posterior branches of the lumbar; the middle of the crest of the ilium, (iliac); immediately above the external abdominal ring, (hypogastric); near the center of Poupart's ligament, (inguinal); the testicle or labia majora, (scrotal or labial).

In *crural neuralgia*, the points are, in the course of the anterior crural nerve or its branches; at the origin of the crural nerve, at the lumbar plexus; at the groin; near the center of the sartorius muscle; over the inner condyle of the femur; around the inner ankle or malleolus; and at the internal side of the sole of the foot, along the integument of which the internal saphenous branch of the crural nerve sends filaments as far as the great toe.

In *sciatica* or *femoro-popliteal neuralgia*, the points are, at the posterior superior spinous process of the ilium; the center of the iliac crest; the superior portion of the sciatic notch; the great trochanter; the ischiatic tuberosity; the middle of the thigh; near the insertion of the biceps, as well as along the whole of the thigh; the knee; the outer portion of the ham; the head of the fibula; the whole length of the fibula; the center of the fibula; the external malleolus; the upper part of the posterior surface of the lower leg; and the foot and toes.

M. Trousseau, in a clinical lecture on neuralgia, observes:

"If neuralgia occupied the branches of the trifacial, it was always at the point of emergence of the ophthalmic branches, and of the superior maxillary and the inferior maxillary, that the pain was felt most acutely; then came the frontal point where pain rarely failed; then the parietal point where it was more frequently wanting; lastly, the occipital nerve, although having no relation of origin with the trigeminal, is almost always affected. An extraordinary thing—inexplicable, but invariable in all the cases which we have carefully observed and noted—is that, whether the trifacial were alone attacked, or the occipital nerve

derangements, syphilis, gout, anemia, blood-disease, profuse hemorrhages, caries of the teeth, want of proper nourishing food, and malaria, have all been named as exciting causes of neuralgia. Cold and dampness being undoubtedly the most frequent among these causes. Indeed, neuralgia may be produced by any cause that deranges the molecular nutritive actions of the nervous structure, so as to impair its function, and give rise to nerve debility, or diminution of the vital power and functional action of the nerve.

The principle *symptom* of neuralgia is the pain, which usually comes on suddenly, is of a lancinating, agonizing character, shooting along the course of the affected nerve like an electrical shock, frequently feeling as if red-hot wires were thrust into the part, and after the pain passes away a numbness in the part remains for some time. These pains will commonly be found seated at one or more of the points referred to by Dr. Valleix, often passing from one to the other in rapid succession; or, they may radiate from those points at which pressure gives rise to pain. Again, they may dart from one focal point or pain-center to another, without any suffering whatever in the intermediate portion of nerve; and, in many instances, instead of shooting along the course of the nerve in the direction of its trunk, or superficial ramifications, it will dart in a direction opposite to that of the affected nerve. Although, especially in severe neuralgic attacks, there may be tremors, cramps, or spasmodic movements of the muscles whose nerves are affected, yet no heat, redness, or swelling will be present, these existing only when there is an inflammation of the nerve. Sometimes, previous to the sudden attack of acute pain, slight sensations of heat will be experienced in the part affected, or itchings, numbness, etc., which more or less rapidly augment in severity.

The pain may continue for from a minute or two to several hours, and may reappear at regular or irregular periods, the intervals between which may vary from twelve or twenty-four hours to several weeks, months, or even years. In some cases, there

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simultaneously affected, pressure on the spinous apophyses of the first two cervical vertebræ was *always* very painful, and in a certain number of cases immediately awakened the pain in the affected nerves. If the nerves of the brachial plexus were attacked, invariably pressure over the spinous apophyses of the last cervical vertebræ produced pain, and it was the same when we explored the vertebral column in the case of intercostal, lumbar, and sciatic neuralgia." The spinous apophyses being painful at a point nearly corresponding to that at which the nerve emerges, and not unfrequently the pain extends a little higher up the vertebral column.

exists no pain during the intervals, while with others there is a constant dull pain, of a very annoying character which continues persistently, and which is augmented with each paroxysm; or, this constant dull pain may be the only symptom of the neuralgia. The pain of neuralgia may be often excited by the most trifling causes, as, certain movements of the patient, the use of certain articles of diet, etc. As a general rule, pressure upon the affected nerve will produce pain in one or more of the focal points indicated by Valleix; this pain may be merely a temporary increase of the persistent dull pain complained of; it may consist of painful twinges along the course of the nerves; or it may be of a lancinating, darting character, like those which occur during the paroxysms; and, in some cases, the slightest degree of pressure upon one of these pain-centers will give rise to the most terrible neuralgic paroxysms.

A peculiar feature attending the pain produced by pressure is, its limited extent of surface, frequently being confined to a space not exceeding one-fourth of an inch in diameter, and terminating so abruptly, that at a distance of even one-twelfth of an inch from the margin of this diameter, ordinary pressure would not develop any indications of morbid sensibility. Hence, great care must be taken in the examination of patients, for the purpose of determining the location of the focal neuralgic points, to carefully press with the finger-end not only upon the painful part as located by the patient, but also upon the whole course of the nerve-trunk and its chief ramifications; by this means we may excite pain in parts where it does not appear spontaneously, and thus ascertain the extent of the neuralgic affection. This pain from pressure is more severe during the paroxysms, and less so in the intervals, and almost invariably exists at those points where pain occurs spontaneously. It must also be recollected that this pain from pressure is not constant; an examination to-day may not excite pain, but an examination to-morrow of the same point may find the pain or tenderness present; or, pain produced at a given point will not be re-excited by subsequent pressure until a certain interval has passed, when the point again assumes its usual morbid sensibility. Undoubtedly there are some cases in which there will be no pain at all on pressure; and, again, this pain may be observed only during the paroxysm, and wholly disappear during the interval. The most usual kinds of neuralgia are as follows:

1. *Facial Neuralgia*, Neuralgia Faciei or Tic Doloreux, which is frequently met with, is seated in some one or more of the ramifications of the trifacial or fifth pair of nerves. We must carefully

distinguish the spontaneous pains from those produced by pressure. Instead of following the course of the nervous filaments, as some writers suppose, the spontaneous pain occupies very variable points, often multiple. In twenty cases, the spontaneous pain existed in the temple nine times, in the cheek six times, in the forehead six times, in the eye five times, in the gums three times, at the ala of the nose in two cases, in the lip once, and once at the point of emergence of the infra-orbitar nerve. The pain on pressure existed eleven times at the point of emergence of one or of two branches of the trifacial nerve, twice at the temple, once at the nasal ala and at the lip. As to the exact location of the pains, it was six times at the supra-orbitar, six times at the infra-orbitar, and once at the mental foramen.

These pains, both the spontaneous and those elicited by pressure, are apt to be very mobile, often rendering local medication of no avail; thus, the pain which, at the commencement of the paroxysm, was at the occiput, may pass to the scalp, then to the temple, and fix itself on the jaw, or at the temporo-maxillary articulation. At other times, the pains may pass from one side to the other; at one time it may occupy the dental branches or the teeth, at another the occiput, or else the top of the head. The examiner may find the pain on pressure very severe at the top of the head, and soon after it will have left this place to exist at the occiput, the eye, or at any other region.

When the neuralgia is seated in the first or ophthalmic branch, the painful point is at the supra-orbital foramen, and the pain darts to the forehead, the eyebrow, and eyeball, often being accompanied with a profuse secretion of tears. When this pain is confined to the frontal ramifications of the ophthalmic branch, it has been termed "brow ague," or "clavus hystericus."—When it is seated in the second or superior maxillary branch, the pain point is at the infra-orbital foramen, from whence it shoots to the upper lip, the upper teeth and gums, the posterior nares, and palate, with a tingling or twitching of the cheek and the lower eyelid.—When it is seated in the third or inferior maxillary branch, the pain darts to the temple, to the lower teeth and gums, to the lower lip, and to the chin, being often attended with a more or less profuse discharge of saliva.

The acute form of facial neuralgia, that is, during its commencing periods of attack, say for the first thirty days, is always more severe than the chronic form which occurs subsequently; and the disease is more refractory in its chronic stage than in its acute. Not unfrequently the affection disappears when a cutaneous erup-

tion presents itself, or an obstinate cough, a diarrhea, a vaginal inflammation, severe vomitings, repeated syncope, vertigo, etc.

Facial neuralgia may be determined from *toothache* by the location of the pain in a carious tooth, the pain on percussing the tooth, and by the tooth appearing to be longer to the patient than usual when the teeth are brought in contact with each other; there will also be an engorgement of the gums with redness, ascertained only by an attentive examination, and which swelling may increase and terminate by abscess. Whenever the pain is accompanied or followed by a marked swelling of the gum, even in the absence of any visible decay of the tooth, we may affirm that it is due to dental caries; and whenever a tooth is painful to the touch or to percussion, when it seems longer than usual to the patient, and when there exists no morbid sensibility in the other teeth, no caries being visible, we may likewise diagnose that such tooth is carious. An exception to this exists in those cases where the teeth are not decayed, become loose, from obliteration of the alveolar processes and shrinking of the gums, as with old persons, also become painful, and ultimately fall out without being decayed. In some instances, the neuralgia finally determines dental caries. Removal of the teeth has sometimes cured pains resembling neuralgia; while, at other times, persons have lost tooth after tooth by extraction, without any relief whatever, the neuralgia persisting, or even coming on with redoubled violence. And however excusable the physician may be in these cases of difficult diagnosis, he should never venture upon a removal of a tooth until he has carefully examined the case in every respect, and can not, consistently with the symptoms thus closely considered, believe the neuralgic pain to be due to any other cause than caries of such tooth.

The neuralgia may be determined from *disease of the eye-structure*, in which there is almost always more or less derangement of vision, intolerance of light, and more or less constitutional disturbance. From *organic cerebral diseases* by the presence of paralysis in these affections; at first it may be difficult to discriminate between the neuralgia and the brain maladies, but after a time, if the brain be affected paralysis will manifest itself, as, cessation of the nasal mucus secretion and difficulty in blowing the nose, cessation of the flow of tears on the affected side, loss of hearing, immobility of the eye, strabismus, emaciation, delirium, coma. In such cases the neuralgia is only a symptom of the organic lesion of the brain. From *inflammation of the maxillary sinus*, or antrum of Highmore, by the pains starting from the molar sinus and shooting into the head and neighboring parts,

being accompanied with more or less fever, and usually swelling at the part affected, though this may sometimes be wanting.

2. *Neuralgia of the Scalp and Cervical Neuralgia.* The pain is sometimes located in the scalp, at other times in the posterior cervical region, and the nervous branches are so intermixed that it is impossible to designate the neuralgia according to the branch affected. The posterior cervical plexus, especially the large branch of the second cervical pair, which passes over the occiput and extends to the top of the head, as well as certain branches of the anterior cervical plexus, as the superficial cervical branch, the auricular branch, and the mastoid branch, are all susceptible of neuralgia. The occipital portion of the scalp receives filaments from the posterior cervical plexus; the lateral and auricular portions receives them from the anterior cervical; and the anterior portion from the supra-orbital nerve; and all these branches or filaments are extended to the vertex.

The pain generally occupies but one side, often having a fixed location, limited to a small portion of tissue, being frequently termed "clavus hystericus," or, when it occupies a greater extent, "ovum hystericum." It is often seated at the top of the head, but it may occupy any part of the scalp; when it is located in the occiput, it forms the variety named "cervical neuralgia," and is usually confined to one side of the head, extending to the mastoid region, the back of the head, along the side of the neck, frequently as far as the shoulder, and then it may be complicated with cramps or contractions of the muscles of the neck. Sometimes the pain may originate in the occiput, and gradually remove so as to become fixed in some other region, as, the temple, the face, the teeth, etc. The pains are extremely severe, and are variously described, seeming to some as if the head were being opened, or a tearing, lacerating pain to others, while others again have sharp rattling noises in the head which they fancy must be heard at a distance. Pressure, during the paroxysm, increases the severity of the pain; during the interval, the sensibility of the scalp diminishes, and pressure only produces a dull soreness or tenderness.

In some cases no pain on pressure is produced either during the paroxysm or the intervals, probably, from not being able to detect the correct focal point. The spontaneous pains may also alternate with those of gastralgia, facial, intercostal, or lumbar neuralgia, or with palpitation of the heart. These pains are often so severe as to compel the patient to cry out, to produce a kind of delirium of action and speech, a disposition to commit suicide, and even the hairs may be seen to have raised. This erection of the hair is

frequently permanent; in some cases, the hair on the affected side of the head falls out, or becomes gray; the patient often experiences an annoying sensation of constantly falling.

When the top of the head is affected, a degree of heat above that of the surrounding parts may often be discovered; and some patients experience such a degree of icy coldness, not appreciable by the examiner, that they will cover their head, but without causing any warmth. The temporal arteries are usually very prominent, swoln, and pulsate strongly, during the paroxysms.

In eleven cases, the pain was fixed four times in the scalp, four times at the top of the head, in a space about the size of a silver dollar; once at the parietal, and of the same extent as the preceding, once at the occiput, and once, throughout the whole scalp, on one side. The pain darted into the neighboring parts seven times; three times to the face, four times to the side of the neck, twice around the ear, twice it suddenly changed sides; once it seemed to pass from one side of the head to the other, and twice it was attended with a spasmodic condition of the muscles of the neck.

Persons affected with these varieties of neuralgia are very liable to relapses; menstruation, especially when the flow is abundant, appears to be an exciting cause among females. When the disease is confined to one side, to the supra-orbital and temporal regions, the pain being one of weight and tension, instead of acute and lancinating, not increased by pressure, but, on the contrary, somewhat relieved, aggravated however by noises or by a jarring of the system, with severe nausea and vomiting, it is termed *hemicrania* or *migraine*. It usually continues for twenty-four hours, or, in severe cases, longer; obstinately resists treatment; terminates by a complete restoration to the usual health, without being thought of during the interval; and may be renewed from time to time without any appreciable cause, or, from some impropriety in diet, labor, exposure, etc., or from depressing moral emotions, etc. This may, perhaps, be a neuralgia of the encephalon itself, or of its membranes. If the brain be diseased, the symptoms of such disease will be observed during the intervals. *Rheumatism of the scalp* occupies both sides of the head; the pain is persistent, and dull, increased by pressure, or motion of the muscles affected, and becomes much relieved upon the application of warmth, which is not the case with hemicrania.

3. *Neuralgia of the Brachial Plexus*, which includes the Scapular, Brachial, and Cervico-brachial neuralgia of writers. As with the other kinds of neuralgia the spontaneous pain in the present form may vary in intensity and duration, usually being more acute in

the earlier periods of the disease, and diminishing as the malady continues. The pain on pressure does not always accompany the spontaneous pain; thus we may have the most severe violent spontaneous pain, and, after a very attentive examination, be unable to detect any point painful on pressure; and this pressure may be made upon the exact points to which the patients refer their sufferings. This, however, is the exception; as a general rule, we will develop a very acute pain by pressure, at the time of the paroxysm and, sometimes, pressure upon the focal points during the intervals, will not only occasion pain, but will bring on the neuralgic paroxysm. Hence, the pressure should not be repeated unnecessarily. Sometimes, during the examination, while holding the arm in one hand, and making pressure around the shoulder with the other, the patient will cry out with pain, which we may attribute to the pressure, but which is due solely to a convulsive spasm with painful contraction, determined by a movement which we have given to the arm. This form of pain is often constant, and remains when all other pain has disappeared, so that the least movement of the arm is not only painful, but may bring on a crisis of spontaneous pain. From this cause, we often observe patients keeping themselves in a state of immobility, not daring to make the least motion of the arm, for fear of provoking a paroxysm; and this may be carried to such a point that the patient fears to speak, or turn the head, and yet, notwithstanding all these precautions, an involuntary twitch will occasion a paroxysm. Generally any movement is painful, but in some certain cases pain will ensue from only one or two movements, especially those of abduction. These pains may also appear and disappear without any attributable cause, so that while at one period the patient may move his arm in any direction without pain, an instant afterward the slightest movement is impossible on account of the pain produced; and these pains from motion may exist when there is no pain whatever from pressure. This spasmodic muscular contraction with pain is a phenomenon which may be explained by the nature of the plexus, composed of muscular as well as sensitive fibers; these fibers are isolated from each other from their origin to their termination, yet, notwithsanding this isolation, there exists between the two kinds of fibers so close an association, that when one suffers the other may become convulsed,—for this last condition is not always present. Both the nerves of sensibility and mobility may be affected simultaneously, or, one of these systems alone may be involved.

When the pains are very severe, a muscular paralysis may be

the result; the irritation, by modifying the substance of the nerves, may destroy their irritability, or produce an exhaustion of the nervous force. In luxation of the shoulder, the wresting of the circumflex nerve frequently produces a loss of irritability resulting in paralysis of the muscles of the shoulder, the deltoid in particular. The paralysis, unlike that due to cerebral lesion, will gradually disappear.

The brachial plexus has a number of branches divided into collateral and terminal. The collateral are composed of three groups which the plexus furnishes,—1. Above the clavicle; 2. on a line with the clavicle; 3. in the armpit; they are distributed to the whole of the shoulder, to the supra-scapular region, to the anterior, lateral, and posterior thoracic regions, as well as to the subscapular region. The terminal branches are known under the names of internal cutaneous brachial and its accessories, musculocutaneous, median, radial, and cubital or ulnar, which are distributed throughout the thoracic limb, and which give to the limb, the same as the collaterals to the shoulder, sensation and motion. As each branch of the plexus may be affected separately, the seat of the pain will vary in each particular instance, and if, following the example of some writers, we would designate the neuralgia according to its exact location, the divisions would be innumerable. It appears, therefore, better to bring them together to a common type, under the name of neuralgia of the brachial plexus, or brachial neuralgia, and then to form three grand subdivisions based upon the three principal regions to which this plexus sends its ramifications, and which we will name the cervical, the scapulothoracic, and the humero-palmar. There may be instances where the pain occupies these three regions at the same time, but generally only one or the other, or even a small portion of but one of them. After having occupied a large surface, it may concentrate upon a particular point, and remain there for a long time.

The cervical form is the least frequent of any; it rarely exists alone, or rather, when it exists alone it does not form the neuralgia we are now considering. When it is accompanied with pain on motion, the patients have their heads inclined toward the affected side, which gives them a peculiar aspect.

The scapulo-thoracic form is the most frequent among them; the principal seat of the pain is at the anterior part of the articulation, on a line with the trunk of the plexus; from this point it radiates to the top of the shoulder, likewise frequently to the pectoral region of the affected side, as well as to the supra-scapular and scapular regions, and still more frequently to the scapulo-

vertebral groove or gutter. This latter variety is almost always accompanied with pain on pressure; the collateral branches are therefore affected, especially the posterior thoracic, the supra, and sub-scapular branches, the circumflex nerve, and the anterior pectoral or thoracic branches, without naming the trunk of the plexus, which is very often painful upon pressure.

The humero-palmar form presents the most numerous varieties of location. The pain may be seated in the armpit, and from thence extend along the arm, even to the fingers, especially to the ring and little fingers; or, it may exist only at the internal part of the fore-arm and in the index finger; or, it may commence at the bend of the elbow and extend to the fingers. The internal-cutaneous brachial, the musculo-cutaneous, the antibrachial portion of the median, and the palmar and digital portion of the cubital, are the branches more frequently affected; the radial nerve is less frequently attacked.

It is rare to observe either the spontaneous pain, or that caused by pressure, extend in the direction and following the distribution of these nervous branches; on the contrary, they are more frequently observed to occupy a very limited region, as the top of the shoulder, the lateral part of the thorax, the bend of the arm, the elbow, the internal part of the arm, the fingers, etc. But it must be observed, that in facial neuralgia and in the one under consideration, the conditions are not absolutely the same; in neuralgia of the fifth pair, it is a question wholly of a nerve of sensation, while the brachial plexus is, at the same time, sensitive and motor. The principal seat of the paralysis which sometimes complicates this neuralgia, is the deltoid muscle; that of the contraction or stiffness, is the muscles of the axilla and of the fore-arm.

The pains are generally worse at night; the patient is very apt to be wakeful, and, sometimes, when the paroxysm is very violent, he will be delirious temporarily; eating may sometimes be prevented on account of the pains; and, frequently, there is an abundant perspiration. Sometimes, the disease consists in a constant uneasiness of the affected shoulder, accompanied with moderate pains, which vary according to circumstances.

Neuralgia of the brachial plexus may be determined from *scapulalgia*, or which would be better termed *scapulitis*, by observing that this last is an inflammatory condition of the shoulder and contiguous parts, and is accompanied with a throbbing pain, which darts into the neighboring parts, constant, not progressing by jerks, and increasing or diminishing with slowness. There is pain on pressure, but it is more general than in neuralgia, also heat of

the affected part, and a constantly appreciable febrile reaction. Any movements give rise to pain, and at the termination of the acute stage, there frequently exists a stiffness of the muscles, and there is apt to be tenderness in the part during damp or rainy weather. There is also a pain coinciding with acute or chronic pleurisy, which may be confounded with neuralgia, but which is more of a rheumatic character; this pain may be seated at the anterior part of the articulation, and in the muscles of the posterior part of the shoulder as well as of the corresponding vertebral gutter,—it is increased by pressure on the affected parts, by great respiratory movements, and by very extended movements of the arm. The pain is continuous, and never assumes the rapid shootings of neuralgia.

4. *Neuralgia of the Lumbar* and Sacral Plexuses*, or Lumbar and

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**Pains of the Loins.* Dr. Oke, of Southampton, makes the following very just statements: "Perhaps there is no symptom more commonly met with in practice than pain in the loins, which is usually and at once attributed to bile, gravel, or rheumatism; but as it may be also derived from other causes left out in a hasty decision, I shall enumerate them, and endeavor to point out the symptoms by which each may be distinguished. . . . . In order to arrive at its true cause, we must endeavor to ascertain what function is principally involved, which will at once lead us to it.

"If the loin pain be *rheumatic*, it (the soreness) will be increased by pressure, and by the slightest action of the affected muscles. There will probably be also rheumatism in other parts of the body, the system will not evince much disorder, the urine will be high colored and deposit a sediment of urates. (In neuralgia, pressure over the origin of the nerves which are distributed to the loins, will increase the pains, rendering them much more severe. Besides, there may also co-exist neuralgia in other parts of the system.)

"If the loin pain be derived from the *hepatic function* irregularly performed, the pain will shoot upward along the splanchnic nerves to the scapulæ; the alvine evacuations will be either deficient in, or exuberant with, bile, or show a morbid quality of that secretion; the urine will have a bilious tinge; there may be congestion of the hemorrhoidal veins, and the spirits will be depressed.

"If the pain arises from disturbed *duodenal function*, three or four hours after a meal the pain will be aggravated, shooting through toward the right side of the abdomen, and remaining until the food has passed into the jejunum; dyspeptic symptoms will prevail, and sometimes there will be painful pustules or boils breaking out about the face.

"If the pain arise from the *kidneys*, it will shoot down the course of the spermatic nerves toward the round ligament in the female, and toward the testis in the male, which will often be retracted by the action of the spermatic nerves upon the cremaster muscle. There will be more or less irritation communicated to the mucous membrane of the bladder; in which case the urine will deposit mucous, calculous matter, blood, pus, or albumen, according to the nature of the case; or it may be otherwise morbid in its constitution.

"If the pain be from the *uterus*, then it will be more in the back, and will arise

Sacral neuralgia, embraces those neuralgic affections which are seated in the whole or in part only of the lumbar and sacral nerves, whether of the anterior or posterior branches of these nerves, of the superficial or cutaneous branches, or of the deep-seated plexus and the visceral branches. They include the ilio-scrotal neuralgia, sciatic neuralgia, crural neuralgia, neuralgia of the neck and body of the uterus, spermatic neuralgia or of the nervous filaments of the spermatic cord, lumbo-abdominal neuralgia, neuralgia of the urino-genital organs, and of the anus, etc., of writers.

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either from disordered function, or disease of that organ. In the first case, the pain will be more of a neuralgic character, will return in forcing paroxysms extending around the hips and hypogastric region, will frequently be attended with hysteria, as well as with increased menstrual discharge. In the second case, from disease of the uterus, the pain will be *constant* and severe, extending along the anterior crural nerve half way down the thighs. There will be a thin, offensive discharge from the vagina, and the countenance will be wan and sallow, exhibiting the wear and tear of organic lesion.

"If the pain be from the *colon*, there will be constipation, and inflation in the course of the bowel, or the fecal discharges will be of small diameter, or there will be soreness of the intestine under pressure, especially at its ascending or descending portions, accompanied by mucus, or shreds of lymph in the form of boiled vermicelli, among the excretions.

"If the pain be from *arterial dilatation*, an abnormal pulsation of the vessel involved—the aorta, for instance—may possibly be detected by auscultation in the incipient stage of the disease, *if such were suspected;* but in a large majority of cases such a cause may reasonably escape the attention of the ablest surgeon, from there being no tangible symptom that might lead him to suspect it; and even after the dilatation has considerably advanced, it may be sufficiently large to press upon and disturb the spermatic nerves, but not large enough to project and pulsate externally, and may, at this stage, be confounded with diseases of the renal function. This can be determined, however, as the aneurismal sac approaches the surface.

"If the loin pain be due to *disease of the spinal column*, the pain will be aggravated by percussing the spinous processes at this part of the spinal column, or by suddenly striking the toes against an uneven surface. There will be involuntary action of the muscles, especially of the flexors of the legs, diminished temperature, abnormal feelings, and more or less loss of power of the lower limbs. Should there be at the same time any unnatural projection of the spinous processes, the disease will be confirmed.

"If the pain be from a *collection of matter upon the psoas muscle, unconnected with spinal disease*, it will be dull, continuous, and deep-seated, extending from the loins down the psoas, or in whatever direction the matter may have taken its course. The pain will be aggravated by flexing the thigh toward the abdomen, and there will be difficulty in walking; moreover, there will be marks of a strumous habit, and more or less symptoms of hectic fever. Should any fluctuating tumor present at the groin, or at any other point where the matter may find its way out of the body, it will be conclusive as to the nature of the case."

In these forms of neuralgia, as in all others, it is important to distinguish between the spontaneous pains and those produced by pressure. The spontaneous pains are felt principally at the period of the paroxysms; they have that particular feature which has been designated under the names of numbness, pricking, cramp, and lancinating, and though very severe, they rarely cause the patient to cry out, but keep up a state of painful irritation, often preventing movements of the body, or compelling the patient to remain in a more or less bent position. Lumbar neuralgia is more frequently seated in the left than in the right side.

In connection with lumbar neuralgia, we frequently observe similar pains seated in other organs, especially facial and intercostal neuralgia, etc. In violent cases the pain extends to the other regions of the dorsal vertebræ, as, between the shoulders, and under one of the scapula, with a feeling of oppression perceptible only to the patient, or accompanied with a manifest acceleration of the respiratory movements, nervous palpitations, nervous vomitings, painful exaltation of the cutaneous sensibility of the loins, of the abdomen, and of the thigh of the affected side, extending to the nerves of the opposite side, which then present a certain number of painful points. In another moment there will be obtuse sensibility of these same parts, a persistence of pains in a very limited region, and which appears to be the commencing point of the neuralgia. The pains referred to above are evidently due to sympathy or to reflex action, and cease with the paroxysm that has given rise to them; in this way may be explained the extraordinary variations of extent and intensity of pains observed in lumbar neuralgia, depending upon whether our examination is made during the paroxysm or during the intervals.

Very frequently sensations of cold and burning heat in the painful parts will occur alternately; a feeling of vacuity, as if there were no longer an abdomen, and which females compare to the feeling experienced immediately after delivery. The pains occur at regular or irregular intervals, and the paroxysm may be preceded by dull pains so that the patient may predict its approaching return.

The pains produced by pressure are especially appreciable when the superficial nerves are affected; but they are much more rare and more difficult to verify in the deep-seated or visceral forms, although they form an important element in the diagnosis. These focal points are numerous and variable; they may be present a number of times with the same individual, follow each other in the course of the disease, or else occupy one single and invariable location.

According to the intensity of the disease, the period of the exam-

ination, and the length of time that has elapsed, the spontaneous pains as well as those produced by pressure, will be found, during the paroxysm, to occupy both sides of the pelvis, the loins, and the abdomen, without our being able to distinguish one region less painful than the other; but the paroxysm once passed, we can not find a single point sensible to pressure, so that, especially in cases of intermittent neuralgia, the patients often feel so well that they delude themselves with the hope that their malady will not return again. This intermittence of the pains is opposed to the idea of a sanguine congestion; but that which confirms the diagnosis is, that after a certain time has passed, we may detect those painful points which we failed to at the commencement. The principal focal points or pain-centers are the following:

The *posterior points* are often to the number of two or three, very limited, seldom complained of as being acute, the patient rarely speaking of them, and which, consequently, we can then only detect by the palpation. In this case, we will observe that pressure will elicit pain in one or several points, along the sides of the lumbar vertebræ, and, sometimes, the corresponding spinous apophyses are painful under pressure; the pain generally occupying a space about the size of a silver dollar.

The *iliac point*, at the center of the iliac crest, is often the only one pointed out by the patient, and is of small extent. It is important to be aware of its existence and to know its origin; otherwise we may be disconcerted by this pain, as we may not know what to attribute it to. It is outside of any uterine connection; it can not be referred to any intestinal malady; it is too low to be connected with the lungs or liver; and we will be unable to refer it to any cause, unless it be to lumbar neuralgia, of the existence of which disease, probably, we should otherwise have had no suspicion.

The *abdominal point*, at the inferior part of the rectus abdominis, has a particular importance in the differential diagnosis; it is generally very limited, and persists with great obstinacy; very often it alone occupies the attention, and we find, only by subsequent examinations, those of the loins and iliac crest which accompany it.

The *inguinal point*, near the inguinal ring, is also one generally pointed out by patients. The *labia majora point*, like the one preceding, is more subject to spontaneous pain than that caused by pressure, and consists of lancinating, smarting, burning pains, a kind of very painful cramp, without the least trace of inflammation. The *supra-pubic point* is more rarely observed; it disappears more rapidly than the others, and more frequently passes beyond the median line, so that it may be felt on both sides, above the pubis.

The *crural point* consists in acute pains which extend along the anterior and internal part of the thigh, which part is sensible to pressure throughout its whole extent, rather than at a limited point. This irradiation is generally temporary, and ceases with the severe paroxysms.

The *aortic point* belongs rather to sacral neuralgia. A very remarkable pain is observed in the epigastric region; upon applying the fingers upon this region we feel a very powerful pulsation, a violent shock caused by the aorta; these pulsations are very annoying to the patient, and are accompanied by an unique sound, heard upon auscultating, seeming like the first or systolic sound of the heart. Upon pressing the aorta so as to have these pulsations under the hand the patient complains of an acute pain, while, as soon as we quit the aorta to press upon the adjacent parts, there is no longer any painful sensation. Not only the trunk of the aorta, but its principal divisions, are the seat of these pains under pressure which are felt even to the loins. Such are the phenomena during the paroxysm; but in the interval the impulse of the aorta is feeble, even difficultly perceptible; the artery having manifestly diminished in volume, and the pain on pressure is nearly null.

The *sacral point* consists in a very acute pain under pressure of one or the other anterior half of the sacrum, and sometimes throughout its whole extent. This painful point may be readily ascertained in certain particular cases, where the abdominal walls are soft and very depressible, either from leanness, or after a recent delivery. However, when we are aware of the possibility of its existence, we may discover it more readily than may be thought. It is accompanied with spontaneous pains in the lumbar vertebræ, and at the posterior part of the thigh, and pain upon pressure over the sacral region, with weakness of the inferior extremities. Elevating the body of the uterus arouses the sufferings, probably because this organ is then made to press against the sacral plexus, the seat of the neuralgia. When palpation through the abdominal walls will not enable us to reach the sacrum, we may discover the sacral point by introducing the finger within the vagina, and pressing, not upon the uterine neck, but upon the sides of the vaginal cul-de-sac; we may thus excite an acute pain on the side affected with neuralgia.

The *uterine point* occupies the neck of the uterus in the absence of any inflammation of this organ. It has been supposed that the pain was exactly confined to that part of the neck situated on the side affected with the neuralgia, but it is difficult to satisfactorily ascertain this. Ordinarily, there is a sluggish condition of the neck, and an acute sensibility to pressure upon one of the sides of

the vaginal cul-de-sac, or else a very decided renewal of the sufferings, when the uterus is elevated by a very slight pressure. The patient complains of acute pain, and if we did not question her closely, we would be led to erroneously believe that the pain was seated in the place where we made the pressure. At the uterine point the pain is spontaneous, deep-seated, with acute and rapid lancinating radiations alternating with a momentary and complete calm; it has no exact seat, but darts in an obscure manner to the groins, the loins, the thighs, and the sacrum, coming on at times by violent paroxysms, which the patient compares to the early pains of labor. At the same time, the uterine neck is exquisitely sensible to the touch, so that the least contact will occasion a paroxysm, and which sensibility may extend throughout the vagina, rendering the introduction of the speculum impossible.

The *anal point* connected with sacral neuralgia, occupies the anus, which becomes so painful to the touch as to prevent the administration of injections; at the same time there are very acute, lancinating, spontaneous pains which will not permit the patient to remain seated, with most painful rectal tenesmus and repeated expulsion of fecal matters. These pains are distinguished by the absence of any appreciable lesion, and by the character of the pains which cease momentarily from time to time, or are replaced by neuralgic pains of the uterus, the vulva, or neighboring parts.

These are the principal points at which pain on pressure may be observed; they may be verified simultaneously or successively with the same individual, so as to constitute a general lumbar neuralgia; or, one region in particular may be the seat of the pains, so as to draw the attention of the physician exclusively to it, the other regions presenting merely some obscure phenomena calculated only to render the diagnosis clearer. For such cases, in order to obtain more exactness, we must not limit ourselves to characterize the disease as lumbar neuralgia, or sacral neuralgia, but should establish true forms, especially when there is reason to fear an error in the diagnosis. Thus considered, lumbar neuralgia may be divided into five forms, the posterior lumbar, the iliac, the abdominal, the supra-pubic, and the inguino-vulvar; sacral neuralgia into three forms, the aortic, the anal, and the uterine. There are some isolated forms, upon which I will now make a few remarks.

The *ilio-scrotal form*, which is characterized by a pressure continuous with spontaneous, lancinating pains through the urethra; pains in urinating which seem to commence at the external inguinal ring and dart into the testicle and the flank, sometimes into the thigh and knee, the chest, and the head, on the affected side

Painful points under pressure are also observed along the tract of the spermatic cord, and on limited portions of the epididymis, with often a swelling of the testicles. During the paroxysm sexual desires are often intense, with frequent pollutions.

The *vesico-urethral*, and the *urethro-vaginal* forms are connected with lumbo-abdominal neuralgia. There are acute and intermittent pains, in the labia majora and labia minora, the meatus urinarius, and the orifice of the vagina, with tenesmus and constipation, and not the least inflammation. This form may exist alone, but it is often complicated with pains in other regions animated by the lumbar nerves; in the more severe or acute stage there is frequent desire to urinate coming on suddenly; urine limpid and voided drop by drop or in small quantity, with a sensation of pain, heat, and smarting in the region of the bladder, and along the canal of the urethra, often extending to the vulva and the rectum, with painful discharges of gas, and also occupying the anterior part of the vagina, which is the seat of agonizing pains, even in the absence of the vesical tenesmus, together with congestion and temporary redness of these regions; paroxysms repeated from one minute to the other, and followed by a respite of several hours; sometimes, an irresistible expulsive sensation like that of labor, and often accompanied with cries; sometimes the patients remark that the sensation is as if everything was being expelled from the abdomen. When these expulsive sensations are renewed, they extend to the anus, with very frequent stools, but no change in the character or the consistence of the feces. These pains may last for several hours, and then completely disappear to return no more; or they may continue several days with alternations.

The disease may be chronic from the start, or it may follow the acute form. The pains are less acute, the patient is tormented with with a frequent desire to urinate, and more or less vesical pain, the paroxysm often terminating in vesical pain and repeated discharges of limpid, hot urine.

The *vesico-urethral form* with the male, is less common than the preceding; there are shooting pains, occurring at irregular intervals, sometimes dull, prickling, or tingling, at other times very acute, and which are increased by coition, by prolonged sitting, and by the motions of a carriage, and which are felt in the prostatic region, in the membranous portion of the urethra, but especially and very constantly in the glans; the jet of urine is regular, much more frequent than ordinary, and painful especially toward its termination. There also exists, much more frequently than in the healthy state, a spasm or contraction of the urethra during

catheterism, which renders the introduction of the catheter much more difficult for the operator, and more painful for the patient. Independently of the spasm there exists almost constantly a slight congestion in the neighborhood of the prostate as indicated by the necessity for strongly depressing the pavilion of the instrument, and the tinge of blood almost always observed upon withdrawing it.*

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*"There are five pairs of lumbar nerves and six pairs of sacral. The posterior lumbar and sacral are very small, and are distributed to the walls of the loins and of the abdomen, to the scrotum in man, and to the labia majora in women; they may be the seat of the neuralgia.

"The five anterior branches of the lumbar pairs are very large, and anastomose to form the lumbar plexus; this plexus, situated on the sides of the bodies of the lumbar vertebræ between the transverse apophyses and the fasciculi of the psoas muscle, is the seat of the neuralgic pains, either spontaneous, upon pressure, or upon movements of the body. The branches of the lumbar plexus are divided into collateral and terminal; the collateral branches are: 1. The abdominal, designed for the walls of the abdomen, and which we have frequently observed to be affected with spontaneous pains, as well as those upon pressure; (they comprise, the great abdominal branch known under the name of *ilio-scrotal*, because they send a small cutaneous branch to the pubic region; and the small abdominal branch which is equally lost in the skin of the pubis); 2. The inguinal branches, two in number, viz.—the external inguinal branch, designed exclusively for the external and posterior tegumentary regions of the thigh; the internal inguinal branch, which gives off several ramifications;—the internal or scrotal ramification which penetrates the inguinal canal, passes vertically downward, and is distributed to the skin of the scrotum in man, and to the labia majora in woman.

"We must bear this disposition in mind whenever we observe pains in the vulva, the labia majora, and the pubis, with woman, as these frequently occur in lumbar neuralgia; it is the analogue of that which has been described in man under the name of *ilio-scrotal*, except that it is much more frequent; and, whenever we notice such pains, without any appreciable morbid changes in the tissues, we must carefully examine if there do not exist neuralgic phenomena at other points animated by the lumbar nerves.

"The terminal branches of the lumbar plexus are, the obturator nerve, the crural, the large branch of communication of the lumbar with the sacral plexus, or the lumbo-sacral trunk. The obturator nerve is designed exclusively for the external obturator muscle, the three adductors, and the internal rectus. This distribution explains the difficulties which the patients experience in straightening themselves during a severe paroxysm, the obligation to walk bent over, or even to remain immovable in bed, the limbs flexed; and the possibility of walking without pain or even with a complete freedom from it in the intervals between the paroxysms.

"The crural nerve is designed for all the muscles in the anterior region of the thigh, and for the tegument of the same region, as well as for those of the leg and foot, and which will explain why the pains so often extend to the thigh, the knee, and even to the foot, the skin of these regions being of an exquisite sen-

Lumbar and sacral neuralgia may be determined from *morbid organic changes of the spinal marrow*, (especially chronic inflammation of the cord and its membranes), which are very obscure at their commencement, are much more rare than the neuralgiæ, are seldom limited to the lumbar region, and give rise to symptoms in the dorsal region, and especially in the cervical region and in the brain. When there are symptoms of even incomplete paralysis of sensation and motion in the inferior extremities, the bladder, and the rectum, with spasmodic movements, there can not be an error in the diagnosis, as these symptoms never exist in lumbar neuralgia. Organic lesions of the cord are often very obscure; at the commencement, there is a sense of fatigue and dull pains in the limbs with periods of acuteness. These pains are distinguished from those of neuralgia by their being commonly on both sides, extending to both inferior limbs, and by being constantly accompanied with rigidity of the muscles of the loins and legs. They are not increased by pressure, as in neuralgia, or else there is a general exaltation of sensibility, especially in the legs. These signs usually suffice. But it may be remarked that if rheumatic affections of the vertebral column have been confounded with

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sibility to the touch during the pains, and sometimes in a state of anæsthesia during the interval.

"Of the six anterior branches of the sacral pairs, the first four are joined to the large lumbo-sacral trunk which comes from the lumbar plexus, forming, by their anastomoses, the *sacral plexus;* behind, it is in correspondence with the pyramidal muscle, and in front, with the hypogastric vessels which separate the plexus of the rectum, and of the peritoneum. The last two anterior sacral branches are very delicate, and of little importance. The sacral plexus gives collateral branches, and one terminal branch which is the sciatic nerve.

"The collateral branches are, the visceral branches which are distributed to the rectum and the bladder, in man, and to the vagina and the bladder in woman; there are also numerous branches which communicate with the hypogastric plexus. The other branches are distributed to the muscles of the hypogastrium, the levator ani, the internal obturator, the sphincter ani, the scrotum, to the labia majora in woman, to the muscles of the perineum, and of the penis, to the integument of these organs, to the glutei muscles, the quadratus, the gastrocnemii, to the region of the nates and its integument.

"This disposition thoroughly explains why the pains are so frequent at the anus, the urethra, the bladder, the vulva, the vagina, and the region of the nates, as well as the rectal and vesical tenesmus, so frequently pointed out as symptoms of this form of neuralgia, (*sacral neuralgia*). The hypogastric plexus which overruns the ventral aorta and its divisions with its ramifications, being constituted in part by the great sympathetic, and by the collateral branches of the sacral plexus, we may comprehend how sacral neuralgia may be complicated with aortic pulsations of great intensity, as is frequently observed." (*Neucourt.*)

inflammations of the cord and meninges, at the commencement these neuralgiæ may also occasion mistakes, by presenting accompanying symptoms, such as accelerated respiratory movements, spasmodic movements, palpitation of the heart, general debility, etc.

From *rachidian congestion* or *hyperæmia, and spinal irritation*, which present such obscure symptoms as to render it difficult to establish the differential diagnosis with lumbar neuralgia. That which is termed spinal irritation may frequently, from want of proper investigation, be only a dorso-intercostal, or a lumbar neuralgia.

These maladies should be investigated with the utmost care, not omitting a very thorough examination in order to determine the points of spontaneous pain, and of that produced by pressure. The presence of congestive symptoms, and the continual pain, soreness, and debility, often increased upon exercise, may lead us to suspect the case not to be a neuralgia. Yet we may have a complication of neuralgia and congestion.—In rachidian congestion we observe very manifest congestive phenomena, which may exist from the commencement of the disease, giving rise to pains throughout the lumbar region, the abdomen, the flanks, and the thighs of both sides, which are aggravated during menstruation, then gradually diminish, remaining on one side, and finally presenting indubitable evidence of neuralgia, the commencing point of which was, probably, in the rachidian congestion. In other cases the neuralgia exists primitively, but it is aggravated by a rachidian congestion, which often gives rise to pain in the lumbo-sacral region, masking the symptoms proper to the neuralgia, which reappear at a later period, when the congestion is dissipated.

From *chronic metritis* in which the inflammation is reflected upon the lumbo-sacral nervous system, occasioning pains in the loins, groins, and thighs, and may give rise to a temporary neuralgia. In lumbar neuralgia the pains are very acute and alternate with a complete calm; the paroxysms occur with regularity in certain cases, and we may determine the exact seat of the points painful on pressure. This differential diagnosis is very important as regards treatment, for should there even be a chronic metritis complicated with lumbar or sacral neuralgia which we have erroneously considered as forming part of the uterine disease, we may not employ means to remove the neuralgia, and thus allow the patient to suffer for a long time; while, if we recognize the true character of this complication, we will employ the proper means for each disease, and will not become disconcerted by the presence of very painful but temporary symptoms, which appear or disappear notwithstanding

the stationary condition of the metritis, and the urgent demands of the patient for their removal. I refer here to the differential diagnosis when both diseases exist simultaneously; but there is still greater danger to avoid, and that is not to mistake a lumbar neuralgia for a chronic metritis.

Lumbar neuralgia is an affection but little known, and to which attention is seldom drawn; the signs by the aid of which we diagnose it with precision demand a careful *manual* examination, as we can not determine it by the patient's description. When she complains of pains in the loins, groins, and abdomen, our attention is usually directed to the uterine organs. We may now find either leucorrhea, or a slight increase in the size of the uterine neck, a little redness, perhaps, some granulations; and we are too often satisfied with these insignificant symptoms, wrongfully considering all the other symptoms as being produced by the supposed metritis.

From *ovaritis.* The ovary has no nervous relation with the abdominal wall, and if we find a limited point, of small extent, painful under pressure, seated at the lower part of the abdominal rectus muscle, the adjacent parts being wholly indolent, without any appreciable tumor, we must refer the pains to a lumbar neuralgia, and discard the idea of an ovaritis. This neuralgic pain is more commonly on the left side.

From *phlegmonous inflammation of the broad ligaments.* In neuralgia the pains are lancinating, intermittent, dart on one side especially, and occupy the exact points painful under pressure. In the phlegmonous inflammation there also exists pain upon pressure in one of the sides of the vaginal cul-de-sac, but at the same time there may be observed a small tumor, in the painful region, independent of the uterus, or, at least a hardness of the tissues which does not exist in the opposite side; the pains are dull, heavy, continuous, and often severe on both sides.

From *anteversion of the uterus*, which is more frequent among women who have given birth to children, and which usually occurs in an upright position from prolonged walking, or the succussions of a carriage, or the exertion of any sudden force while the bladder is empty. The symptoms are better when the patient lies down; and a vaginal examination will detect the anteverted organ. In neuralgia (vesical) the frequent desire to urinate is also present, but it exists independent of lying in bed or in a state of rest; anteversion may occur with any constitution, while neuralgia most commonly attacks pale, chlorotic, nervous, hypochondriacal females, or who are subject to pains in various parts of the body.

The most valuable sign is the normal situation of the uterus in neuralgia, its displacement in anteversion.

From *vaginal cystocele* which may be very easily confounded with vesico-urethral neuralgia, as its most frequent and inconvenient symptom is frequent emission of urine. In order to distinguish these two affections an examination of the genital organs is necessary. In neuralgia the organs are healthy and in their normal situations; in cystocele the patient complains of a swelling which projects between the labia minora. This sign is not sufficient, for in vesical neuralgia, and in simple inflammation of the meatus urinarius, the patients complain of a similar sensation as if a body were about to escape from the parts. The patient must be examined standing, the legs separated, requesting her to bear down a little. If the case be cystocele, we will perceive a reddish, ovoid, soft, elastic tumor, easily reducible, about the size of an almond or of an egg, formed by the prolapsus of the bladder. Sometimes the cystocele is not sufficiently advanced to project externally; we may then find the soft vesico-vaginal wall forming a considerable prominence in the vagina. Cystocele, again, seldom occurs except as a consequence of labor, while neuralgia may exist among virgins and sterile females; the first comes on slowly and is increased by long walks, or active exercise, and the pains are not severe unless the frequent contact of the urine causes an inflammation with swelling around the meatus urinarius; the latter comes on in paroxysms with darting pains.

From *foreign bodies in the bladder and urethra*, as calculi, pins, needles, etc., which may occasion acute pains in urinating, and may be detected by questioning the patient, by the commemorative symptoms, and by an examination with the sound or catheter.

From *cystitis and urethritis* in which there are acute pains in urinating, the same as in neuralgia, but, inflammation is manifested by redness, tumefaction of the urethral canal and of the meatus, with red and turbid urine, and a muco-purulent secretion; the pains are also throbbing, or become acute only when urinating, while in neuralgia they are darting and occur in paroxysms. In the male a urethral neuralgia often occurs after sexual contact, accompanied with a constant titillation, continual formication in the urethral canal, in the seminal vesicles, and in the neck and body of the bladder, and an undulatory rotation of the testicles, with frequent desire to urinate, and a slight sensation of tension and itching the whole length of the canal; this has been termed *dry blennorrhagia*, *dry gonorrhea*, and "extraordinary sensations of the urethral canal, the testicles, and the bladder, following a gonorrhea."

From *vascular tumor of the meatus urinarius*, by an examination of the parts; although the tumor and the neuralgia may co-exist independent of each other.

From *aneurism of the aorta*, by observing that in aneurism we can not feel the diameter of the artery, while in neuralgia this vessel has its normal diameter at all points, and when the impetus of the artery is increased by the neuralgia, the artery is painful under pressure even in its ramifications, to the exclusion of the neighboring parts. The excessive pulsations are not constant, and when we examine the patients at various times, we will ascertain that sometimes there is neither increased impetus nor particular pain under pressure, the aorta itself being difficult to find and to define. Besides which, in neuralgia, there is almost always some other neuralgic point in the loins or in the abdomen. When gas is confined in the arch of the colon, or in the duodenum, and at the same time the aorta, by its energetic action, simulates aneurismal pulsations, it is very difficult to form a correct diagnosis—for we will be very apt to mistake such a condition for aneurism.

As a general rule the *prognosis* of neuralgia is favorable, more especially when it is treated in its earlier periods; but when complicated with some organic lesion it becomes difficult of cure, and may terminate in epilepsy, mania, apoplexy, paralysis, or death.

There are no *pathological appearances* peculiar to neuralgia. In many instances the disease may have continued for many years without any appreciable lesion being observed; or, should there be any, they will be those of some affection complicating, or producing the neuralgia, as tumors, exostosis, ossific deposits, etc., of the brain, or its membranes, or arteries, injection and enlargement of the capillary nerves, thickening of the connecting tissues, etc.; and, in some instances, they are the results of morbid changes effected by the severe sufferings of the patient influencing the circulation in the brain, or in other organs, etc.

The *treatment* of neuralgia, will greatly depend upon its location, its cause, and its complications; general, as well as local means, are usually employed, the former proving the more efficacious in by far the greater number of curable cases.

The treatment of neuralgiæ in general, and which I have found adapted to the greater number of cases, is, to keep the bowels regular, to neutralize gastric acidity, or other digestive derangement, and to administer such tonics as may be indicated; for which purpose the Compound Powder of Rhubarb, or, the Compound Powder of Charcoal may be administered daily, with the addition, to each dose, of such vegetable tonic, or chalybeate, as the case may

require. The skin should be kept in as normal a condition as possible by the means heretofore recommended, not forgetting to make use of the Spirit Vapor Bath, not only during the paroxysm, but also during the intervals when these are lengthy, as often as once every week or two, each time producing free perspiration; the kidneys should also be kept in a proper condition by the use of non-stimulating diuretics. An attention to diet is very important, avoiding everything that will oppress the stomach, or occasion acidity, flatulence, irritation, or constipation, or in any way disagree with the patient. Exposures to cold, damp, sudden changes and malarial districts, must be avoided, as well as depressing causes, either mental or physical, and the body should be kept clad comfortably warm. Moderate exercise in the open air, a pure, dry, warm atmosphere, and temperate living will be found of great efficacy in aiding the cure.

In facial neuralgia a Belladonna Plaster should be applied behind the ear over the mastoid process of the affected side, while at the same time a Belladonna Liniment, or some sedative lotion, should be well rubbed along the course of the affected nerve, and over its tender or painful points; this course should be continued for a reasonable length of time, and then, if no benefit be derived therefrom, a Compound Tar Plaster must be substituted for the Belladonna Plaster behind the ear, and a discharge be kept up from this place for as long a period as the patient can bear,—re-applying the plaster after a short interval should the cure not be permanent. If the neuralgia be in other parts of the system, the Belladonna, or, the Compound Tar Plaster must be placed over those parts of the spinal column that are sore, tender, or painful on pressure, and the sedative lotion be applied along the course of the affected nerve branches and over its painful points.

Internally, one of the following preparations may be administered, according to the scrofulous, rheumatic, or anemic condition of the patient:

1. Take of Sulphate of Quinia one scruple, Elixir of Vitrol one fluidrachm, dissolve the Quinia, and add Tincture of Black Cohosh one fluidounce and a half, Tincture of Aconite Root two fluidrachms. The dose is twenty drops every two hours, in half a fluidounce of water, continuing its use daily until the disease is cured. If, after using this for three or four weeks, no amelioration is effected, it should be omitted; it is especially adapted to rheumatic, malarial, and regularly periodical cases. 2. The Compound Pills of Ferrocyanuret of Iron, in anemic, chlorotic, and periodical cases. 3. In scrofulous cases, the following may be

employed: Take of Bromide of Potassium three drachms, Carbonate of Iron two drachms, Pulverized Digitalis one drachm and a half, Alcoholic Extract of Conium Maculatum two drachms, Simple Syrup, if required, a sufficient quantity; mix thoroughly together, and divide into sixty pills, of which one pill is a dose, to be repeated three or four times daily.

Neuralgia, due to osseous tumors, cerebral or other diseases, as, gout, rheumatism, syphilis, etc., structural lesions of the nerves, uterine, or other irritations, etc., can not, as a general rule, be benefited until such disease, whatever it may be, is first removed by appropriate treatment; and, in all cases of neuralgia, especially when very obstinate, the physician should be as thorough as possible in his investigations, that he may ascertain the existence of any lesion to which the neuralgia may be attributed with a degree of certainty. In a few cases, division of the affected nerve has been followed by permanent relief; but this is the exception and not the rule, as, in the majority of instances the disease returns as severe as ever. And this should be expected, as the cause of the disease rarely exists in the portion of the nerve that has been divided, but is generally due to lesion or derangement of some distant point, perhaps not safely within reach of the surgeon's knife. Neuralgia after amputation is seldom cured; it has, however, been occasionally benefited by acupuncture, and the internal use of sedatives and quinia.

Various other means have at times proved efficacious, and to which I will now refer. During the paroxysm of facial neuralgia, take upon the moistened extremity of the finger, one-third of a grain of finely powdered Hydrochlorate, or Acetate of Morphia, and rub it upon the gums of the affected side for several minutes, the patient inclining his head on that side, so that the gums may be bathed by the saliva for five or ten minutes, and which saliva he eventually swallows. If the pain is relieved, this will do; if not, a second application may be made in the same manner in about four hours after the first application, and, if required, a third may be used in four hours after the second; but it is better not to use the third application, except in cases where the pains are very intense, and have not been relieved. If there is a diminution in the pains, or the patient experiences narcotic symptoms, as, giddiness, faintness, a strong desire to sleep, or nausea, we must on no account repeat the dose. The best effects are obtained from this medication when the neuralgia is seated in the vicinity of the gums and jaw; the results are less effective when the temple, the eye, eyebrow, or ear, are the seat of the pain, in which cases, the

Morphia may be used by hypodermic injections. In many cases, warmth applied, either by means of hot flannels, or, by frictions with the Compound Tincture of Camphor, will be found useful, especially in cases attended with general debility; the warmth acts as a stimulant, giving to the nerve that degree of irritability which it requires.

The physician should be careful about extracting teeth during pregnancy, as facial neuralgia at this period is often due to uterine irritation, and should be relieved by anodyne applications, or leeches.—As worms in the intestinal canal may give rise to neuralgia, or render it obstinate to treatment, the practitioner will do well to bear this in mind, and adopt the necessary measures whenever required.—Dr. Craig, in facial neuralgia, inserts two or three needles near to where the supra-orbital-nerve issues above the eye, and the pain is frequently relieved, as if by magic; he considers the neuralgia, in such cases, as due to a superabundance of nervous fluid in the affected nerve. Dr. McCourty has cured the neuralgia by hypodermic injections of a solution of Strychnia along the course of the facial nerve, between its exit at the stylo-mastoid foramen and its passage to the neck of the condyle of the lower jaw. A few drops to be injected at a time, and repeated every two or three days. He has also cured paralysis of a year's standing, by similar injections over the lower extremity of the spinal cord.

In neuralgia of the scalp, topical applications are difficult to make, and, as a general rule, are of but little efficacy when applied; acupuncture, the needles being kept in their place for an hour at a time; the pommade of Gondret to the top of the head; cold affusions to the top of the head, the patient being in the bath at the time of the affusion; emetics; division of the branches of the occipitalis major, making the incision on both sides down to the bone, and about two inches in length, and then applying caustic from time to time to the wound, so as to keep up a discharge for three or four consecutive weeks; have been found successful in many instances, especially when aided by counter-irritation over the tender parts of the spinal column.

In neuralgia of the lumbar and sacral plexuses, narcotic injections, or the introduction of a small quantity of Opium, or of Extract of Belladonna, into the rectum or vagina, will frequently be found useful, aided by such internal remedies as are indicated by the condition of the patient, as preparations of Iron in anemia or chlorosis; Iodide of Potassium, Guaiacum, Compound Tincture of Colchicum, etc., in cases where a rheumatic principle is sus-

pected; uterine tonics, where uterine irritation is present; urethral injections of Belladonna Extract and Glycerin, where there is urethral neuralgia with vesical tenesmus, etc., and which should be aided by occasional catheterism, or the repeated introduction of bougies into the urethra. In one case of uterine neuralgia, attended with intermittent pains resembling those of labor, the patient being in great agony during the paroxsyms, considerable relief was obtained by the use of opium suppositories introduced into the vagina; but finally these ceased to produce any benefit, and the pains continued, occurring regularly every day, remaining for four or five hours each time, and defying all the measures employed; I, therefore, as a dernier resort, ordered leeches applied to the groins, and, to my great surprise, a prompt and permanent relief occurred, the patient not having had an attack since, some two years. Although not certain as regards the matter, still I am disposed to believe that, in this case, the female was in the first month of pregnancy, as there was a flow of blood for some time after I first saw her, and she informed me that a strange-looking substance had passed before I was called to attend her. In another, a case of urethro-vaginal neuralgia, attended with vesical tenesmus, a solution of Nitrate of Silver applied to the vulva and to the walls of the urethra, together with the internal use of Oil of Turpentine, as well as rectal injections composed of a tablespoonful of Oil of Turpentine rubbed up with a sufficient quantity of the Yolk of Egg, repeating it once per day, effected a permanent cure.

In neuralgia of the brachial plexus, sedatives are frequently useful when applied locally, as Belladonna, Opium, Conium, etc., in the form of ointment, liniment, or plaster. Five or six grains of Sulphate of Morphia rubbed up with one ounce of Oil of Sweet Almonds, or of Glycerin, furnishes a very excellent local application. But these are apt to fail with vigorous and plethoric individuals, as well as in cases where there is a tendency to febrile symptoms. In many instances revulsive measures will prove advantageous, as Croton Oil Liniment, Compound Tar Plaster, etc. Shampooing, acupuncture, electro-puncture, and the application of heat, have all been occasionally successful; leeches applied in the neighborhood of the painful part, have likewise been followed with advantageous results. A liniment or ointment of Aconitine or of Veratrine, used as an external application, is very useful in this variety of neuralgia.

The local application of Chloroform has proved promptly efficacious in removing the pain when applied as follows: Moisten a small circular piece of lint, two or three inches in diameter, and

apply it at once to the affected part, then cover this with a concave watch-glass, and keep it in close contact with the skin by means of the open hand applied over the glass. The heat of the hand facilitates the evaporation of the chloroform. A gradually increasing burning sensation will be experienced by the patient, for about five minutes; and in from five to ten minutes considerable irritation will be produced, and all local pain will be removed. This may also be used in rheumatism, and other painful external affections. It reddens the skin, and is followed by desquamation, or a dark brown stain, which disappears after ten or twelve days.

Of late years, hypodermic injections have been employed, and found very valuable; although not always effecting permanent cures, they afford great relief in most cases. They appear to exert a prompt influence in relieving the pain, and are coming into general favor among the profession. I have known daily hypodermic injections of a Solution of Morphia, continued for a month, to effect permanent cures of very obstinate painful affections. The agents that have been used, are the Acetate, Hydrochlorate, or Sulphate of Morphia, in concentrated solution, and a Solution of Sulphate of Atropia, six grains to the fluidounce of Distilled Water; five drops of this solution is equal to one-fifth of a grain of Atropia. From one-half to one grain of one of the Salts of Morphia, in solution, is used (according to the severity of the case and accompanying circumstances) at one injection; or from one-tenth to one-twentieth of a grain of the Atropia solution, repeating the injection as often as required. Should any of the symptoms of poisoning by Opium follow the Morphia injection, combat them by the internal administration of Belladonna; and should any of the symptoms of Belladonna poisoning follow the Atropia injection, they must be overcome by the internal use of Opium. The Atropia is less apt to irritate than the Morphia solution. Hypodermic injections are administered with small graduated syringes, to which are attached hollow needles of steel; a fold of the skin is to be pinched up between the index finger and thumb, so as to hold the part beyond tense, then the needle, held perpendicular to the part, is introduced with a steady, rapid movement into the tense part, after which any desired direction may be given to it; the required amount of fluid having been injected, the needle is withdrawn, and a finger pressed for a short time upon the puncture, in order to prevent the escape of the injected fluid. The effect is usually prompt. If the injection has to be repeated, it will be better to pass it into another adjacent part, because repeated introductions into the same point is apt to induce local inflamma-

tion, nausea, effusion of blood, and abscess. These injections may also be used in cases of wakefulness, delirium, mania, where the stomach is irritable, and when the patient refuses to swallow. They should not be used when cardiac diseases are present, or when neuralgia is due to cancerous affections, etc. I have employed these injections successfully in a number of instances. In neuralgia, the nearer the seat of the pain the injection is made, the more beneficial will be the result. M. Luton, of Rheims, has cured several cases of sciatic, intercostal, and other forms of neuralgia, by hypodermic injections of a more or less concentrated solution of Nitrate of Silver.

Among the internal agents that have been employed in the treatment of neuralgia, the following have been found the most efficacious: 1. Croton Oil in doses to cause a purgative effect, has been found especially useful in facial and sciatic neuralgia. 2. Strychnia has been beneficial in cases where there is no mechanical irritation affecting the nerve at its origin, or along its track, and when there is no cerebral or spinal disease. 3. Valerianate of Zinc, in doses varying from half a grain to two grains, repeated two, three, or four times a day, has proved efficacious in cases not depending upon any organic cause; it has also been of value in epilepsy and satyriasis—and is best administered in pill form. 4. Lartigue's Pills have been recommended; they are composed of Alcoholic Extract of Sabadilla thirty-one grains, Barbadoes Aloes, pure Scammony, each, fifty-five grains; mix thoroughly, and divide into one hundred and ninety-two pills. The dose is two pills every six hours until a purgative effect is produced, and subsequently administering them in doses to keep the bowels moderately purged. 5. Pierlot's Solution of Valerianate of Ammonia, given in doses of three spoonfuls per day. 6. Concentrated Tincture of Gelseminum in doses sufficient to produce its peculiar effects. 7. Meglin's Pills, composed of equal parts of Extract of Hyoscyamus, Oxide of Zinc, and powdered Valerian; when continued for any length of time they occasion violent and persistent gastric pains. 8. Take of Sulphate of Quinia ten grains, Iron Filings thirty grains, Extract of Valerian fifteen grains; mix, and divide into twenty pills, of which the dose is two pills every two hours. 9. Take of Extract of Belladonna fifteen grains, Sulphate of Morphia three grains, Strychnia two grains, Capsicum thirty grains, Sulphate of Zinc fifteen grains, Extract of Hyoscyamus a sufficient quantity to form thirty pills; the dose is one pill, to be repeated three times a day. 10. Saturated Tincture of Arnica Flowers one ounce and a half, Tincture of Aconite three drachms,

Tincture of Gelseminum six drachms; mix. I have found this very valuable in some cases, in doses of half a drachm every three hours. 11. Another very excellent preparation is composed of two parts, each, of Extracts of Valerian and Henbane, and one part, each, of Extract of Aconite and Sulphate of Quinia, forming the mass into four-grain pills, of which one may be given every three or four hours. 12. Take of finely powdered Hydrochlorate of Ammonia two drachms, Ferrocyanuret of Iron eight grains, Sulphate of Quinia four grains, Camphor two grains; mix thoroughly together, and divide into four powders, of which one is to be administered every one, two, three, or four hours, according to the severity of the attack. At the same time apply the Belladonna Plaster, or the Compound Tar Plaster, to the points painful upon pressure; generally, three powders will effect the cure, when the disease is not due to structural lesion. 13. When the neuralgia is due to a gouty or rheumatic principle, the following is considered excellent: Take of Tincture of Colchicum, Tincture of Aconite Leaves, each, four fluidrachms, Ethereal Tincture of Belladonna eight fluidrachms; mix; the dose is from six to ten drops every six or eight hours, in an ounce of Water. 14. Take of Strychnia two grains, Phosphoric Acid one fluidounce; mix. To twenty minims of this solution, add Sulphate of Magnesia half an ounce, and Peppermint-water six fluid ounces. The dose is from four to eight fluidrachms, two or three times a day. 15. Take of Formic Ether two parts, Formiate of Quinia one part, Distilled Water ninety parts, Syrup of Codeia thirty parts; mix. This is said to have proved effectual in very severe and obstinate cases, in doses of a fluidrachm repeated every hour or two. 16. Take of Potassio-tartrate of Iron two scruples, Wine of Opium eighty minims, Cinnamon Water eight fluidounces; mix. The dose is one fluid ounce, repeated three times a day.

Among the external applications are the following: 1. Take of Aconitine eight grains, Lard, or Oleic Acid one ounce; mix, and rub a small quantity over the affected part with considerable friction, being careful not to apply it over abraded or excoriated parts. 2. Take of Veratria one grain, Lard, Glycerin, or Oleic Acid, twelve grains; mix well together. Rub upon the affected parts for fifteen minutes, or until a rash, and a tingling sensation are produced,—repeat the application three or four tims a day. 3. Take of Chloroform, Fluid Extract of Aconite, Tincture of Camphor, Laudanum, each, equal parts; mix. Rub well over the affected parts, then lay over them a piece of lint moistened with the above, and cover so as to prevent its evaporation. 4. Take of

Extract of Belladonna one drachm, Lard one ounce, mix well together, and add Chloroform two drachms. 5. Take of Croton Oil, Oil of Turpentine, Oil of Sassafras, each, two fluidrachms, Olive Oil two fluidounces; mix. Rub over the painful parts two or three times a day. 6. Take of pure Chloroform four fluidrachms, Cyanide of Potassium two and a half drachms, Lard three ounces, Wax, a sufficient quantity to give consistence. Rub a piece about the size of a pigeon's egg into the scalp, and then cover the head with oil-silk; in facial neuralgia, rub it in over the affected nerve, and repeat it according to circumstances. 7. Apply the vapor of Bisulphuret of Carbon over the tender points. 8. Rub the painful part with Alcohol, and then rub in three or four drops of pure Conia, and cover with oil-silk. 9. In uterine neuralgia, apply the vapor of Carbonic Acid to the uterine neck, for about half a minute or a minute at a time. 10. Take of Formic Ether five fluidrachms, Morphia four grains, Essence of Mint two and a half fluidounces; mix, and rub over the painful points. 11. Take of Hydrocyanic Acid, Glycerin, each, one fluidrachm, Aconitine one grain; mix, and apply over the painful parts with a camel's hair pencil. 12. The continuous galvanic current has proved decidedly beneficial in many instances where the disease is due only to nervous mal-nutrition, not connected with cerebral or spinal disease; in such cases a Pulvermacher chain may be worn. The interrupted current is useless, and frequently aggravates the sufferings of the patient. Neuralgia caused by wounds or organic lesions of nerves or of neighboring parts can not be cured by electricity or galvanism; these agents are only beneficial when the neuralgia is of a rheumatic character, and when there is a mere morbid exaltation of sensibility.

Neuralgia from neuroma requires to have both the tumor and portion of nerve upon which it is seated removed by an operation.—If the neuralgia occur in a cicatrix, it may be due to exposure of a nervous fibril; by exsecting the cicatrix the nerve-twig may be removed also; or, the application of Caustic may, with promotion of subsequent suppuration, effect a similar result.—When an obstinate neuralgia is accompanied with a urinary deposit of oxalate of lime, it will be necessary to administer Nitro-muriatic Acid internally, keeping the bowels regular, using the shower bath, and, if possible, traveling, or changing the residence from city to country and vice versa. In this case, a sedentary life must positively be avoided. If, after the oxalic deposit has been removed, the neuralgia still remains, then adopt the measures heretofore advised.

When neuralgia attacks the throat or larynx, giving rise to what is sometimes termed a *nervous sore throat*, it is accompanied with more or less acute pain along the front part of the neck and throat, which may extend to the sternum, and the fauces frequently have a sense of constriction as if a string were tied around their back part. Sometimes the pain is accompanied with spasm of the muscular fibers, and may be mistaken for spasm of the glottis. As seen by the larynyscope, the larynx is in a perfectly normal condition. Bromide of Ammonium may be employed both locally and internally. Or, Aconitine Ointment may be rubbed along the seat of the pain, and some of the other measures already named for the removal of neuralgia in other parts be adopted.—In all cases of neuralgia, acidity of the stomach, when present, must be corrected by alkalies or absorbents, and tonics.

VERTIGO.

Vertigo, giddiness, or swimming in the head, is a morbid condition characterized by a peculiar sensation, in which it seems to the patient as if everything was turning around him, while himself was turning around at the same time. This sensation may occur either standing or sitting, but more commonly while standing, and usually disappears on lying down. When standing, the patient feels as if he would fall, and grasps or rests upon some near object to prevent it; when the limbs give way, as sometimes occurs, then the patient falls, and at times with considerable violence, as if rudely knocked or pulled down. Loss of consciousness rarely occurs, except in the epileptic vertigo. Vertigo is ordinarily accompanied with paleness of the countenance, a difficulty or even impossibility of speaking and of moving the limbs; sometimes involuntary evacuations of the bladder and rectum take place. The duration of the attack is generally very short, being only a few minutes; if it exists over fifteen minutes, with syncope, the prognosis is very unfavorable, all things else being equal.

Vertigo occurs in various conditions of the system, and may be divided into, 1st, idiopathic or nervous, unaccompanied with any appreciable lesion of the brain; 2d, sympathetic, or that which, without any appreciable lesion of the brain, is due to disease of some other organ, as, dyspepsia, menstrual derangements, etc.; and 3d, symptomatic, or that which is due to a morbid organic change of the brain. From these, two fundamental forms may be established, viz.: nervous vertigo, or that without morbid condition of

the brain; symptomatic vertigo, or with organic lesion, including vertigo from anemia, and that from plethora, in which a particular agent, the blood, determines the vertigo by modifications in its quantity, and in its constituent elements.

1. *Nervous vertigo* is frequently an insignificant condition, which may appear and disappear under the slightest causes, and even without any appreciable cause, at longer or shorter intervals. It may be caused by swinging, the motions of a vessel, see-saw, by being in an elevated situation, by strong moral or physical impressions, close mental application, gastric derangements, confined rooms, use of narcotics, alcoholic or fermented liquors, worms in the intestinal canal, etc. Nervous, hysterical, and hypochondrical persons are especially subject to vertigo, which frequently accompanies facial neuralgia and neuralgia of the scalp. Vertigo frequently precedes an epileptic attack, sometimes for several years previously; in some cases the patient will be stopped in the midst of a sentence for a short time, which sentence he will subsequently finish as if nothing had occurred, being unaware of the interruption. Epileptic vertigo may be suspected when the interruption in conversation occurs, as above referred to, and when it returns, without being due to any appreciable cause, as, the vapor from charcoal, odor from flowers, pregnancy, loss of blood, sudden fright, etc. All irritations of the digestive tube, chronic inflammation, or an acrid, rheumatic, erysipelatous or herpetic principle, may sympathetically irritate the brain and produce nervous vertigo. Dyspnæic and nervous affections of the bronchia, and lungs, often give rise to vertigo. In nervous vertigo the pulse may remain natural, or be feeble and quick.

2. *Vertigo produced by plethora*, is often accompanied with other symptoms, as dazzlings, tinnitus aurium, deafness, slight derangements of vision, of numerous white or red scintillations, a flushed appearance of the countenance, red and injected eyes, strong and full pulse, rather slow than accelerated, sleep more prolonged and heavy than in health, just the opposite of nervous vertigo. These symptoms are increased by heat, by a stimulating diet, by late rising, by motion, and especially by stooping over, or by the horizontal position which favors the determination of blood in the vessels of the head; they occur among young and vigorous subjects, and more particularly among those disposed to cerebral congestions. In the unfavorable cases there is a heaviness of the head with somnolence and tinnitus aurium, which persist until removed by treatment; in the serious cases, there is momentary embarrassment of speech, cramps and formication, more marked on one side

than the other, a loss of consciousness, or else a sensation of numbness in all the limbs, because the cerebral congestion is general and not limited to one portion of the brain as in hemorrhage. In rare cases, loss of sight, hemiplegia, or even death may occur. Vertigo from plethora may also follow the suppression of a customary flow, as, piles, menstruation, epistaxis, etc., and may be present from pregnancy, residence in confined places, hot baths, exposure to the hot rays of the sun, as well as to intense cold. The immoderate use of fermented drinks is a frequent cause of this vertigo, as well as of meningitis and ramollissement; so likewise is the use of the water of warm mineral springs, whether used as drink, or in baths or douches.

3. *Vertigo produced by anemia*, is accompanied with pale countenance, buzzing or whistling sounds in the ears, emaciation, small and rapid pulse, abnormally slow when the vertigo is accompanied with a partial syncope, slight bloating of the face and other parts of the body, palpitations, shortness of breath, temporary loss of sight, and a blowing, humming, or musical noise in the blood-vessels of the neck, on auscultation. This form of vertigo may occur from profuse hemorrhages, insufficient food, excessive fatigue either of mind or body, from chlorosis, as well as when the general health has become impaired by a chronic disease, scrofula, cancer, tubercles, etc. Sometimes, persons who remain long in the bath, suffer from vertigo, with temporary loss of sight, owing to the diminished flow of blood to the brain, and the consequent want of stimulus to this organ; this, is very apt to occur among persons who thus bathe with empty stomachs. Between nervous and anemic vertigo there is a close correlation, especially in the different cachexias and affections that act simultaneously on the blood and the nerves.

4. *Vertigo produced by an organic cerebral lesion*, is very intense and obstinate, and often precedes, even for several years, the other symptoms of the brain disease; other phenomena may exist simultaneously with the vertigo, as, dazzlings, dimness of vision, objects appearing of a red color, momentary embarrassment of speech, loss of consciousness, partial or complete loss of vision, hearing, or other sense, failure of intellect, and especially of memory, numbness of one side, or cramps, tetanic shock, heaviness of the head, particular awkwardness of the patient in his accustomed work, a cold sensation on one side, formications, permanent contractions, hemiplegia, and all the other symptoms indicative of hemorrhage, ramollissement, or the presence of a tumor compressing the brain. If, at the same time that one or several of these

symptoms are present, there is a more or less persistent vertigo, re-appearing frequently with a person beyond forty years of age, these will be strong indications of the existence of a chronic cerebral lesion. Obstinate vomitings with persistent vertigo, frequently coming on, are often indications of a serious disease of the brain.

The *diagnosis* of vertigo is readily made out by the patient's description; but the great difficulty, in many cases, is to determine its nature or cause. And as the success of the treatment will depend upon the correctness of the diagnosis, the physician should call all his knowledge, tact, and judgment into action during the examination. Nervous vertigo more commonly occurs among the young, and nervous, and is often indicative of some form of epilepsy, especially when it occurs very often; while vertigo from cerebral lesion seldom occurs until after the fortieth year. But, whether the latter form is due to ramollissement, chronic meningitis, cerebral tumors, intra-cranial growths, etc., will in many instances, be a very difficult matter to satisfactorily determine. It must also be recollected, that other diseases than those of the brain may give rise to vertigo, as gastro-intestinal irritations, morbid changes in the coats of the arteries, disease of the heart, lungs, kidneys, or uterus, cancer, gouty diathesis, etc.

The *prognosis* of vertigo should always be given with a degree of reserve. When it occurs occasionally in the young, with no apparent lesion, as in the nervous form, the prognosis is favorable; but when it comes on frequently, with more or less loss of consciousness, and other symptoms of impaired health, and especially when the patient has indulged in masturbation, or veneral excesses, the prognosis is less favorable; it may terminate in epilepsy. Vertigo occurring in advanced or middle age is always to be dreaded, and the more so, if it co-exists with some of the symptoms indicating a lesion of the brain. It is often the case that an elderly person after several attacks of vertigo, will suffer no more from it for two, three, or more years, being apparently cured; but, finally, he will be suddenly attacked with hemiplegia, or with a fatal apoplexy.

The successful *treatment* of vertigo may be summed up in a few words, viz.—Ascertain its cause, and remove that, if possible, by appropriate treatment. If the vertigo is due to plethora, it may be overcome by purgatives, keeping the bowels regular, and the use of diuretics, and sudorifics, aided, in some cases, by revulsives. The diet should be light, and every exciting cause should be avoided, as, any kind of liquor, strong coffee, sedentary occupations, excessive exercise, etc.

If anemia or chlorosis be the cause of the vertigo, it must be

combated by preparations of iron, in some instances conjoined with a preparation of manganese; bitter tonics; and substantial food; keeping the bowels regular daily; taking moderate exercise; keeping the feet warm and dry; and not losing too many hours in sleep.—If it be associated with scrofula, gastro-intestinal derangement, cerebral disease, or any other malady whatever, the proper treatment for such malady must be pursued.

If the vertigo be nervous, or if the morbid conditions above referred to be removed and the vertigo still remains, we must endeavor to ascertain its cause, and if it is accidental, not habitual, and is slight, if it occurs in a person of ordinary health, our means should be rather hygienic than therapeutical. The patient should be removed to a place where he can inspire a pure, fresh air, his clothes should be loosened, and his temples may be bathed with vinegar or cologne, while at the same time the feet may be placed in a stimulating foot-bath, and be vigorously rubbed. In the intervals, he may pursue the course indicated in the preceding paragraph, avoiding every cause which will occasion the least disposition to vertigo. In some instances, antispasmodics may be required, as, Valerian, Castor, Assafetida, Cramp Bark, etc.; in other instances, Belladonna, Quinia, Morphia, etc., will prove useful. When the vertigo is kept up from gastro-intestinal acidity, the Compound Powder of Charcoal, or, Calcined Magnesia will be of service to neutralize the acidity, and, at the same time, keep the bowels regular. Cold water to the head every morning will be serviceable in cases where no cerebral disease exists; in cold weather the water should be tepid. In some cases, counter-irritation by rubefacients, along the whole course of the spinal column, and over the occipital region, will be required; and in some rare cases, suppuration from the nape of the neck, or the cautery to the top of the head may be of service, but I have not yet met with cases where such severe measures were necessary.

Nervous irritability of the brain may exist primarily, but it may also be sympathetic with irritation of another organ, as, of the bowels from worms, of the uterus from menstrual disorder, etc., or, it may result from too great a degree of heat, an active moral impression, insolation, etc.; these causes having been determined in any case, their removal or avoidance will generally be followed by a disappearance of the vertigo.

HEADACHE, OR CEPHALALGIA.

Headache is symptomatic of some functional or organic lesion, often of a serious nature. It may be considered a warning sign, which it is, in all instances without exception, very unwise to neglect; and as the chronist may be called upon to treat it, a few brief remarks may be made in relation to it.—Headache is common to civilized life, may occur at all ages, and is more serious, as a general rule, when it occurs in advanced life; it may be divided into several varieties according to the causes producing it, the principal of which I will now consider:

1. *Headache from plethora* may exist under two varieties, persistent and occasional; both of these varieties are due to one or more of the various causes inducing a plethoric condition of the system, especially a full and generous diet, and are more frequently met with in spring and summer. In young persons the pain is apt to be severe and rending, and is mostly seated in the temples and brows; while in older persons it is of a heavy throbbing character, and is often referred to the posterior part of the head. The patients usually present a healthy robust appearance. These forms of headache occur more frequently between the ages of thirty and fifty.

The persistent headache is attended with a sense of fullness, sometimes of throbbing, dizziness, and indistinctness of vision, which may continue for several days or weeks. The appetite is good, the bowels disposed to constipation, the urine high colored, the sleep profound but unrefreshing, with sometimes unpleasant dreams or nightmare, and the least exertion determines blood to the head and aggravates some of the symptoms. The pulse may be strong, full, and accelerated slightly, or, it may be strong, full, and oppressed or less frequent than natural, the latter being more common with persons of advanced years; the respiration rather more difficult than usual, with a slight labored action of the heart. If the headache occurs about the menstrual period, or during pregnancy, in addition to the constant aching at the temples and brows, there will be wandering pains and a sense of heaviness in the back and loins increased by motion. Nature sometimes affords relief by the occurrence of an epistaxis, hemorrhoidal flow, or diarrhea. In advanced age, in addition to the above symptoms, there will be flushed face, vascular injection of the eyes, giddiness on stooping, or upon suddenly looking upward, drowsiness after meals, and in some instances, an indistinctness of articulation on waking, which is an unfavorable symptom.

The occasional headache occurs frequently, seldom lasting more than a few hours, is more common among males residing in cities and towns, especially among those of sedentary habits, whose occupations require a stooping position, or who are exposed to impure atmosphere. The pain is very annoying, often occurs in the night or in the morning, and appears to be much influenced by the weather. The stomach is usually acid, weak and irritable, the tongue coated white but rough at its root, the bowels costive, the appetite good but irregular, and the respiration not free.

The *treatment* of these headaches consists in keeping the bowels, skin, and kidneys in as normal a condition as possible. Aperients or mild laxatives, cooling diuretics, and frequent bathings of the surface with considerable friction are about all the therapeutical measures required. In a few rare cases, it may sometimes become neccessary to occasionally administer, in the early part of the treatment, an active purgative. A very excellent cooling diuretic is composed of Acetate of Potash fifteen grains, Nitrate of Potash eight grains, Spearmint Water a fluidounce and a half; mix. To be taken at a draught, and repeated twice a day. Syrup may be added to it to render it more palatable. The diet should be moderate and of easy digestion, avoiding acids, fats, and all liquors or stimulating beverages; late suppers especially should be avoided; indulgence in sleep should always be avoided after dinner, substituting in its place some gentle exercise in the open air. Sleep should not exceed nine hours; the bedroom should be airy; the head somewhat elevated on a hard pillow during sleep; and, as soon as awake in the morning, the patient should at once arise, and plunge his face into a basin of cool or tepid water, repeating it two or three times. In warm seasons, a shower-bath of tepid water will prove beneficial, taken every morning. Excesses of all kinds must be avoided. If any accustomed discharges have become suppressed, or, any cutaneous eruptions disappeared, means must be taken to effect their return.

2. *Headache due to congestion* differs from plethoric headache in this respect; in the latter there is an actual excess of healthy blood; in the former, the fault lies in the mechanism of the circulation, in the deficiency of healthy tone in the system, there is an increased quantity of blood in the brain, usually combined with a deterioration of its quality, while, instead of the vessels of the rest of the body being replete with blood, the quantity is often rather diminished. Congestive headache often follows febrile attacks, as well as long-continued enfeebling diseases; it may also be caused by impure air, crowded rooms, narcotics, tight neckcloths, intoxicating

liquors, paroxysms of asthma or hooping-cough, playing on wind instruments, prolonged and intense mental applications, a low posture of the head during sleep, depressing passions, etc.

The pain is dull, heavy, with a sense of weight, and is usually referred to one part of the head. It is apt to be accompanied with some variety of tinnitus aurium, dizziness, dimness of vision, pale, sallow countenance, pale or bluish lips, cold hands and feet, depressed spirits, constipation, sedimentary urine, full and large pulse, easily checked by pressure, or languid, weak, or small pulse, and a disinclination for exertion which aggravates the sufferings and gives rise to palpitation. The patient is usually nervous, or delicate and weakly, though not necessarily thin or slightly made. Sleep is sound, heavy, or snoring, and disturbed. Mental excitement will produce a rush of blood to the head, followed by dull, oppressive pain, and a sense of coldness in the extremities.

Females as well as males are liable to this form of headache, especially those who have exhausted their vitality by excesses, and those of advanced years. If the attack of plethoric or congestive headache be sudden and acute, and attended with giddiness, partial loss of speech, numbness of one of the extremities, it is of a serious nature, and may terminate favorably after an unpleasant and annoying crisis, as vomiting, nausea, great depression, etc., or, it may be followed by apoplexy, paralysis, or insanity.

In the *treatment* of congestive headache, the same hygienic rules should be pursued as advised in the plethoric. Tonics should be administered internally, as the Compound Pills of Valerian, or, Compound Pills of Black Cohosh. In some cases, Citrate of Iron and Strychnia with Extract of Belladonna will be found very beneficial. "The use of Belladonna would seem to be indicated to remove that habitual tendency to congestion of the brain which usually results in apoplexy." (*R. Hughes.*) The feet and hands should be kept warm by wearing woolen gloves and hose, and by friction; and, in winter, the feet should always be warmed before retiring to bed, or, else kept warm when in bed by hot irons, bottles of warm water, etc. If the headaches occur at the "turn of life," uterine tonics will be indicated; or, a mixture of Tincture of Muriate of Iron ten minims, Hydrochloric Acid five minims, Tincture of Blue Cohosh thirty minims, Cinnamon Water one fluid-ounce, may be taken for a dose, and be repeated twice a day, about an hour after each meal. In a few instances, mild stimulating diuretics may be required, and, rarely, counter-irritation to the nape of the neck.

3. *Headache from derangement of the digestive organs* is a very com-

mon affection, and frequently occurs, although the patient can recall no particular irregularity of diet, and may attribute the headache to the weather, want of exercise, etc. More commonly, however, it can be traced to some particular article of food, to some excess in diet, or to some other cause which may have given rise to disorder in the digestive system. This form of headache occurs chiefly in early and in middle life, becoming less frequent and less severe as age advances, and the irritability of the system becomes diminished. The same cause which, in early life, produces a sick or bilious headache, frequently gives rise, in aged people, to an attack of diarrhea; indeed younger persons, in whom diarrhea is easily produced, are seldom subject to dyspeptic headache.

The pain in the head may be seated in the forehead, temple, or may extend over most of the head; it may be acute, sharp, or darting, but more generally is an annoying sensation of dull weight than of actual pain. There is languor, disinclination to exertion, coldness and numbness of the fingers, slight nausea, tongue coated white, and pale red at its tip and edges, dimness of vision, the eyes aching on reading, the pulse languid and feeble, colored specks floating before the eyes, and inability to concentrate the mind on any subject. Costiveness is usually present. Mental anxiety, sedentary occupations, irregularity in diet, imperfect mastication of food, improper food, eating in haste, or immediately after severe exercise, etc., frequently give rise to this form of headache. An article of food may disagree, may give rise to a headache to-day—when the brain or stomach is unusually excitable—which might have been taken with impunity yesterday, when those organs were less irritable. Mental excitement exercises a powerful influence over the first process of digestion, as well as over the appetite for food; a sudden intelligence or shock frequently destroys the sensation of hunger at once. The brain should be calm for half an hour before and after, as well as during a meal, in all instances. Merchants, stock-brokers, speculators, who are constantly in a state of business hurry and excitement, as well as those who wear out their brains with literary occupations, etc., are especially predisposed to the occurrence of headaches arising from dyspepsia, on very slight errors in diet. The sudden relinquishment of intemperate habits also lays the foundation for indigestion and its headaches; the convert rushing into the other extreme, and positively avoiding the diet that his debilitated frame actually requires. With some persons, whose digestive functions are more or less impaired, one or more particular articles of diet always occasions a diarrhea or a headache.

The *treatment* of this form of headache depends chiefly upon its

cause; if dyspepsia be present, no permanent cure can be had until this malady is removed. However, relief to the headache may frequently be afforded. If the stomach be acid, as evinced by a white coat on the tongue, or if the headache comes on several hours after a meal, a dose of Rhubarb and Magnesia, or of the Compound Powder of Charcoal, to operate upon the bowels, will be followed by relief. If the body of the tongue be pale, some aromatic stimulant may be added to the powder. If the tongue be red, Opium, Belladonna, or some other sedative will be indicated. If the diet, or any of it is of difficult digestion, and the headache comes on within an hour or two after the meal, an emetic should be given. The headache that ensues after inebriation may be removed by two or three doses of the following mixture: Take half a drachm of Supercarbonate of Soda, a fluidrachm of Essence of Peppermint, and a gill of Water; mix for a dose, to be repeated every fifteen minutes. A full dose of Acetate of Ammonia, repeated in half an hour, if necessary, will also relieve the headache from liquor. In other respects, the course laid down under the head of Dyspepsia should be pursued, both as to hygiene and therapeutics.

4. *Sick headache* is of two varieties, and is almost invariably due to indigestible food, or gastro-intestinal acidity, and is peculiar to nervous persons, as well as to those of sedentary habits; habitual constipation, insufficient sleep, intemperance, irregularity of diet, the reaction from any excitement, or sudden and powerful exercise, are among the exciting causes. The first variety is more common in early life, and especially among those who in after years become disposed to apoplexy or other cerebral diseases. It commences with a blurred, obscure, or double vision, which is very annoying, and is accompanied by a sensation of more or less depression; the indistinctness of vision becomes gradually more and more severe, and a slight pain occurs in the forehead and temples, which is at first hardly appreciable, but which becomes very intense with more or less rapidity, often feeling as if the head were being rent apart, and when it reaches its maximum degree of intensity, the confused vision has passed away. As the headache is advancing in severity, nausea sets in, and sometimes vomiting. The countenance is pale, the patient is frequently chilly, and seeks to lie down in a place free from light and noise. Strong pressure upon the temples, pressing them toward each other, affords a temporary relief. Usually, after vomiting, a sleep ensues, from which the patient awakes free from the pain, but with a soreness in the anterior part of the head, which may continue for several days, and which is aggravated by any jarring movements of the head or body. These attacks may occur

every few days, or at much longer intervals; they usually pass off in a few hours, when not treated medicinally, and sometimes the attack will continue for three or four days.

The second variety of sick headache is more common in middle life; the headache generally commences soon after waking in the morning, though it may occur at any period of the day. The pain is at first dull and oppressive, gradually becoming severe and heavy; it is located in the forehead, or one of the temples, usually the left, or over the inner corner of the eyebrow, and, in either case, with a fullness of the corresponding eye. The breath is offensive, the mouth has a clammy, unpleasant taste, the tongue is coated with a yellowish white substance, the hands and feet are cold, the pulse feeble, and frequently severe rigors play along the spinal column. The same as with the first variety, there is a depressing sense of nausea, increased by motion or the erect posture, and the patient seeks darkness and silence. At length vomiting occurs, the contents of the stomach being ejected, or only a thin, acid, acrid, glairy fluid. Sometimes the matters vomited are followed by a yellow, nauseous, and bitter fluid, the bile. In other respects it follows a march similar to the preceding variety.

As the causes of these two varieties are similar, the *treatment* will likewise be the same. If there be acrid or indigestible food in the stomach, an emetic will be the most efficient medication; otherwise, the administration of alkaline solutions will answer. The best preparation that I have ever employed in this difficulty is the following compound: Take of Supercarbonate of Soda half a drachm, Prepared Charcoal a drachm, Camphorated Tincture of Opium a fluidrachm, Water a fluidounce; mix well together and give for a dose. This should be given in the commencement of the attack, repeating the dose every fifteen or twenty minutes, until the headache, or its commencing symptoms, have disappeared. While under its influence the patient should lie quiet, upon his back, in a darkened room, as free as possible from noise or conversation; three or four doses generally checks the further advance of the headache. In some instances, Essence of Peppermint may be substituted for the opiate tincture. If the pain is actually present, in addition to this compound, the head may be bathed with a mixture of Vinegar, Spirits, and Rain Water, equal parts; and a compress moistened with this fluid be fastened over the forehead and temples. The patient should also endeavor to sleep, from which he must be allowed to wake naturally, and after which the headache will be greatly relieved.—In a few cases a purgative will be required to unload the bowels of any offending matters.

To prevent a return of attacks of sick headache, the stomach and nervous system must be restored to a normal condition by the use of tonics, the use of which should be persevered in for many months. A very excellent tonic is composed of Citrate of Iron and Strychnia one drachm, Aletridin one drachm, Powdered Colombo, a sufficient quantity to form a pill mass; divide into sixty pills, of which the dose is one pill, to be taken about an hour after each meal, repeating the dose three times a day. Or, the Compound Pills of Ptelein, or, Compound Pills of Ferrocyanuret of Iron, may be used.

Persons subject to sick headache should keep their bowels regular, avoid all indigestible or acid articles of diet, and keep as free as possible from excessive mental activity or irritability. They should especially avoid the use of those articles, which they have ascertained by experience, render them liable to attacks of sick headache. Acidity of the stomach is the important abnormal condition to be prevented.

5. *Bilious headache* also presents two varieties, one, due to accumulation of bile in the system; the other, to an exuberant secretion of that fluid, either actual or relative. They occur more frequently in summer and autumn, and among persons disposed to hepatic and bilious diseases, especially those of dark complexion and black hair. The first variety is more common in hot climates, especially among those who are irregular or intemperate in their habits. The headache is generally limited to the forehead, eyebrows, and eyelids, and not unfrequently there is a sense of smarting in the eyes and lids. The conjunctiva has more or less of a yellow tinge; the tongue has a brownish or yellowish coat, and may present a cracked appearance at its center. The mouth has a peculiar bitter and nauseous taste in the morning, the appetite is diminished; the nights are restless with annoying dreams; and the patient is apt to be melancholy or depressed in mind.

The second variety, due to an excessive action of the liver, and commonly known as "an overflow of bile," is attended with a throbbing and rending pain in the head, suffused countenance, hot skin, and a bitter, nauseous taste. Objects seem dim, or with a halo around them, and on attempting to read, the letters appear blurred; sometimes the patient feels as if he would fall. Frequently exercise, or a spontaneous vomiting of bile, relieves all these symptoms. Persons who are immoderate in eating and drinking, who eat improper articles, and who are neglectful of the ordinary rules of hygiene, are especially liable to this form.

Bilious headache may be always relieved by either an emetic, or

a purgative; but unless the patient will pay a rigid attention to hygienic measures he must expect its frequent return. Medicines are rarely required, if the patient is attentive to these measures. In cases of long standing, or when associated with some morbid condition of the liver, the treatment must be directed to the functional or organic lesion, in order to effect a permanent cure.

6. *Headache from deficient renal action*, in which the urine is alkaline, of specific gravity 1.015 to 0,130, with deposit of phosphate of lime, and triple phosphates, and a deficiency of urea. The pain is of a dull, heavy, weary kind, affecting the memory and imagination, and disinclining the patient to mental labor, with a sense of debility, and a disposition to drowsiness, with a restless, uneasy sleep. The appetite is good or irregular, the bowels regular, the tongue clean, and the pulse quick, and often feeble.

The *treatment* consists in the administration of Nitro-Muriatic Acid, the use of the spirit-vapor bath every week or two, daily frictions over the surface of the body, and mild tonics; keeping the bowels regular, and using animal food chiefly as diet. In some rare cases, a non-stimulating diuretic may also be required. (*See Treatment of Phosphatic Gravel.*)

7. *Nervous headache* comprises several varieties which are distinct and well-marked in their symptoms; and include also a large number of a mixed character. Nervous headaches are more frequent among females, and males of great nervous susceptibility, and especially those of sedentary habits, or devoted to mental labors. The exciting causes are loud noises, vivid light, impure atmosphere, repulsive odors, venereal excesses, masturbation, worms, improper diet, mental excitements, depression of mind, exposures to cold, dampness, sudden changes, or high winds, loss of sleep, uterine or ovarian irritation, prolonged fasting, exhausting discharges, noxious vapors, etc.

The first variety, or *ordinary nervous headache*, frequently occurs and terminates suddenly; and is exceedingly common among persons of high nervous susceptibility, of vacillating spirits, fickle tempers, and great sensitiveness. The pain is acute and darting, with a sensation of compression and swimming in the head, which are augmented by noises or light. Frequently there is a sense of weight on pressure on the eyeball, which is much relieved when the patient lies with the face turned downward; the pulse is small and feeble, varying with the least excitement, with palpitation of the heart on the least exertion; the bowels are usually constipated; vision dim; memory more or less impaired; the mind dull, peevish, or irritable; despondency; restlessness; a sense of sink-

ing; coldness of hands and feet, often succeeded by heat; eyes sunken; countenance careworn; and more or less debility. The headache commonly comes on in the morning, continues more or less severe throughout the day, and diminishes at night.

The second variety is *hysterical* headache, which is generally due to uterine or ovarian irritation, and may be associated with spinal irritation. It is usually confined to one side of the head, or to a single spot, frequently over one eyebrow, usually the left. When both sides are attacked, the pain is more severe on the left side. The pain is severe, of a shooting kind, darting always from the neck to the temple, and often likened to the sensation of a wedge or nail driven into or pressing on the brain; it is often accompanied with a sensation as of a ball passing from the abdomen and lodging in the throat or head,—from these circumstances it has received the name of "clavus hystericus." Neuralgia of the breast, or of the seventh or eighth intercostal, frequently co-exists. It is frequently associated with anemic headache, and rarely with congestive. Abdominal pains and flatulency are apt to be present. This variety of nervous headache occurs during the menstrual life of the female, between the eighteenth and fortieth year, and may continue, intermittingly, for days, weeks, or months. Excessive exercise, over-dancing, mental shocks or irritations, improper diet, exposures to cold, etc., are exciting causes.—It sometimes occurs in a severe form in both sexes, and is then termed "brow ague" or "hemicrania." (*See Facial Neuralgia.*) It occurs chiefly in cold, damp, and marshy districts, is intermittent in its character, and is more frequently met with in middle life.

The third variety is headache from *anemia* or *debility*, and which is due to exhausting discharges, as hemorrhoidal flux, prolonged diarrhea, oversuckling, chlorosis, etc. The pain is generally referred to the top of the head, and is frequently described as resembling a ticking, or the beating of a small hammer on the skull. The pain is not very severe, as a general thing, but is increased by the erect posture, and diminished by the recumbent. The cheeks are pale, as well as the lips, the eyes more or less sunken, with a dark areola around them, vision is impaired, a general sense of debility and languor, dyspnœa, often a sinking pain at the epigastrium, and a craving appetite. Faintness, perspirations, palpitations on exertion, cramps of the legs, depression of spirits, frightful dreams, etc., are apt to be present. Sometimes the headache is sudden, violent, and vertiginous, and attended with muscæ volitantes, strange spectral figures, or an apparent loss of vision.

In the *treatment* of nervous headache, but little permanent relief

can be obtained unless the remedies are addressed to the cause; to lessen the pain during an attack is an indication, but it is of minor importance in the treatment. In most instances, the pain can be temporarily relieved by anodynes, combined with stimulants proportioned to the degree of nervous debility. A very excellent preparation for this purpose is a powder composed of Sulphate of Quinia one grain, Piperine two grains, Sulphate of Morphia one-eighth of a grain, Pulverized Assafetida four grains; mix for a dose, and repeat three or four times a day, according to circumstances. The following will also be found useful in cases of nervous exhaustion: Take of Chloroform, Tincture of Ginger, each, half a fluidounce, Aromatic Spirit of Ammonia two fluidrachms; mix. The dose is twenty-five drops in a wineglass of milk, repeated three times a day; it usually relieves in four or five days. The following also, form excellent compounds, both for relieving and permanently curing the headache: 1. Take of Tincture of Aconite two fluidrachms, Tincture of Gelseminum, Tincture of Black Cohosh, each, five fluidrachms; mix. The dose is from twenty to forty drops, three, four, or five times a day, taken in some suitable vehicle. 2. Take of Extract of Aconite half a grain, Extract of Stramonium one-eighth of a grain, Valerianate of Quinia one-fourth of a grain, Extract of Black Cohosh one grain; mix for a pill. The dose is one pill, to be repeated every two or three hours. 3. An infusion of equal parts of Skullcap, Valerian, and Catnip, drank freely, will frequently relieve a severe nervous headache.

But in order to effect permanent cures, a general treatment should be pursued; in the ordinary nervous headache, attention must especially be paid to diet, and the condition of the stomach and bowels, aided by agents to impart tone to the nervous system, and lessen its irritability or susceptibility. For this purpose, the following will be found an efficacious preparation: Take of Aletridin, Alcoholic Extract of Black Cohosh, Sulphate of Quinia, Ferrocyanuret of Iron, each, one grain; mix, and divide into two pills, of which one may be taken for a dose, repeating the dose three times a day, for some months. Another very excellent combination is composed of Sulphate of Quinia, Extract of Aconite, each, half a drachm; Extract of Black Cohosh, Extract of Hyoscyamus, each, one drachm; mix, divide into sixty pills, of which give one for a dose, and repeat the dose every three hours. This is especially useful among those of delicate habit of body, and in females laboring under leucorrhea, and uterine derangement. In a few cases, especially those connected with gastric derangement, an occasional emetic will prove of great value, continued until the

foulness of the tongue is permanently removed. Moderate exercise in the open air; sea-bathing, or cold sponging the whole surface of the body, every morning, followed by brisk friction, should also be employed, especially during the warm seasons. Very rarely, counter-irritation will be found useful; as, for instance, a rubefacient to the nape of the neck and behind the ears, or the Croton Oil Liniment. A liniment made of one part of Croton Oil, and eight parts of Paregoric, rubbed upon the parts until pustules appear, leaves no permanent blemish. In many instances of severe headache, in conjunction with the above measures, the feet and legs should be frequently bathed in a warm stimulating alkaline solution, and sinapisms be applied to the soles. Persons subject to any variety of headache, should never wear tight clothing around the neck or upper part of the body. Simple nervous headache is frequently relieved by a full dose of Hoffman's Anodyne. A similar course of treatment will be beneficial in the hysterical form of headache, aided by the proper treatment for the hysteria, according to its cause.

Headache due to debility or exhaustion, requires us in the first instance, to check the enfeebling drain on the system, if still in existence, and then to give tonics to strengthen the whole system, as, the Citrate of Iron and Quinia; the Compound Pills of Ferrocyanuret of Iron; or, the Elixir of Iron and Cinchona. The diet should be very nutritious; a little wine or ale is allowable; the body should be kept properly clad; all physical or mental exertion or excitement must be avoided; and the bowels should be kept regular, without being purged. At the turn of life, where there is considerable flow, with excessive headache, the following will be found exceedingly useful: Take of Tincture of Muriate of Iron one fluidrachm, Hydrochloric Acid half a fluidrachm, Compound Tincture of Cinnamon six fluidrachms, Syrup of Poppy nine fluidrachms, Cinnamon Water fifty-seven fluidrachms; mix. The dose is a tablespoonful every hour or two. It is in this class of cases that the Sulphate of Nickel in half grain or grain doses, repeated three times a day, has been found useful.

Headaches that assume a periodic or intermittent character in their attacks, usually give way to Extract of Belladonna; to a combination of this Extract with Sulphate of Quinia; or to a mixture of Tincture of Gelseminum, Tincture of Black Cohosh, and Sulphate of Quinia.—As headache is frequently kept up by the presence of decayed teeth, a careful examination of these organs should be made in obstinate cases.

8. *Rheumatic headache* is more common among persons who

are disposed to rheumatism, and may be caused by exposure to cold; uncovering the head when perspiring; sitting bareheaded in a current of air; sleeping in a damp bed; as well as other causes that may give rise to rheumatism. The pain is dull and aching, more like intense soreness than actual pain, is generally worse in the evening, and better in the morning, or when warm applications are made. The brow, the back of the head, and the temples, are more ordinarily the parts complained of; sometimes the pain continues in one place; at others it shifts about, and is almost always preceded or accompanied by a sense of coldness over the head and face. There will be soreness and tenderness of the parts complained of, on pressure, which, however, is not restricted to these particular parts. In severe cases if the patient's hair be rubbed sharply in different directions, it will increase his pain considerably. If giddiness, drowsiness, throbing, flushed face, and injected vessels of the eye, be superadded to the preceding symptoms, it is indicative of an affection of the cerebral meninges, probably from rheumatic metastasis, and the case will demand prompt and energetic treatment.

The *treatment* in this variety of headache will be the same as that described for rheumatism, aided by stimulating liniments over the affected part, as well as dry cupping or other counter-irritating measures to the nape of the neck. If the attack be recent, and arises from exposure, a spirit-vapor bath will be of great service.

9. *Syphilitic headache*, is a disease occasionally met with, especially among those who are of a scrofulous habit, and who have undergone a mercurial course of treatment for the cure of syphilis. The coronal or parietal bones are more generally invaded, as well as the nasal and temporal. The pain is severe, is increased by warmth at night, by stimulating drinks, by exposure to cold and by pressure; in most instances a raised surface can be detected by the finger at the painful spot, wherever it may be located. Sometimes the pain will be of a gnawing character, and when seated at the vertex, a sensation is often experienced as if the head were bursting, or, as if something had fallen from the back part of the head to the front. With this symptom of pain, there may be gnawing pains in the tibia, tenderness of the roof of the nose, sore throat, and copper-colored patches on the body or limbs. The *treatment* will be the same as named for constitutional syphilis, together with compresses over the tender spots, kept constantly moistened with the following preparation: Take of Iodide of Ammonium one drachm, Glycerin, Water, each, one fluidounce; mix. In some

instances, the addition of three fluidrachms of Tincture of Stramonium Seed to the above, will be found to increase its usefulness.

10. *Organic headache*, or that which is due to cerebral disease, is difficult to explain, as the brain itself is perfectly insensible. These headaches are also frequently difficult to detect, as they may give rise to symptoms of gastric disorder, debility, etc., which are of themselves the only causes of many headaches; and should the pain be relieved by treatment, we may be still further deceived, and neglect to attend to the true cause of the headache,—the brain disease. It is of great importance therefore to determine, and at as early a period as possible, the cause of the pain; for headache is frequently the only prominent symptom during the early stages of cerebral disease when this is more yielding to treatment. The pain varies from a fixed uneasiness in the head, not amounting to actual pain, to that of a fixed, deep-seated, very severe, and unchangingly persistent pain, and is increased by mental application, by bodily fatigue, by stimulants, excitements, by stooping, by close or heated rooms, and by cheerful conversation, which usually affords relief in ordinary headaches, becoming laborious and insupportable; and in the more advanced stages the least motion of the head will increase the suffering, or induce vomiting. Nausea or vomiting may appear at any period of the headache, but, unlike the vomiting of sick headache, it is not due to gastric disease or error in diet, and occurs when the pain is most severe without giving any relief. Sometimes the headache is intermittent, or may affect only one side of the head, and be mistaken for brow ague, but may be distinguished from it by the accompanying symptoms of cerebral disease, and by the absence of the causes that may give rise to brow ague. In connection with the headache, there will be brief attacks of unconsciousness, numbness or want of power in the limbs, formication, transient loss of memory, failing of hearing, or of vision, and eventually convulsions, paralysis, or imbecility. In this form of headache, a most careful and minute investigation of the case should be entered into, bearing in mind that cerebral disease may be due to constitutional or hereditary causes, to injuries of the head, to neglected discharges from the nose or ear, etc.

To relieve the headache, cold external applications, counter-irritation, change of air, and anodynes, will be found useful; and, to check the nausea, sedatives may be administered internally, assisted by a rigid attention to diet and regimen; but no permanent cure can be affected, until the cerebral disease, whatever it may be, as tumor, abscess, induration, softening, atrophy, and hyper-

trophy of the brain, abnormal development of bone, etc., is cured by appropriate treatment,—a result by no means of frequent occurrence.

Headache in advanced life is due to no trivial sympathy, but is almost invariably associated with morbid alterations in the structure and the blood-vessels of the brain; at this period of life the energy of the nervous system is diminished, the stomach and bowels are less sensitive, the muscular tissue is no longer renovated with the ceaseless activity of adult life, and thickenings, indurations of, and morbid deposits in blood-vessels and other tissues are very common. The patient complains fretfully of headache, is dull and stupid in the morning, becoming peevish as the day advances, with the head hot, and the tongue dry and brown; questions are often incoherently answered; and sometimes the sufferer being early put to bed, will be found during the night, unconsciously wandering about the bedroom.

High feeding is opposed to longevity, and, with old persons especially, the diet should be curtailed; animal food should be sparingly used; the diet should consist principally of chocolate, cocoa, arrowroot, gruel, jellies, etc., and the body should be kept at a proper degree of warmth both during the night and day. Medicines to relieve the cerebral disease, should be used cautiously, as the "power of resistance to disease" being diminished, no cure can be expected; palliation is all that the physician can do; at the same time keeping the bowels regular by gentle aperients, or by figs, stewed prunes, etc., together with dry cupping to the nape of the neck to overcome severe symptoms, and some gently stimulant and cordial-tonic to relieve debility. The less medicines are given to aged persons, the better will it be for them.

Headache, with pain across the eyebrows, and at the root of the nose, with dryness of the nostril, frequent sneezing, occasional giddiness, red and watery eye, may occur from eggs of insects being deposited in the nostril, and lodged in the frontal sinus, where they produce their "grubs." Headache may also be occasioned by lead-poisoning, by worms in the intestines, by certain affections of the eye, ear, heart, kidneys, and other organs, and by drunkenness, and is also peculiar to certain trades and occupations.

CRAMP.

Hypochondria, syncope, hiccough, nightmare, palpitations, etc., are only symptoms of certain functional or organic lesions, which, although generally treated upon separately, will not be considered

here as distinct affections; a removal of the disease giving rise to them, or of which they are an accompanying symptom, will be followed by their disappearance. A few remarks may, however, be made concerning cramp attacking the limbs.

Cramp is a sudden, violent, and very painful spasm or contraction of one or several muscles, particularly of those of the calf or posterior part of the leg; it more commonly manifests itself during the night, often arousing the patient from his sleep. Cramp in the limbs may be due to debility and overaction of the muscles attacked; to an improper position in bed, frequently occurring when the patient overstretches the limb with the toes drawn downward; to direct compression of a principal artery, muscle, or nerve; and to derangement of the digestive organs. It is also symptomatic of spinal or cerebral lesions, which the physician must keep in mind when investigating the causes of frequent and severe attacks of cramp. It may also be due to other causes, as, cholera, etc., not included in the limits of this work. When the cramps are attended with headache, mental debility, formication, numbness of the limbs, etc., a very close examination should be made to ascertain the existence of spinal or cerebral disease; for the complication of cramp with these maladies is an indication of their severity and danger. When the muscles of the superior limbs are attacked, the danger is greater than when the cramp is confined to those of the lower; and the danger is still more imminent when the spasm extends from the superior to the inferior limbs.

Cramp of the lower leg not associated with disease of the brain or spinal cord, may be almost instantaneously relieved by drawing or pressing the superior surface of the foot as closely as possible toward the tibia, and holding it thus until the spasm passes off, which will occur in a few seconds; or, in ordinary cases of cramp in the extremities, a ligature may be placed around the limb above the affected muscles. To prevent the recurrence of the spasms, an attention must be paid to diet and regimen, with gentle exercise of the affected muscles, and daily frictions with the Compound Tincture of Camphor. If derangement of the digestive organs be the cause of the cramp, the appropriate measures must be adopted to overcome such disorder. It has also been recommended to have the bed or mattress upon which the person sleeps form an inclined plane, so that the head may rest twelve inches higher than the feet, and which may be effected by cutting down the lower legs of the bedstead so as to form this inclination.

When the cramp is due to cerebral or spinal lesion, the only means of permanent cure is, the removal of the spinal or brain dis-

ease; though, in such cases, the cramp may often be relieved by the measures above recommended, with frictions, etc.

Mrs. S——, aged twenty-six, of strumous diathesis, after the birth of her first child, became subject to menstrual derangement, with great nervous exhaustion, and cramps in the fingers, toes, arms, and legs. These cramps would sometimes occur daily, and at other times would not appear until after an interval of several days; they were very severe. She labored under more or less constant headache, rigors along the spinal column, irregular appetite, cold hands and feet, occasional formication along the spinal column and the inferior limbs, diarrhea, etc. Viewing the case as one arising from a cerebro-spinal derangement, I placed her upon the following course of treatment, which effected a cure in the course of seven months. Take of Bromide of Potassium one ounce, Water twenty fluidounces, Solution of Perchloride of Iron one and a half fluidounces; mix. The dose was a teaspoonful administered three times a day about one hour and a half previous to each meal. Pustulation by means of Croton Oil Liniment was kept up alternately over the nape of the neck, and one or the other mastoid process; and the following lotion was applied along the spinal column twice every day: Take of Strychnia five grains, Alcoholic Extract of Belladonna one drachm and a half, Camphor half an ounce, Alcohol four fluidounces; mix. The diet was regulated, as well as the bowels; and no other exercise was permitted than that of a passive character. An infusion of High Cranberry Bark, Skullcap, and Sassafras Bark was used as a common drink, several times a day.

CHRONIC DISEASES OF THE CIRCULATORY SYSTEM.

NOTWITHSTANDING the laborious investigations of many eminent physiologists with regard to this class of chronic maladies, there yet remains much to be done, both in the way of diagnosis and treatment. In the acute affections of the heart, as a general rule, an experienced and practiced ear may be able to determine the location and character of the disease with an almost positive certainty; but in chronic maladies of this organ and its appendages, so many various parts may be involved, and such varied morbid changes be effected, that it proves a difficult, if not, in some instances, an impossible thing to diagnose them with any degree of certainty or even of satisfaction. And should we be enabled to positively discriminate the peculiar character of the heart or arterial malady under which a patient is laboring, unfortunately for him or her, we can promise nothing certain as regards treatment, for in this class of chronic diseases therapeutics have proved very unprofitable.

Diseases of the heart and arteries may be located in one or several parts of these organs, and may be complicated with, or be the result of, disease of other organs; either of those adjacent, as, for instance, the pleura, lungs, etc., or of those at a distance, as, the kidneys, brain, etc. And in our investigations of cardiac affections, these phenomena should constantly be borne in mind, so that we may connect facts and circumstances in a proper manner, and thus be enabled to arrive at correct diagnosis, and, as far as possible, efficient treatment.

Among the principal symptoms observed in functional or organic affections of the heart, are the following, viz.:—Slight difficulty of breathing, increased by exercise; more or less pain in the region of the heart; suffocating weight; a short, dry cough, and often spitting of blood on the least exercise; breathing by starts; great anxiety; no expectoration; palpitations; irregular and intermittent pulse, frequent and bounding, and sometimes unequal in the two

wrists, not synchronous; enlargement of the chest immediately over the heart; slight exertions, and sometimes the least excitement produces palpitation; timidity; apprehensions of evil, or of dying; fainting; diminution of strength; chills; rheumatic affections; cardiac epilepsy; heart beats tumultuously and indistinctly; irritable temper; bleedings from the nose and sometimes from the lungs; purple lips; sometimes the heart acts so powerfully that the whole system can be seen to shake; swelling of lower extremities; occasionally a puffy swelling appears suddenly on the face, particularly under the eyes, and after a day or two as suddenly disappears; a distress which the patient can not locate in any particular spot; sometimes the patient can not lie down from the palpitation and suffocative breathing; dropsy of the lower extremities; partial impotency; derangement of the urinary discharge both in quantity and quality; oppression and constriction in the region of the heart; angina pectoris, or pain and constriction in the left side of the chest, with a peculiar numbness and more or less pain in the left arm, particularly on the inside as low as the elbow; the countenance presents a peculiar and haggard appearance. Heart disease is often produced by self-pollution during youth. Very few of the forms of disease to which the heart is subject can be permanently cured, though in many cases much relief may be given by the adoption of proper measures.

Before entering upon a description of the symptoms and treatment of heart affections, I will briefly refer to certain matters connected with auscultation and percussion of this organ, which it is important for the practitioner to be acquainted with. A full and thorough explanation of these matters is not included within the scope of this work; and it can only be obtained from the excellent monographs of Hope, Latham, Stokes, Walshe, Flint, and other writers upon cardiac diseases.

The præcordial region, or region of the heart, is that space upon the walls of the chest that defines the outline of the organ, including its base, apex, and lateral margins. "A line drawn from the inferior margins of the third ribs across the sternum, passes over the pulmonic valves a little to the left of the mesial line, and those of the aorta are behind them, but about half an inch lower down. A vertical line, coinciding with the left margin of the sternum, has about one-third of the heart, consisting of the upper portion of the right ventricle, on the right—and two-thirds, composed of the lower portion of the right ventricle and the whole of the left, on the left. The apex beats between the cartilages of the fifth and sixth left ribs, at a point about two inches

below the nipple, and an inch on its sternal side." (*Hope.*) And any change of this position of the apex is indicative of disease of the heart, or of its surrounding parts. The heart lies obliquely, having its long axis directed from right to left, forward and downward, its base corresponding, in front, to both third costal cartilages, and its apex to the sixth left costal cartilage. Posteriorly, the upper margin of its base is opposite the fourth dorsal vertebræ, and the lower margin opposite the seventh or eighth, being separated from the spine by the aorta and œsophagus.

In a state of health the heart presents certain sounds and impulses, which are normal, and any variation in degree or quality of which indicates a greater less departure from health. These normal sounds of the heart may be detected by auscultation in the præcordial region; it will be ascertained by carefully listening at this region, that for one pulsation of the arteries, the heart gives two successive sounds, with two hardly appreciable intervals of silence between them.

The *first*, *systolic*, or *inferior* sound may be heard more distinctly over the apex of the heart, below and rather to the outside of the nipple; it is duller and more prolonged than the second sound, is synchronous with the contraction or systole of the ventricles which expels the blood from the cavities of the heart, or the heart's shock against the ribs, with the pulse at the wrist, and, for the most part, with inspiration.

The *second*, *diastolic*, or *superior* sound may be more distinctly heard at the upper part of the cardiac region, above, and a little to the inside of the nipple, near the margin of the sternum; it is clear, sharp, and short, is synchronous with the dilatation or diastole of the ventricles, which admits the entrance of blood into the cavities of the heart, with the recedence of the heart from the ribs, with expiration, and with the interval between the pulsations not being synchronous with the pulse.

The interval between the first and second sounds is called the *first* or *post-systolic silence*, and that which follows the second sound is termed the *second* or *post-diastolic silence*. If the whole period from the commencement of one pulsation or entire revolution of the heart to the commencement of the next be divided into ten parts, the average periods of sound and silence will be very nearly as follows: For the first sound four parts, for the first silence one part, for the second sound two parts, and for the second silence three parts. This order of succession is termed the heart's *rhythm*. A precise idea of these sounds can only be obtained by auscultation; they will be found to vary materially at different parts of

the cardiac region, in intensity, duration, pitch, and quality, while the periods of silence can only differ in duration. Some difference will also be perceived from change of position on the part of the patient, from morbid changes in the lungs, hepatic or splenic enlargements, nervous excitement, excessive debility, etc., the heart remaining healthy, or being only functionally affected.

The *impulse* of the heart, is its beat or stroke against the walls of the chest—also termed the apex-beat, the position, extent, force, character, and rhythm of which may be more or less modified by disease, muscular exertion, mental excitement, forced or accelerated respiration, position of the body, obesity, etc. It may be felt by placing the hand upon that portion of the chest corresponding to the apex of the heart, and usually the impulse is visible.

In diseases of the heart and its arteries, the sounds, the rhythm, and the impulse of this organ become more or less altered; in addition to which, adventitious sounds are perceived, and which are called *murmurs*.

The heart-sounds may be increased, as, in functional excitement of the organ, simple dilatation, hypertrophy, etc.; they may be weakened by obesity, softening, fatty degeneration, atrophy, morbid infiltration, etc. The duration of the sounds, or the rhythm of the heart's action may be irregular in various ways; and the distance of the sounds from the auscultator's ear, will be perceptibly increased in cases of fluid or gaseous accumulation in the pericardium, while they will be brought nearer to the ear than natural, by enlargement of the heart, or adhesion of its pericardial surfaces.

The character or quality of the sounds of the heart, as well as of their pitch, may also undergo considerable change. Thus, in a dense hypertrophy with thickening of the valves of the auricles, the first sound becomes dull, muffled, and toneless; but when the walls of the ventricles are thin, and the valves natural, it becomes more or less clear, flapping or clicking, with raised pitch; however, if the ventricular walls are in a state of eccentric hypertrophy, with thickening of the valves, the sound is of a changing nature. Both the first and second sounds will be found to undergo modifications depending upon the character of the malady, and the particular parts influenced by it. In certain cases one sound may be single and the other double; or both may be double; or the same sound may be double at one locality and single at another, etc.

The sound and impulse of the heart, should generally be taken together. A clearer sound leads to the suspicion of a thinned heart, but if it be accompanied with a weaker impulse, we are

certain that the walls of the organ are attenuated. A stronger impulse may lead us to suspect hypertrophy, but the suspicion becomes certainty if at the same time there is a diminished sound. If both sound and impulse are increased, there is probably no hypertrophy, but a more forcible action of the heart from excess of nervous energy, and vice versa. If both the sounds and impulse are detected beyond the præcordial region, they generally indicate dilatation of one of the ventricles; if the sound predominates over the impulse there is attenuation with the dilatation, or rather less than a proportionate increase of muscular substance; if the impulse predominate over the sound, there is hypertrophy with the dilatation, or rather more than a proportionate increase of its muscular substance.

The intervals of silence are also modified by disease; if the arterial walls are feebly elastic, or if the first sound is disproportionately shortened, the first silence is lengthened. If the mitral orifice is constricted, the second silence is lengthened. And so with other causes. And all these various modifications, together with their indications, should be thoroughly understood, and carefully investigated by the practitioner.

The position and bulk of the heart may be ascertained by percussion; but this is a difficult matter, requiring a considerable degree of experience before it can be reliably accomplished. Yet, in order to establish a satisfactory diagnosis of certain maladies of the heart, it is of essential importance that percussion be brought in as one of the methods of investigation.

It must always be borne in mind that respiration exerts a certain influence upon the heart, effecting a change in its position with regard to the walls of the chest; thus, during a full inspiration, the heart's action diminishes in rapidity, its impulse in the interval between the fifth and sixth ribs is hardly if at all observable, while, at the same time, the heart's-sounds become greatly lessened, and the dullness of the superior margin of the præcordial region changes its location to the extent of two or three inches. In many cases, however, the impulse may be detected downward and inward, from three to nine lines to the left of the center of the ensiform cartilage, at which point percussion will elicit dullness, while at the normal point of impulse between the fifth and sixth ribs, it will elicit quite a clear sound.

In a full expiration the heart's action is rather increased in rapidity, its impulse is very sensibly felt, and apparently occupies a greater extent, while the præcordial dullness of the superior margin is decidedly augmented, the systolic sound being frequently much

louder. And although these changes may not always be present, yet during an examination by auscultation and percussion, it must always be present to the mind of the examiner, that they do most commonly occur.

The adventitious sounds or murmurs are divided into endocardial, and exocardial, or pericardial; they are entirely different from the ordinary sounds of the heart, and are the results of certain morbid changes within or on the surface of the heart.

Endocardial, *intracardiac*, or *valvular murmurs*, are usually more inward and deeper, and further from the ear, and are characterized by a blowing sound, which may vary from that so soft as to resemble the passage of the gentlest wind, to that of a very harsh character, or cooing, whistling, etc., and the pitch of the murmur may be high or low-toned. Various terms have been applied to this murmur, according to its peculiarity; thus, it has been termed a bellow's sound, (*bruit de soufflet*); sound like sawing, (*bruit de scie*); sound like rasping, (*bruit de râpe*); musical sound, (*bruit musical* or *sifflement modulé*); sound like filing, (*bruit de lime à bois*), etc. But notwithstanding these variations in the quality of the endocardial murmur, they are of but little importance, as they have only one common significance, namely, morbid conditions interfering with the integrity of the valves. The endocardial murmur may occur at any period of the heart's rhythm, it may be pre-systolic, systolic, post-systolic, pre-diastolic, diastolic, or post-diastolic, and it may occur during the sounds and silences of the heart in various ways. It may take the place of the heart's natural sounds, and be heard in their stead. It is regularly or irregularly intermittent, and when once developed is habitually persistent. It is essentially indicative of something wrong inside of the heart; but to determine the nature of this something, we must note the time in the heart's beat or rhythm when it occurs, the space within which it is chiefly heard, the direction in which it is conveyed, and the preceding and accompanying symptoms of the constitution generally. But it must be remembered, that even in the most acute cases, endocardial murmur is not a certain evidence of disease.

Endocardial murmurs have been divided into Organic and Inorganic. *Organic endocardial murmurs* are generally associated with valvular abnormalities, as, constriction of the valvular orifices, thickening, hardening, calcification, or roughness of the valves, excrescences, etc., which are determined by the quality, duration, pitch, intensity, and period of time of the murmur.

Inorganic endocardial murmurs have been subdivided into 1, *hæmic*, depending upon some abnormal condition of the blood, (spanæmic),

as in chlorosis, profuse hemorrhage, exhausting diseases, sexual excesses, inanition, etc., or from the formation of coagula within the heart, interfering with the regular progress of the blood current; and, 2, *dynamic*, depending upon some abnormal action of the heart, as, from violent excitement of this organ, dynamic changes interfering with the closure of its valves, etc.

The *bruit de diable*, noise like a humming top, is a continuous hum or cooing like that which reaches the ear from the hollow of a sea-shell when applied close to it, also called the "venous hum." This is an inorganic murmur due to an impoverished condition of the blood, though it has occasionally been heard among young healthy persons. It is more readily detected over the internal jugular vein, and will cease when the vein is firmly pressed upon by the finger, returning when the pressure is removed.

Dr. Chambers recommends as by far the "best extant means of distinguishing single pericardial and valvular murmurs—sounds precisely the same in their effect upon the ear, and occurring often at the same period of the cardiac movements, and, therefore, undistinguishable unless particular manipulation be used. The plan is—first, fit the stethoscope firmly and steadily on the place where the murmur is loudest, and get impressed on the auditory nerve clearly the special character of the murmur; then, keeping the instrument still closely applied to the chest in the same position, remove your head very gradually, and try to gain a point at which you can hear the normal heart-sounds without the murmur. If you *can* do this, the murmur is pericardial. If you can not, but the murmur is heard as far off as the heart-sounds, it is endocardial. In all cases where the disease is endocardial only, or pericardial only, the knowledge thus obtained may be safely acted upon."

Exocardial, *extracardiac*, *pericardial*, or *friction murmurs* are usually more outward, nearer to the surface, and closer to the ear, and are characterized by a rubbing, or to-and-fro sound, presenting, however, various modifications. The principal modifications are: 1. The *friction*, or *attrition murmurs*, which may resemble a to-and-fro rubbing murmur, a grating, scratching, creaking, squeaking, grazing, clicking, or prolonged whistling sound. *Bruit de frottement*, a rubbing or friction sound; *bruit de cuir neuf* or *bruit de craquement*, a sound resembling the creaking of new leather; *bruit de raclement*, a scraping sound, etc. 2. *Continuous murmurs*, resembling a rumbling or squashy churning sound. 3. *Clicking murmurs;* and, 4, murmurs caused by the *bending* or *crumpling of layers of tough exudation matter*. These murmurs are generally indicative of some morbid condition of the pericardium.

The pericardial murmur does not take the place of the natural sounds of the heart, nor is it heard in their stead; it may accompany either the systole, or the diastole, or both together; it may vary in pitch, intensity, duration, extent, and regularity, becomes increased in sharpness when the patient bends forward; is changeable in seat and intensity, and is sometimes attended with friction-fremitus or a sensation of vibration or friction when the finger is applied over the region where the murmur is heard. It is sometimes so soft as to be with difficulty distinguished from the endocardial murmur, requiring the closest attention to determine its character, or even to detect it. Both the pericardial and the endocardial murmur may co-exist when pericarditis is accompanied by endocarditis.

These are, in brief, the physical signs met with in investigations of the heart, both in its normal and abnormal conditions, and without a thorough understanding of them in all their various combinations, modifications, etc., it will be impossible for any one to treat cardiac diseases with any degree of certainty or satisfaction. The medical man must make himself intimately versed in them.

A few general rules may be now referred to, as regards diagnosis of the maladies under consideration:

1. The most formidable organic diseases of the heart are those of the valves. Though valvular disease of an extensive character may exist for several years without compromising health to a serious extent, and without abridging the usual term of human existence. As a general rule, if there be no cardiac murmurs, there is no valvular lesion, and vice versa.

2. Disease of the aortic valves is frequently associated with hypertrophy, and, in aortic regurgitation, also with dilatation. Cerebral symptoms are also more common and urgent.

3. Disease of the mitral valves is mostly associated with dilatation. Pulmonary symptoms are also more common and urgent.

4. Adhesions of the pericardium are more generally associated with dilatation.

5. Atheroma of the aorta and renal disease, are frequently associated with simple hypertrophy.

6. In aortic regurgitation the pulse is generally "jerking," or sudden and sharp.

7. In mitral insufficiency, the pulse will be soft or irregular, and there will be a bellows murmur with the first sound, heard loudest over the apex.

8. A friction murmur, synchronous with the heart's movements, indicates pericardial lesion; in rare cases it is wanting. Tumult-

uous action of the heart is frequently an indication of pericarditis.

9. Aortic insufficiency is indicated by a bellows murmur with the second sound, heard loudest at the base.

10. "A murmur with the second sound, loudest at the apex, is very rare, but when present it indicates—1st, Aortic disease, the murmur being prolonged downward to the apex; or 2d, Roughened auricular surface of the mitral valves; or, 3d, Mitral obstruction, which is almost always associated with insufficiency, when the murmur is double, or occupies the period of both cardiac sounds."

11. "A murmur with the first sound, loudest at the base, and propagated in the direction of the large arteries, is more common. It may depend—1st, On an altered condition of the blood, as in anæmia; or, 2d, On dilatation or disease of the aorta itself; or 3d, On stricture of the aortic orifice, or disease of the aortic valves; in which case there is almost always insufficency also, and then the murmur is double, or occupies the period of both sounds. It may occasionally depend on roughness of the ventricular surface of the mitral valves, and on coagulated exudation attached to the internal surface of the heart."

12. "Hypertrophy of the heart may exist independently of valvular disease, but this is very rare. In most cases it is the left ventricle which is affected, and in connection with mitral or aortic disease. In the former case the hypertrophy is uniform with rounding of the apex; in the latter, there is dilated hypertrophy, with elongation of the apex." "When the heart is enlarged, and still more when it is adherent, there is diminished motion of all the ribs on the left side, with the exception usually of the second and third. If there be pericarditis, the motion is still more interfered with, and the motion of the abdomen just below the xiphoid cartilage is also much affected, being in all cases lessened, and, in some extreme cases, quite interrupted. While the motion of the center of the abdomen is diminished, that of the abdominal walls at each side is usually not affected." (*Sibson.*)

13. Disease of the heart is sometimes present with chorea, especially when this is due to a rheumatic affection.

14. General anasarca, with no change in the blood, nor albumen in the urine, is nearly always indicative of disease of the heart or large vessels, even when there are no important cardiac symptoms present.

15. *Fremissement cataire, cardiac,* or *valvular thrill,* is a strong thrill or purring tremor, resembling the purring sound of a cat, which

may both be heard and felt by the hand when applied over the spot where it occurs; this thrill is always accompanied by a bellows murmur, and is very distinct in insufficiency of the mitral valve with dilated hypertrophy of the left ventricle, its seat being below and within the nipple, and also in constriction of the aortic orifice coupled with the same kind and location of hypertrophy, its seat being at the aortic base. It is more frequently met with in the former condition than in the latter. It may also be observed in chlorosis, becoming less distinct as the blood improves. Stokes considers this thrill to be the pulse of aortic regurgitation on a large scale, and indicative of regurgitation into the ventricles of the heart, into a large or a dilated artery, or into an aneurismal sac.

This tremor may be felt most distinctly when the flat hand is laid over the part of the præcordium corresponding to the point of the heart's impulse. "If it be due to narrowing of the left auriculo-ventricular opening, it will be perceived at the period corresponding to the heart's diastole; if it occurs when the impulse is feeble, the heart broad, (as indicated by increased lateral dullness on percussion), and the second sound increased, it is due to the same narrowing, as above stated; if it coincides with an increased impulse, an hypertrophied left ventricle, (as indicated by a tremulous impulse and increased dullness, in the longitudinal direction, on percussion), and with absence of the second sound of the heart, it may be considered as due to imperfection of the aortic valves; if both contracted left auriculo-ventricular opening and imperfect aortic valves are present, the tremor accompanies the diastole, the sound of which is increased and audible in the pulmonary artery, and absent in the aorta and carotid arteries, and the heart is enlarged in its longitudinal and transverse directions." (*Jaksch.*)

In examining a patient suspected of laboring under some cardiac lesion, the practitioner will first ascertain the history of the case, its past and present symptoms as noticed by the patient; he will then observe the condition of the face, the eyes, the breathing, the pulse, the palpitations, whether any cough or dropsical swellings are present, and also inquire into the condition of the renal and intestinal excretions. This effected, he will then inspect the cardiac region, its form, whether prominent or depressed; the condition of its integuments, whether the præcordial interspaces are of the same width, and lie on the same plane as their fellows on the opposite side, and whether the soft parts on both sides present the same characters; and, the impulse of the heart, whether visible or not, at what point visible, its character and force.

He will next proceed to examine by palpation or application of

the hand, to determine the position, character, extent, force abruptness, sharpness, shortness, etc., of the heart's impulse; the movements of the præcordial ribs and interspaces, whether they are widely separated or bulged outwardly, or whether they are narrowed; and the condition of the *vocal vibration* or *fremitus*, (a peculiar thrilling sensation communicated to the fingers when applied to the chest of a person while he is speaking); whether this be augmented, diminished, or annulled; also whether there be present any fremissement cataire, or pericardial tactile friction fremitus, or a rubbing or friction sensation or sound of short duration, and generally movable from one part of the cardiac region to another.

In the next place, the practitioner will percuss the cardiac region for the purpose of determining the size of the heart, and whether hypertrophy, dilatation, or pericardial effusion, etc., is present. The next and last means of exploration will be auscultation, by which the sounds and murmurs of the heart are distinguished, their character, location, pitch, combination, etc.

Acute carditis, endocarditis, and pericarditis, may exist separately or together, and if not permanently removed, may result in a chronic form of the isolated or conjoined affections. The terminations of these inflammations into a chronic form, are generally associated with certain morbid changes and conditions of the heart and its arteries, as, effusion, hypertrophy, etc.; therefore, instead of treating upon chronic pericarditis, chronic carditis, etc., as distinct diseases, I will only refer to those chronic conditions of the organs under consideration which may be the result of some previous acute inflammatory action, or which may exist and gradually progress, independent of any previous acute attack. Indeed, as a general rule, these chronic affections are only clinically known by their effects upon the valves and orifices of the heart, hypertrophy, hydropericarditis, etc.

ORGANIC DISEASES OF THE HEART.

PERICARDIAL ADHESION

Also termed Chronic Pericarditis, may be the result of the acute form of the disease, or may exist independently of it. The *symptoms* will be found to vary considerably; with some patients there will be merely a pain in the cardiac region, which may be constant

or occur at regular or irregular intervals; with others there will be shortness of breath and easily excited palpitation; again, all these symptoms may be present, together with many others, as, uneasiness upon lying on the left side, sense of suffocation at different times, startings in sleep, apprehensions of dying, etc. The pain will vary in intensity, in some instances being hardly noticed, while in others, especially when the result of a rheumatic attack, it will be very annoying, and be frequently shifting about. The pulse is generally frequent, and may be regular or irregular. Pressure upon the epigastrium in the direction of the pericardium, sometimes occasions a sense of soreness. In some instances the affection presents no prominent symptoms, and is with difficulty detected by auscultation, palpation, and percussion, if detected at all.—Pericardial adhesion is more usually associated with some abnormal condition of the heart, as, atrophy or hypertrophy, but it may occasionally exist with the heart in a perfectly natural condition.

It is by no means an easy matter to form a positive *diagnosis* of pericardial adhesion from the physical signs, more especially when it has been in existence for some time, as these signs vary according to the closeness of the adhesions, and to the presence or absence of adhesions of the pleura, and they are also present with other morbid conditions of the heart and its vessels. Auscultation may detect clicking sounds, or friction sounds from loose adhesions, or a slight single rub occurring with the systole, and a kind of abrupt, undulatory, double-jogging or tumbling motion of the heart. The heart's impulse may be felt in its natural location, or slightly above it, and a depression of the præcordial region may be felt in the neighborhood of the fifth and seventh left cartilages, or above, at the base of the organ. Dullness on percussion may also be found just above the third left cartilage. Yet these signs can not be positively relied upon as indicative of pericardial adhesion, as they may be present in other lesions of the heart, or may be more or less wholly wanting.

It is rarely the case that a chronic adhesion of the pericardium results in death, not unless it co-exists with effusion, hypertrophy, or atrophy, etc., in which instances the *pathological appearances* will be the same as named under Dropsy of the Pericardium, Hypertrophy of the Heart, etc. The pericardium may present a degree of redness, with or without a change in its consistence, transparency, and thickness; opaque, white, tough patches may be observed upon various parts of it, the result of exudation, and which may be removed, leaving a healthy surface beneath; or, a white,

obscurely-defined patch may be perceived upon its anterior part, which is not removable, and which is probably due to continued friction.

The *treatment* will consist of measures to lessen excitement, and promote absorption. For the former, an attention to the skin, bowels, and kidneys are especially required, together with a diet of nutritious but non-stimulating food used moderately and at regular intervals; the use of Veratrum, Gelseminum, Digitalis, Cactus, or Aconite, to quiet any tumultuous action of the heart; an avoidance of sudden and powerful mental and physical actions; and, when the irritation is considerable, counter-irritation over the cardiac region, and anodyne applications, as, plaster of Aconite, Belladonna, etc.

For the latter measure, above named, Iodide of Ammonium, Bromide of Ammonium, etc., may be administered internally, and may also be employed locally, in the form of wash or ointment, over the affected region. Or, a plaster may be employed, consisting of Extract of Belladonna one drachm, Iodide of Ammonium, moistened with Alcohol, fifteen grains, Iodine five grains; mix and form a plaster. If rheumatism be present, or the patient be subject to this affection, the internal remedies recommended for its treatment must be employed.

If the pericardial disease be attended with, or be due to tubercular disease, which may be suspected, when tubercular symptoms are present in the lungs or other organs, or where the patient has been long exposed to the most powerful exciting causes of tubercular cachexia, the remedies advised for such tuberculous or scrofulous conditions must be administered, together with counter-irritants to the chest, saline diuretics, tonics, good, nutritious food, and a speedy removal from the influence of depressing causes.

HYDROPERICARDIUM.

Dropsy of the Pericardium may be the result of acute pericarditis, especially when this is consequent on acute rheumatism, may occur as a phenomenon of general dropsy, or it may be due to pressure, or morbid conditions of the large blood-vessels of the heart. In aged persons hydropericardium is apt to be the result of ossification of the aorta.

When due to a previous acute attack, the *symptoms* will vary considerably; the pulse may be small, frequent, irregular, intermitting, and weak; syncope; obscure palpitations, jugular veins distended, countenance bloated, and more or less of a livid color, extremities cold, a feeling of weight and oppression in the præcor-

dial region, and more or less of an inability to respire freely in the horizontal posture. The symptoms depending principally upon the particular cause of the dropsy, or upon the accompanying morbid conditions of the heart and its appendages. Sudden startings during sleep are common. Dropsy, cough, and dyspnœa may be present, but in a very mild degree; the adjacent structures may become variously displaced, as, the margins of the lungs, the left lung itself, the liver, central tendon of the diaphragm, etc., which may be pushed upward, or downward, etc., according to the degree of fluid effused. Generally the patient can rest more easily by lying on the side affected.

Inspection will discover more prominence of the præcordial region, and a fullness or widening of its intercostal spaces, with more or less external œdema in this situation; the impulse will be undulating, and will be felt upward and somewhat outward, about the fourth intercostal space, behind and slightly external to the nipple. These symptoms, as well as those detected by auscultation, are not constant, and will vary according to the degree of fluid present. Perhaps the most valuable sign is that resulting from percussion, which detects an increased præcordial dullness of a triangular shape, the base below, and the apex above; the base usually corresponding to the sixth or seventh ribs, and the apex of the triangle reaching to some point between the second left cartilage and an inch above the clavicle. The right margin of the triangle may frequently be detected by the vocal fremitus, which will be strong over the condensed tissue, and feeble or null over the fluid.

Auscultation will detect any irregularity in the force of the impulse, and in the rhythm of the heart; friction-sound may, or may not be heard at the base of the heart. The sounds of the heart will be feeble, muffled, and distant at its apex, but will increase in loudness as the stethoscope is carried upward; the second sound will be full and loud at the summit of the sternum, while the first sound will be much more marked at this point than directly over the ventricles. When the apex lies behind a thick body of fluid, if the hand be applied while we are auscultating, the heart's impulse will be found to lag a little behind the systolic sound.

When the hydropericardium forms part of a general dropsy, the presence of the latter, its cause, together with the signs of pericardial effusion, must all be taken into consideration, in order to avoid an incorrect diagnosis; the general symptoms will be in accordance with the disease occasioning the local dropsy.

When the hydropericardium is due to impeded or disordered

circulation, the result of chronic organic changes of the heart, lungs, etc., the fluid accumulates slowly and no inflammatory symptoms are present. In many cases, the patients will be debilitated, and of a lymphatic or leucophlegmatic diathesis. It is only when there is a considerable amount of fluid present that the patient will experience any decidedly marked symptoms, as a weight in the cardiac region, pain in the back and loins, sense of oppression, sometimes dry cough, inability to active exercise, palpitations, cold and œdematous extremities, depression of spirits, lividity of the lips, an inability to remain in the horizontal position, and a scanty, high-colored, and turbid urine. These symptoms vary considerably with different patients, and with many the only symptoms complained of will be the sense of weight and oppression. The pulse may be regular or irregular.

The physical signs will be very similar to those named above when the disease is due to an acute attack, with the exception that there will be no prominence of the præcordial region, no sound of friction, and the triangular præcordial dullness will have its apex considerably below the point named above.

The *diagnosis* of hydropericardium is by no means an easy matter, and especially when it is complicated with disease of the valves, etc.; besides which, a pleuritic effusion, which almost always accompanies the pericardial effusion, may cause a displacement of the heart, and may also obscure the symptoms very much. Consequently, we must take into account all the symptoms present, as, derangement of the heart's action, and of the pulse, weight and oppression in the cardiac region, the impulse of the heart, as if transmitted through a fluid, the triangular præcordial dullness on percussion, the sounds from auscultation, the absence of the fluctuation in hydrothorax, palpitations, syncope, cold and œdematous extremities, previous history of the case, etc.

The *prognosis* is unfavorable; but less so in the first variety described. Yet cures are sometimes effected, and remedial measures should always be thoroughly and perseveringly pursued.

Post-mortem examination reveals various conditions according to the cause of the effusion and its complications. In the first-named variety there will be evidences of inflammatory action present, as, thickening of the pericardium, deposits of lymph, and albuminous flakes in the fluid; and the fluid may be serous and turbid; albuminous; almost purulent, or even bloody. And several lesions may also be detected, as, of the heart or its valves, of the pleura, and of the lungs and bronchial tubes.—In the second variety there will be no injection of the pericardium, as in the preceding case; and this

covering will be found opaque, somewhat thickened, and perhaps softened; sometimes it will be quite white. The fluid will be colorless, yellowish, brownish, or greenish, and mostly limpid; but sometimes turbid. The surrounding organs will likewise, as a general rule, be found in an abnormal condition.—The appearances in the third variety will resemble those of the two preceding forms, depending, however, upon the particular cause of the effusion, and the character and location of the morbid conditions.

The *treatment* of hydropericardium, after all inflammatory symptoms have been subdued, will consist principally of alterative tonics and counter-irritants; hydragogues and diuretics will be found of no service, except to remove accompanying dropsy of the extremities or other parts; and in those cases due to organic changes in the lungs, heart, or great vessels, their employment will more generally be followed by serious consequences, from the great depression they occasion;—hence they should be used, if at all, with great care, and only in those instances where the strength and general condition of the patient will permit. Dry cupping, or wet cupping over the region of the heart will often be found advantageous as an external means; or, the application of a Compound Tar Plaster, keeping up a discharge for a long time. The strength of the patient must be kept up by tonics and nutritious diet; and Iodide of Potassium, Iodide of Ammonium, or Chloride of Gold and Sodium be administered internally, or, such other remedies as the accompanying lesions or primary disease may require. The Chloride of Gold and Soda, in particular, will greatly promote absorption and relieve the effusion, and also act as a diuretic. In connection with these means, a persevering and prolonged use of the Compound Infusion of Parsley will be found a most valuable auxiliary, especially in those cases where there is much debility, paleness, or anemia. An attention to the general hygiene of the patient, adapting it to his particular condition will also be a necessary part of the treatment.

Paracentesis pericardii or tapping the pericardium, has been proposed, and in a few cases has been performed successfully, while in others it has afforded temporary relief. M. Aran relates a case in which he performed pericardial paracentesis twice within twelve days, twenty-eight ounces of fluid escaping from the first operation, and forty-nine ounces from the second. After each operation he injected an iodurettted solution into the sac; the result was successful. It must be recollected, however, that if the disease occasioning the effusion of the fluid be not removed, there will, after a longer or shorter time, be a renewed accumulation of fluid. The cases in which this operation will prove more successful, will, it seems to me,

be those in which the effusion is the result of inflammatory action. If the operation be performed, great care should be taken to prevent the introduction of the external air.

At this place I will make a few brief remarks relative to *Cardiac Dropsy*, or dropsy resulting from a disease of the heart. Medical writers have not positively determined the particular cardiac affections which occasion dropsy, though it is well known that patients who have suffered for years from valvular affections, hypertrophy, etc., have ultimately died without dropsy having occurred, or, if it did, it was only during the last weeks of life. Dropsy may occur, however, from hypertrophy, dilatation of the right side with or without a tricuspid regurgitation, or any other cardiac disease which interferes with the flow of the venous blood; the dropsy not depending so much upon the extent of heart disease present, as upon the degree of venous congestion it produces, and the impoverished condition of the blood.

The first observable symptom of anasarca due to a cardiac lesion is a swelling of the feet and ankles, pitting upon pressure; the swelling increases, and gradually ascends upward. Indeed, a dropsical swelling beginning in the ankles is considered a very important indication of heart disease. Sometimes the swelling will be first noticed about the eyelids, which is as important in its indication as when it commences in the inferior extremities. The swelling in the feet is usually worse in the evening and better in the morning; that in the face is worse in the morning, and better at night. The infiltration is at first confined to the subcutaneous cellular tissue, but eventually increases and extends into the peritoneal and pleural cavities, the pericardium, and indeed into every serous cavity of the body.

In connection with the dropsical effusion, certain symptoms of heart disease may also be detected; thus, cough and dyspnœa may have preceded the dropsy, or may accompany it; there may be irregular movements of the heart; the heart may be felt and heard to beat beyond the præcordial limits; its impulse may be unnatural; there may be fluttering palpitations, distended jugular veins, a dusky skin, and livid lips and extremities. Or, the patient may have at some time previously suffered from an attack of acute rheumatism, which may have occasioned some cardiac lesion to be ascertained by a thorough investigation. In aged persons, a series of symptoms will be present indicative of organic changes in the heart and great vessels.—The heart disease may or may not be associated

with some affection of the kidneys; and this latter malady may of itself give rise to what is termed *renal dropsy.*

In the *treatment* of cardiac dropsy it must be borne in mind that, unless the heart disease giving rise to the dropsy be cured, no permanency of cure can be expected; for after its disappearance under treatment, the effusion may appear again and again. Besides, any serious lesion of other organs, as, the liver, kidneys, lungs, etc., anemia, plethora, or constitutional taint, which may co-exist with the cardiac dropsy, will render this disease less amenable to treatment.

The principal remedies for the removal of the dropsy, are diuretics and hydragogues, such as are hereafter named under the treatment of Dropsy; in conjunction with such agents as are calculated to improve the condition of the heart, to repair the impoverished blood of anemia when this is present, to remove any constitutional taint, and to impart strength to the general system. The use of the spirit-vapor bath once or twice a week, according to the strength of the patient, will also be found exceedingly beneficial. When the patient is greatly debilitated, we must be very cautious in the employment of active depletory agents, as, hydragogues, diuretics, and profuse sweating; in such instances the greatest benefit will be derived from the prolonged use of the Compound Infusion of Parsley, made with equal parts of good Holland Gin and Cider, instead of Cider only. Of course, the general hygiene of the patient must not be neglected.

HYPERTROPHY OF THE HEART.

Hypertrophy or Enlargement of the Heart is an increase of the muscular tissue of this organ, more generally occurring in the left ventricle, but also found affecting the right ventricle, as well as the auricles. When the muscular walls of one or more of the heart's cavities are thickened, the cavities remaining of their natural size, it is termed *simple hypertrophy.* If with the thickening of the walls the cavities become diminished in size, it is termed *concentric hypertrophy*, or, *hypertrophy with contraction*, which, together with the previous form, is of rare occurrence. When the walls are thickened, and the cavities become larger than natural, it is termed *eccentric hypertrophy*, or, *hypertrophy with dilatation.* The hypertrophy may be limited to one or two compartments, or it may be general and affect them all. Males are more liable to the disease than females; and it is more commonly met with after the middle period of life, though younger persons, even to childhood, are not wholly exempt from it. Hypertrophy of the heart

is rarely met with alone, dilatation of the cavities, and valvular affections are more generally co-existent with it.

The *cause* of hypertrophy is generally some impediment to the circulation requiring an increased effort of the heart to surmount it, or, an obstruction to the free play of this organ. Dr. Barlow divides these causes into three classes, viz.: 1. Obstruction from changes in the orifices of the heart, or in the course of the circulation. 2. Obstruction arising from changes in the quantity or physical properties of the blood. 3. Deficiency of strength in the parietes of the heart itself.—Among the exciting causes may be named those which act by habitually stimulating the heart, as, excessive use of fermented liquors; exciting moral emotions; violent and prolonged muscular efforts; a sedentary life in conjunction with the habitual use of rich and stimulating diet; intemperance in alcoholic liquors; excessive venery, or masturbation; a rheumatic diathesis with a syphilitic taint; and the irritation of an adherent pericardium. Impediments to the circulation are produced by aortic contraction, or regurgitation; mitral contraction, or regurgitation; which give rise to hypertrophy in the left ventricle and auricle. Tricuspid regurgitation, and narrowing of the pulmonary artery, or any impediments to the circulation in the lungs, exert a similar effect upon the right ventricle and auricle. Prolonged obstructions to the renal capillary circulation, as well as to the general capillary circulation, may also produce the disease under consideration.

The *symptoms* of hypertrophy of the heart are, a sense of oppression, shortness of breath, and palpitation, which occur especially on exertion, or on ascending high ground, stairs, etc.; these symptoms, however, are not so urgent as in some other affections of the heart. The pulse is full, strong, and firm; losing, however, some of its strength and resistance, if dilatation be also present. The face is generally florid, unless dilatation co-exist, when it will be more or less purple or livid, according to the degree of dilatation. Anasarca is not, as a general rule, an accompanying symptom. The pulsations of the carotid arteries may be seen. Headache, vertigo, epistaxis in the young, and apoplexy in the old, are frequent attendants, the latter more especially in advanced stages of the disease, in which secondary morbid changes in the brain are liable to be generated.

In the *diagnosis* of hypertrophy of the left ventricle, we will find a fullness or arching of the præcordial region, with widening of the left costal interspaces from the third to the seventh; this will be more especially observed in advanced cases. The impulse of

the heart raises the hand applied over its apex with an increase of force proportioned to the amount of the disease. The point of the apex-beat, instead of being between the fifth and sixth ribs, is lower down, sometimes as far down as the eighth rib; and may also be carried outward or inward, from changes effected in the position of the heart as a consequence of its enlargement. It may be regular or irregular, depending upon the absence or presence of some other co-existing abnormal condition, slower than natural, and of a heaving character.

The pulse will be strong, jerking, or vibratory, is increased by exercise or mental excitement, and when palpitations are present, it participates in the tumultuous action of the heart. On percussion we find the præcordial dullness to have extended both transversely and longitudinally, losing its triangular form, for one having more of a square outline. Auscultation will detect the systolic sound dull, muffled, prolonged, and the diastolic sound loud but of lower pitch than natural, and of a clanging character. No bellows murmur will be present, unless there be some other morbid condition present.

The physician must not misjudge the condition of the patient merely because the sounds of the heart can be heard over a large extent, even if they be sharp and clear, as this is by no means indicative of cardiac organic disease; it is not uncommon for palpitation to be present, with the sound propagated over the whole chest, and yet no organic disease be present. Hypertrophy lessens the normal sound; thinness of the walls of the heart, gives the sounds clear and shrill; dilatation of the cavities and thinness of the walls, give loud and clear sounds, but if hypertrophy be present instead of thinness, the sounds will be loud, dull, and the first sound slow.

If the hypertrophy be accompanied with dilatation, there will be some variations in these physical signs. The extent of impulse will be much greater, it may be felt as far as the eighth rib, as well as in the back; is not so heaving as in the simple form, but is sharper, and more knocking, or slapping. The force of the impulse may be so great as to visibly shake the patient's head, or the whole body, and, in some cases, even the bed upon which he lies. More or less pain in the region of the heart is a common symptom. The præcordial dullness may extend from the second to the eighth rib, and if the dilatation be considerable will be of greater extent horizontally than longitudinally. And the systolic and diastolic sounds will be abrupt, greatly louder, of greater extent, and the first sound of a higher pitch than natural. If valvular disease be

present, a systolic bellows murmur will be superadded to the above signs.

Hypertrophy of the right ventricle is, as a general rule, associated with more or less dilatation of its cavity, and when well-marked, is seldom met with, unless in conjunction with hypertrophy of the left also, and is not so readily detected as the latter. The inferior portion of the sternum will be arched, there will be greater epigastric fullness than natural, and the left costal cartilages may be more projecting than the right. Percussion will detect dullness, beyond the right margin of the sternum, depending, however, upon the extent of the hypertrophy, and the dullness will also extend considerably to the left. Greater dyspnœa will exist, and the heart's impulse will be found situated more to the right against the sternum, and ensiform cartilage. The systolic sound at the ensiform cartilage will be duller than natural; the diastolic fuller, stronger, and more accentuated. The pulse is of natural force notwithstanding the strong action of the heart. Engorgement, and œdema of the parenchyma of the lungs, may be present, as well as pneumonia, hemoptysis, and pulmonary apoplexy, but with these latter, valvular disease is also present.

Hypertrophy of the auricles seldom if ever occurs alone, but is usually associated with valvular abnormality, and there are no positive physical signs indicating the enlargement.

In an examination of the physical signs of the various affections of the heart, great care should be taken not to be misled by somewhat similar signs associated with pleuritic and pulmonary diseases.

The *prognosis* of the cardiac hypertrophy depends upon its amount and accompanying morbid states. The simple form is much more favorable to a prolonged existence when of medium amount, and when at the same time, proper hygienic measures are observed. The more extensive the hypertrophy, the less favorable will be the prognosis, and still more unfavorable will it be when associated with dilatation. Dilatation renders the prognosis more serious in proportion as it exceeds the hypertrophy. It is impossible to form an idea of the length of time a person may live with this disease, it varies from a few months to several years, and may destroy the patient suddenly, or he may die from some other disease. Much depends upon the accompanying morbid conditions, the surroundings of the patient, and his management of himself. A physician, a particular friend of mine, was affected with eccentric hypertrophy for thirteen years, when a severe diarrhea carried him off.

Post-mortem examination reveals various conditions, according to

the extent of the disease, and its concomitants. The heart is of greater size and weight than natural, the walls of the affected ventricles being two or three times thicker than when normal, the thickness being, as a general rule, uniform when it is the left ventricle, which is enlarged, and irregular when it is the right, the thickness, in the latter case, being much more considerable near its base. The substance of the hypertrophied walls when cut into will be firmer than natural, and the cut surfaces will present a redder appearance. In connection with the hypertrophy, there may also be observed, more or less dilatation or diminution of one or more of the cavities; false membranous layers between the heart and pericardium; fatty changes; thickening of one or more of the valves; hypertrophy of the columnæ carnæ; calcareous, ossific, or cartilaginous concretions in the aorta, or valves; with diseased states of the pleura, lungs, bronchial tubes, and other organs; but these various abnormal conditions are only the concomitants, and are not always necessarily connected with the hypertrophy.

It is very doubtful whether *treatment* can effect much more than palliation, perhaps, it may moderate, or check the tendency to farther increase, but no more. And were it possible to cure the disease even in its simple form, a tedious, persevering, and rigid course of therapeutical and hygienical measures, continued for several years, would be absolutely required; and, experience has proven that with the best treatment, and under the most favorable circumstances, it is a very difficult thing to persuade a patient with chronic disease to persevere in the treatment of any one physician for more than four or six months at the farthest, unless some decided and well-marked change for the better has occurred, and which, with many diseases, is an absolute impossibility. Hence, a disease which might possibly be cured under the long-continued attendance of a medical man who has closely watched its progress and its characters when under the influence of certain medicines and hygienic treatment, will, probably, never be cured under the attendance of several physicians in succession, each one of whom will necessarily consume a certain amount of time in learning those peculiarities of the diseases, already more or less perfectly ascertained by the previous medical attendants. In many cases, the physician is discharged, just about the period when his knowledge of the disease and its requirements is at its maximum.

In the therapeutical treatment of cardiac hypertrophy, general blood-letting, and all depletive or other measures that debilitate must absolutely be avoided. Cupping or leeching over the region of the heart, to a moderate extent, may relieve pain, or powerful

ventricular excitement, but it is a course I rarely pursue. And even should the patient be highly plethoric, I place more confidence in attentions to the surface without causing profuse diaphoresis, regularity of the bowels without purgation, moderate diet, and diuretics. Yet, there will be cases, in which an action of the liver, or even of the kidneys, will be more thoroughly effected by purgatives than by diuretics, and a tendency to congestion in the system be more fully and permanently prevented.

Various sedative agents have been recommended from time to time for the purpose of tranquilizing the palpitations, and lessening the painful and oppressive sensations in the cardiac region. There are but two which I am in the habit of using, viz.: 1, The Alcoholic Extract of Conium Maculatum, which may be given in one or two grain doses, repeated every half hour or hour, until the desired quietude is produced, and which I consider the best agent in a majority of cases, especially where there is much nervous agitation; and, 2, The Alcoholic Extract or Tincture of Aconite Root, which may be given in doses of one-eighth of a grain, or ten drops, every three or four hours. The Tincture of Gelseminum has also been highly lauded, and, from its influence upon muscular tissue, I should judge it to be valuable, but I have not employed it in this disease.

I have found the Tincture of Sheep Laurel, in doses of ten or twenty drops, three or four times a day, decidedly useful in many cases; or, it may be given in the following combination: Take of Tincture of Musk, Essence of Cinnamon, Ether, and Tincture of Sheep Laurel, each, equal parts; mix. The dose is from ten to thirty drops, repeated three times a day. (*See further on, Palpitation.*)

In combination with these internal agents, local applications should be made over the region of the heart, as, Plaster of Aconite, Compound Plaster of Belladonna, and, in some cases, Croton Oil Liniment, or even the Compound Tar Plaster. Some caution must be had in the employment of these local means, where cupping or leeching is resorted to, at least until the slight wounds produced thereby have cicatrized.

Iodine, Iodide of Ammonium, or Chloride of Gold and Sodium, may be administered internally, with a view and a hope of at least checking further tendency to hypertrophy. A very useful preparation is the following: Take of carefully dried Ox Gall two drachms, Bromide of Ammonium two drachms, Extract of Conium one drachm, pulverized Black Cohosh a sufficient quantity to form a pill mass; mix, divide into sixty pills, of which one is a dose, to be repeated three or four times a day. It will be better to admin-

ister one of these agents for a few months, and then employ the other, and so on alternately. And, in conjunction, diuretics from time to time must not be omitted. The shocks from an electrical or electro-magnetic battery must be avoided, unless they are very moderate. Hydragogues should not be employed, unless dropsical symptoms are present, and then with great care; diuretics are to be preferred when they will act. Measures that may produce anemia must be avoided; and should anemia be present, tonics and chalybeates must be exhibited, as the Elixir of Iron and Cinchona.* If chronic catarrh, chronic bronchitis, pulmonary emphysema, dropsy, or a tendency to apoplexy, etc., be present, the proper preventive or remedial measures must be resorted to.

The following will be found an excellent remedy in cardiac hypertrophy: Take of Iodine, finely pulverized, six grains, Alcoholic Extract of Conium, Alcoholic Extract of Cimicifuga, each, twenty-four grains, finely powdered Xanthoxylum a sufficient quantity to form a pill mass of proper consistence; mix, divide into twenty-four pills, of which three or four may be taken daily, or, one pill every three or four hours.—Recently, I have derived considerable benefit from the Tincture of Cactus Grandiflora.

As to the hygienic measures, the patient must avoid all exertion or excitement, whether physical, emotional, or intellectual; the powerful passions, as, anger, grief, joy, etc., must especially be guarded against. Mental depression must be equally avoided. Cheerful society is advisable, but not where cheerfulness is carried to a degree of excitement. Coition should be rarely indulged in. Exercise must be moderate, in the open air, and principally passive. Late hours at night, as well as rising too early in the morning, are not to be advised. The diet should be moderate, nutritious, and of easy digestion. Contrary to the rule usually laid down, I advise patients with this disease to dispense as much as possible with vegetables, and make use of meats, especially tender beefsteak, and roast beef, with bread sparingly covered with butter, and in my practice it has answered a much better purpose than the opposite course. Alcoholic liquors are to be avoided—though, in some instances, an occasional and moderate use of wine or beer will be advantageous. But, it is better by far for the patient to avoid stim-

* Whenever I refer to the Elixir of Iron and Cinchona, I mean the article now generally prepared by pharmaceutists, and which contains soluble Pyrophosphate of Iron, as one of its ingredients. Or, the preparation under Chronic Peritonitis, consisting of Blue Flag, Black Cohosh, Soluble Pyrophosphate of Iron, etc., may be used as a substitute.

ulating fluids as much as possible, using for drink, whenever required, instead of tea, coffee, or milk, small quantities of some pleasant diuretic infusion. The mind should be kept agreeably occupied; and if there is much wakefulness at night, a pill of the Extract of Conium will induce sleep.

ATROPHY OF THE HEART, in which the walls of the heart become diminished in thickness and weight, is of very rare occurrence; it may be the result of wasting or disease, and is met with in phthisis and cancer, or, it may be congenital. The impulse of the heart is of more limited extent than natural, and lacks force; the pulse is small and rather slow; præcordial dullness is less extensive, and there will be a want of vigor throughout the system generally. Very little, however, is satisfactorily known concerning either the symptoms or the treatment of cardiac atrophy. When the atrophy is due to a conversion of the muscle into fatty matter, it is termed *fatty degeneration*, which will be referred to hereafter.

DILATATION OF THE HEART.

Dilatation of the heart is an unnatural expansion of the cavities and orifices of this organ, and is more commonly complicated with valvular disease, and with organic and functional disease of the heart, lungs, liver, or kidneys. So that the dilatation may be present in various degrees, as well as in different combinations. Indeed, in the majority of cases of cardiac dilatation, their history will reveal some prior affection, as, acute rheumatism, syphilis, etc., as well as, perhaps, some present accompanying organic disease of one or several of the organs above named.

Three forms of dilatation have been described by medical writers; the first, being associated with hypertrophy, or where there is an increased capacity of the heart's cavities, with an abnormal thickening of their walls, and which is termed *hypertrophous dilatation;* the second, where, notwithstanding the dilatation, the walls remain of the same thickness as belongs to them in their normal condition, and which is termed *simple dilatation.* To my mind, this second variety is a minor degree of hypertrophy with the dilatation, and hence really belongs to the first form. The third form is that in which the walls of the chambers are greatly thinner than when in a normal condition, and is termed *attenuated dilatation;* in this form, when the dilatation is excessive, the muscular substance of the walls is soft and flaccid, and in many cases loaded with fat. As a com-

mon rule, the dilatation is general, involving the whole heart, or both ventricles, one, however, being more extensively dilated than the other; partial dilatation, or expansion of certain cavities, is rarely met with, and are of much less importance. Partial dilatation is usually confined to the right ventricle, seldom to the left. The affected ventricle (or ventricles) is dilated more in its transverse than in its horizontal diameter, it therefore assumes a globular form, and the heart's apex being consequently almost effaced is not detected without some difficulty.

Dilatation of the orifices, especially the auriculo-ventricular, may be met with as frequently as that of the cavities, and may exist alone or in conjunction with the latter. As a general rule, it only happens when the auricle and ventricle of the same side are simultaneously dilated. As with the cavities, the dilatation of the orifices may exist in various degrees; but when it is of considerable degree the auriculo-ventricular valves become insufficient for their purposes of closing the orifices. Occasionally, the arterial orifices are found slightly dilated.

The *causes* of cardiac dilatation may be found among those circumstances which give rise to an accumulation of blood in the cavities, distending them. The accumulation of blood may be due to an impediment during its passage from the cavities, and with this there will be a weakness of their walls, rendering them insufficient to overcome the resistance opposed to them; hence, dilatation will ensue more or less rapidly, according to the extent of the obstruction, and the debility of the walls. Among these circumstances may be named valvular disease, contraction of an orifice, frequent returns of nervous palpitations, depression of the mind, excessive venery, masturbation, and whatever tends to produce a feeble state of the heart's activity and power. It is, fortunately, by no means a common affection, and is more apt to be met with in persons of a nervous, lymphatic, rheumatic, or scrofulous constitution, who are feeble and delicate, and also among those addicted to vinous or alcoholic drinks.

Cardiac dilatation may also follow inflammation of the heart; rheumatic attacks of this organ, phthisis, asthma, pulmonary emphysema, syphilis, exhausting maladies, chronic bronchitis, asthma, hepatic congestion, and anasarca, are common concomitants of this disease.

Independent of the *symptoms* of co-existing maladies, those of dilatation of the heart will be such as indicate an enfeebled condition of this organ, and they will be found to vary considerably, according to the degree and extent of the expansion, and its com-

plication with other abnormal conditions of the heart and its orifices. It is not necessary to enter into a description of these varied and modified symptoms, a reference to the principal ones which may be observed when the disease has considerably advanced, must suffice. It must be recollected, however, that uncomplicated dilatation of the heart, as well as partial dilatation, are seldom if ever brought before the practitioner for treatment; the dilatation is almost always general, and the symptoms more or less modified by the co-existing morbid conditions.

The pulse will be found permanently irregular, unequal, weak, and generally small; there will be great uneasiness in the region of the heart with distressing palpitations; the patient will become irritable, peevish, and despondent, will lack both physical and mental energy, and will have his sleep disturbed by frequent startings and unpleasant dreams; he will suffer from attacks of chilliness, from constipation, from dyspnœa, and also from orthopnœa, with diminution of the urinary secretion; albumen may frequently be detected in the urine. Asthma, or a wheezing respiration, and cough, together with the difficult breathing, demonstrate the suffering of the pulmonary organs from the venous congestion. From the tendency to this congestion, the liver also exhibits a rapid increase of tumefaction, in a few hours descending far into the abdomen, yet returning to its ordinary size on the subsidence of the congestion. Œdematous swellings of the feet and ankles, anasarca, ascites, or hydrothorax may be present; usually one of them. The skin will be sallow, or of a leaden color, especially in the morning, about the eyes and mouth; and the inferior extremities will present a blue or livid appearance. Nausea, and deranged appetite exist in the advanced stages. In addition to which there may be injection of the eyeballs, muscæ volitantes, tinnitus aurium, partial deafness, attacks of epistaxis, dull headache, mental sluggishness, drowsiness, and coma. A rupture of the heart may occur under certain circumstances, when there is dilatation of the cavities, with excessive attenuation of the walls, and more particularly, if softening be also present.

In the *diagnosis* of cardiac dilatation we will find the heart's impulse to be feeble, tremulous, and irregular, and it may be more extended than natural, without any arching or bulging of the cardiac region. Dullness on percussion over this region, as in hypertrophy, will occupy a wider space than natural, with a squareness of outline. Auscultation will detect the systolic sound, short, abrupt, superficial, full-toned, and of higher pitch than natural, if the muscular walls of the heart be firm and properly nourished,

while the diastolic sound will be about as usual. But if these walls be soft, flabby, or fatty, the systolic sound will be weak, faint, toneless, and of high pitch, while the diastolic sound will be so faint as scarcely to be heard at the apex. Indeed, the leading physical signs are, increase of the area of dullness over the heart, feebleness of impulse, feebleness and smallness of pulse, feebleness of the sounds of the heart, and absence of true valvular murmur—and, with these, there will be dyspnœa on exertion, pulsation of the jugulars, and a liability to cerebral, pulmonary, hepatic, or renal attacks, with a tendency to dropsy. Should any murmurs be present, they may be due to an impoverished condition of the blood, or to incompetency of the valves, permitting regurgitation.

When the right ventricle only is dilated, the præcordial dullness will extend to the right, there will be a turgid state of the jugulars, and excessive pulsation in the epigastric region. If the walls are very weak, there may be a systolic murmur along the course of the pulmonary artery, from coagulation of blood within the dilated cavity. This partial dilatation is rarely met with.

Dilatation of the auricles may be ascertained by the dullness on percussion over their natural positions. If the right auricle is dilated, the jugular veins will be permanently enlarged and knotty. If the left auricle be dilated there will be signs of mitral disease.

Dilatation of the heart may be distinguished from other cardiac affections by the following symptoms, which are wanting in dilatation:

In *simple hypertrophy* there is a bulging over the cardiac region, the impulse is distinct and thrusting, the heart is lowered, its action is more forcible, the systolic sound is dull, muffled, and prolonged, the systolic silence is short, and the pulse is full, strong, and resisting. In *eccentric hypertrophy* similar symptoms are present, but the systolic sound is loud and powerful; however, if the dilatation predominates over the hypertrophy, the symptoms will then partake more of those of dilatation.

Mitral regurgitant disease will manifest a more forcible impulse, and its peculiar systolic murmur at the left apex; if, however, a murmur exist without the mitral valves being diseased, the signs of dilatation, if present, will enable us to distinguish the malady.

Chronic effusion of the pericardium gives rise to friction sound, the præcordial dullness partakes more of a triangular outline, and the impulse will be undulating.

The *prognosis* of dilatation of the heart is always unfavorable; a slight degree of expansion may be present without lessening the

period of life. But when the cavities are greatly dilated, with urgent dyspnœa, great constitutional debility, pulsation of the jugulars, impoverished blood, and œdema or dropsy, life may terminate in from six to twenty months.

When the expansion is moderate, it produces little inconvenience, can not be so readily detected, and requires but little treatment. A proper course of hygienical and therapeutical measures may prolong life considerably.

A *post-mortem* examination reveals an enlargement of the chambers of the heart, and, sometimes, also of the auriculo-ventricular orifices, with more or less grumous coagula in the dilated cavities. If the walls are hypertrophied, the appearances named under Hypertrophy will be observed. If the dilated walls be thinned, they may be found reduced to a line or two in thickness, and consisting of a soft, flabby tissue, sometimes readily broken down by the mere pressure of the finger, and presenting a darker red color than natural, or paler, or mottled yellowish-brown. If this softness of the tissue is unequal, the formation of an aneurismal-like pouch may be perceived at the softer and more yielding point. The fleshy columns are usually stretched and spread out. If the muscular walls be microscopically examined, the fiber will be found somewhat granular, with a diminution of its striated character, and fatty or other adventitious matters may also be present.—In connection with the above appearances there may also be evidences of other abnormal conditions, as, pericardial adhesions, valvular disease, etc., as well as diseased states of the other organs heretofore referred to as co-existing with the dilatation.

The indications of *treatment* are, to remove the cause of the dilatation if this be possible; to tranquilize the circulation, and to relieve the heart of the blood which overloads or oppresses it; to strengthen the walls of the heart, so that it may be enabled to expel the contents of its cavities, and oppose the further progress of the dilatation; and to diminish pulmonary, hepatic, and other congestions, without enfeebling the patient.

Dilatation arising from valvular disease, or from pericardial adhesion, can only be palliated, not cured. But when it arises from prolonged muscular exertion, violent mental emotion, repeated attacks of bronchitis, profuse hemorrhages, exhausting diseases, anemia, constrained postures, playing on wind-instruments, etc., much benefit may often be derived from treatment, provided the disease is not in an advanced stage, the walls of the cavities are not thinned or softened, and the patient has not reached his fortieth year.

To tranquilize the circulation, and to relieve the heart, the patient must be kept as quiet as possible, avoiding all physical and mental excitement, although moderate exercise without inducing fatigue is advisable, such as walking short distances, riding in a coach, etc. The diet must be regulated, selecting nutritious food, easy of digestion, and such as will not occasion uneasiness of the stomach, acidity, flatulency, or constipation; full meals must not be permitted as they are apt to occasion palpitation. Animal food is decidedly preferable to vegetable. As to fluids, the less drank by the patient the better will it be for him, except it be for the purpose of producing diuresis, whenever this is indicated. A dry air is preferable to a moist one. The bowels should be kept free either by diet, or by mild laxatives; the renal secretion must be kept as normal as possible by diuretics, and the skin must be maintained in a healthy condition by occasional bathings, and the wearing of flannel. The feet must be kept warm and dry. And all dyspeptic symptoms must be combated by remedies which will neither enfeeble nor excite. The Extract of Belladonna, or of Conium Maculatum, may be used both internally and externally to tranquilize excited action; but aconite, digitalis, and cupping or leeching are to be positively interdicted. The Alcoholic Extract of Cimicifuga or its infusion will be found useful as a tonic and tranquilizer.

To strengthen the walls of the heart, in addition to the preceding measures, tonics must be given, and everything calculated to debilitate the system must be avoided. A very excellent non-stimulating tonic may be prepared, as follows: Take of the bark of the root of Wahoo, root of Black Cohosh, each, two ounces, Bloodroot, Pleurisy Root, each, half an ounce; mix, make into two quarts of syrup, and give one or two tablespoonfuls, every three or four hours. In a few cases, where the patients had reached adult age, were anæmic and feeble, with a tendency to dropsical infiltrations, the disease having made but slight progress, I have met with the most decided benefit from the employment of the Elixir of Iron and Cinchona, in conjunction with the Compound Infusion of Parsley. At the commencement of the disease considerable benefit may be derived from preparations of Iron conjoined with Strychnia in doses varying from one-fiftieth to one-twentieth of a grain. The Tincture of Cactus Grandiflora in doses of from ten to forty drops three times daily, has been highly recommended, in all heart diseases; it is employed in conjunction with the other measures pursued. I have certainly found it useful in several cases. Prof. J. M. Scudder prefers adding a

fluidrachm of the tincture to four fluidounces of water, of which the dose is a teaspoonful, three or four times a day.

To diminish pulmonary and other congestions we must rely entirely on expectorants, diuretics, and gentle diaphoretics, together with frictions over the surface, warmth and local stimulants to the inferior extremities, and quiet on the part of the patient in a moderately warm and dry apartment. Dry cupping and sinapisms over or near the congestive organ will also be of service.

Paroxysms of dyspnœa may be relieved by the Ethereal Tincture of Lobelia, Indian Hemp, or, some of the non-stimulating measures named under the treatment of Asthma; or by the Liniment of Oil of Turpentine, Oil of Amber, etc., named under Hypertrophy. The Tincture of Cactus has also afforded singular relief. Dropsy, by the means named under Hypertrophy; the Compound Infusion of Parsley will frequently be found beneficial, when its stimulating influences are not so great as to contra-indicate its use. More ordinarily, however, when the disease has advanced so far as to give rise to dropsical effusions, a temporary benefit is the most that can be expected from treatment; and more especially when disease of the valves and orifices is also present. Flatulence must be corrected by carminatives, with alkalies or absorbents conjoined, if gastric acidity be present. The employment of anæsthetics for any purpose whatever, is positively dangerous.

FATTY DEGENERATION OF THE HEART.

This disease does not consist in the deposition of fatty matter in the areolar or connective tissue of different parts of the heart, nor in fatty infiltration under the pericardium, amid the muscular fibers and under the endocardium, conditions which sometimes occur, but of which we have no positive methods of diagnosis and treatment. It consists wholly of a metamorphosis or conversion of the elementary particles of the muscular substance of the heart into oily or fatty matter. The disease may exist in association with hepatic diseases of various kinds, hemorrhagica purpura, scorbutus, Bright's disease, chronic rheumatism, etc., and especially with white softening of the brain, of the spinal cord, fatty softening of the kidneys, and gout; but, it must be borne in mind, that these affections may also be present in many instances, while the heart remains sound. The disease may also exist in thin persons, as well as in those who are corpulent. And although the young may labor under it, it is much more common to those of middle and advanced age.

The *causes* of fatty degeneration are not well understood. All persons are liable to it, but especially those who are sedentary in their habits and indulge in the luxuries of the table, and in smoking tobacco; it has also occurred among those who were very abstemious and careful in their mode of living. Males appear to be more liable to it than females. Frequent venesections appear to dispose to it, as well as the constant use of vinous and fermented liquors. The disease appears to be due to a mal-nutrition resulting in atrophy of the muscular elements and a molecular deposition of oily matter.

The *symptoms* are very variable, and are by no means positive; and often, if not *generally* as the rule, the fatty metamorphosis will have advanced considerably before any well-marked characters will be manifested. Thus, there will be a remarkably slow pulse, sometimes as low as forty-five or fifty beats in a minute, or it may be frequent and irregular; (Dr. H. Kennedy considers the pulse a very important aid in the diagnosis, whatever may be its number of beats; the heart being enlarged, so is the pulse; and when he finds the pulse large and compressible, passing sedately or lazily under the finger, not conveying the idea of strength, but rather of action without power, he considers himself justified in concluding that fatty heart exists—but he does not, of course, exclude other symptoms, in order to render the diagnosis more perfect); general debility; sense of nervous exhaustion; frequent sighing; the least exercise gives rise to cardiac uneasiness, or dyspnœa, or both; the appetite as well as the digestive powers are feeble; the bowels costive; the liver enlarged; the general tissues soft and flabby; muscular power at its minimum; sallowness or lividity of the face; slight œdema of the feet and ankles; orthopnœa; apnœa; asthmatic respiration; lowness of spirits; peevishness; cough; palpitations; cardiac pain; attacks of syncope from the slightest causes; choking sensations; loss of sexual power; mental debility; failure of memory; feebleness or failure of sight, hearing, and taste; singular sensations in the head; apoplectiform, or epileptiform attacks, etc. Arcus senilis is frequently present, and in conjunction with some of the other symptoms may become a valuable indication; but then it may exist independent of any heart disease, as, an accompaniment of old age, or of some disease of other organs. Patients laboring under fatty cardiac metamorphosis frequently anticipate and correctly prophesy a sudden death. These symptoms are not always present; it has often happened that the degeneration has advanced to a considerable extent before it was suspected, and even then not until some unusual

exertion had developed some of its symptoms. Rupture of the heart is by no means an uncommon occurrence. Paget observes: "The principal characters which all these cases seem to present is, that they who labor under this disease are fit enough for all the ordinary events of calm and quiet life, but are wholly unable to resist the storm of a sickness, an accident, or an operation." Persons have been met with of great muscular powers, and presenting none of the symptoms of this disease until shortly before death, in whom a post-mortem examination has detected an extensive fatty degeneration of the heart. In many instances, the first symptom experienced by the patient, is, a sensation of great distress and pain in the region of the heart; he carries his hand over the organ as if to relieve his suffering, falls into syncope, and either dies in a few minutes, or lives for a short period only, with frequent attacks of syncope, cramps, pain, dyspnœa, and a haggard, cadaverous countenance.

The physical signs possess no more positiveness than the symptoms just referred to. The heart's impulse is weak, and indistinct, as if the organ were lazily projected forward; the præcordial dullness remains of normal extent; the systolic sound is weak, short, and relatively high-pitched, is followed by a long systolic silence, and then a feeble but relatively distinct diastolic sound. If the disease be complicated with dilatation or valvular disease, the physical signs will partake more or less of the character of the accompanying disease, according to its extent, and the diagnosis, which is at all times beset with difficulties, be rendered still more obscure.

If the præcordial dullness be not enlarged, if congestion or dropsy be present, and distension and pulsation of the jugulars, the case is dilatation, and not fatty degeneration.—No murmur is present in the fatty disease, unless there be a co-existing valvular malady.—If there be prominence of the præcordial region, a triangular shape of the præcordial dullness, with distinct heart-sounds at the summit of the sternum, the case is one of pericardial effusion, or hydropericardium. The apoplectiform attacks of fatty degeneration of the heart differ from uræmic coma, in being frequently accompanied with stertor; and from ordinary apoplexy, by being of much shorter duration, attended with paleness of the face, and manifesting no subsequent disposition to paralysis.

The *prognosis*, when fatty degeneration of the heart is detected, is always serious; yet it is not always fatal, for an extensive degeneration has been known to exist, without presenting any diagnostic symptoms, and in which death was occasioned by other

causes not connected with the heart disease. If the disease can be detected before it has made much progress, and is uncomplicated, the chances for recovery, or permanent amelioration, are greater in proportion to the youthfulness of the patient. If complications be detected, as dilatation, etc., the prognosis is rendered still more unfavorable. In this disease, death frequently occurs instantaneously.

Post-mortem investigation reveals a softened state of the affected muscular tissues, which may be easily torn apart, and the interior of the ventricles presents a mottled appearance of buff-colored spots of a peculiar zigzag form; the affected tissue varies from a very light brown to a somewhat darker color, and sometimes oil globules can be pressed out of it. A similar mottled appearance may be observed beneath the pericardium; and, in very extensive cases of degeneration, a section of the walls of the ventricle will discover the same appearance throughout their entire substance, as well as of the columnæ carnæ. The heart is more commonly dilated, though it may be hypertrophied, present patches of sanguineous infiltration, and, at the softened parts, an aneurismal pouch, or even a rupture may be observed. Disease of the valves may also be present, but this is not necessarily connected with the fatty metamorphosis. Under the microscope, little else will be seen than fat granules and oil globules; the transverse striæ of the muscular tissue being absent or indistinct; the nuclei of the fibers having disappeared; and the muscular fibers being much shorter than natural, and brittle. These fibers will be made more distinctly visible, after the addition of Ether to the specimen under examination, which dissolves the fatty matter and oil.

The *treatment* of this disease will greatly resemble that of fatty degeneration of other organs, viz.: to improve the nutrition of the affected organ; and although we may not expect to restore the disorganized heart, we may do much toward palliating urgent symptoms, checking a rapid advance of the malady, and thus prolonging life. (*See treatment of Softening of the Brain*, page 163, and *Apoplexy*, page 203.) Among therapeutical agents, preparations of Iron and Quinine are the best tonics. I have derived considerable advantage from the internal employment of the Elixir of Iron and Cinchona, or of a similar preparation referred to under the treatment of Chronic Peritonitis, persevered in for a long time, in conjunction with the following: Form a saturated Tincture of Squills in Sweet Spirits of Nitre, of which from half a fluidrachm to a fluidrachm is to be taken every two, three, or four hours, until free diuresis is produced, after which its use may be dispensed with for

a few days, and then renewed, and so on during the treatment. (This tincture is also excellent in that morbid condition of the renal organs common to gross and corpulent persons, which is attended with nausea, and from which sudden death frequently occurs.)—Benefit will frequently be derived from Strychnia, which may be given in powder or tincture, or in the preparation named Citrate of Quinia and Iron with Strychnia. This article stimulates the muscular action of the heart, and is especially useful in cases associated with general weakness, or anemia. The Tincture of Arnica has also been advantageously employed for a similar purpose.

To relieve the dyspnœa, the following preparation will frequently be found advantageous: Take of Oil of Turpentine three fluidounces, pure Oil of Spike four fluidrachms, Oil of Sassafras, Oil of Amber, each, two fluidrachms; mix, and form a liniment. Rub some of this upon the throat, and over the whole of the chest, three or four times a day, whenever severe dyspnœa is present. (*Prof. A. J. Howe, M. D.*) Cardiac pain may also be relieved by this liniment, or by dry cupping over and around the seat of the pain, or by the use of some counter-irritant in the same location.—Apoplectiform attacks will require the internal use of stimulants, together with rubefacients or counter-irritants to the inferior extremities. Inhalations of Ether or Chloroform, or the employment of direct cardiac sedatives must be avoided, as they may produce serious results.

No exhausting or debilitating measures should at any time be pursued. The bowels should be kept regular, as well as the kidneys; the surface of the body should be bathed daily with a stimulating alkaline liquid, and considerable friction be produced, at the same time, by means of a flesh-brush. All unpleasant symptoms not herein referred to, must be promptly treated upon general principles. Passive exercise in a pure bracing air is advisable when no unpleasant results are produced; it is better, however, not to exercise at all, than to carry it to too great an extent. Tender animal food, avoiding the fat part, is the best diet, and may be used in moderation; port wine, claret wine, or Rhine wine may also be used judiciously to sustain a sufficient vigor of circulation; but fats, fermented liquors, succulent vegetables, amylaceous diet, pastries, soups, milk, and coffee must be avoided.

Long fasting must be prohibited, as well as alkaline drinks; any gastric acidity must be removed by the use of Charcoal or other absorbents. On the appearance of syncope, diffusible stimulants must be had recourse to; and where the pulse is slow, with a tendency to syncope, or apoplectic symptoms, brandy or wine must be freely used,—being governed rather by the effect these stimulants

produce, than by the quantity given. Tobacco smoking must positively be dispensed with. Physical and mental quietude must be positively enjoined.

There are several other diseased conditions of the heart, as well as of its orifices, valves, and arteries, which have been described by pathologists, as, *Anemia. Congestion, Accumulations of Blood in the Cavities, Extravasations of Blood in one or several parts of the Heart, Polypus Formations, Œdema, Softening, Induration, Calcification, Tuberculous Depositions, Carcinoma, Parasites, Aneurisms*, etc., and though some of them may be detected, or their presence be suspected by the physical signs, yet, as a general rule, but little is known relative to their causes, symptoms, or treatment; and, indeed, they are beyond the power of art. This passing notice, therefore, is all they require in this work, and to those of my readers who desire full information concerning them, I would recommend the various valuable monographs upon Diseases of the Heart, which have of late years been presented to the profession.

DISEASES OF THE ORIFICES AND VALVES OF THE HEART.

These are among the most serious diseases of the heart, and are met with in quite a number of instances of organic cardiac diseases, either as a cause, or as an effect. They are due to inflammations, especially those of a rheumatic or gouty character, atrophy, abnormal growths, morbid deposits, or degenerations, etc. In a practical point of view, it is of very little importance to determine whether the disease exists at the right or left side of the heart; whether it be a lesion of the mitral, tricuspid, or semilunar valves; a contraction or dilatation; an ossification; a permanent patency, or warty excrescence. The great practical points are to determine whether the murmurs present are actually due to an organic lesion, and what is the vital and physical condition of the muscular portion of the heart. These diseases present an impediment or obstruction to the circulating current, either by a narrowing or constriction of the orifices producing an obstruction to the circulating fluid, or by a dilatation of the orifices to a degree which renders their perfect closure by their valves impossible, and which occasions a backward current or *regurgitation;* this may also be caused by a diseased condition of the valves which may interfere with their normal play.

In the description of symptoms and diagnosis, presently given, it must be remembered that they principally refer each one to distinct

and separate morbid states; also, that it is rarely the case to find such isolated morbid states, as valvular diseases are almost invariably complicated, that of one valve or orifice with that of another, or with some lesion of the muscular cardiac structure; and these complications or combinations are very numerous. Again, the most prominent physical signs are often due to a more recent and least-developed malady, while the co-existence of a more important one may not be recognized. Fortunately, however, it is not necessary to minutely recognize every point connected with this class of lesions, in a practical view; the important points to determine, as already stated, are, the certainty of valvular or organic disease, as well as the vital and mechanical state of the heart, to the latter of which the treatment will be principally addressed.

Valvular disease is much more frequent on the left side of the heart; it may exist for a long time without causing local or general disturbance; it gives rise to disease of all the cavities of the heart, of the lungs even, also of the brain; and is much more apt to terminate in sudden death than when the disease is on the right side. If regurgitation without obstruction exists, we will be more likely to find dilatation of the heart; if obstruction without regurgitation, hypertrophy is the rule.

The *symptoms* of valvular disease are numerous and varied, and although they do not of themselves give any positive indication of the nature of the disease, yet they should always be taken into account with the physical signs in forming a diagnosis. The principal ones are,—more or less dyspnœa, aggravated by exercise or on ascending a hill or pair of stairs; often orthopnœa; palpitation; irregular cardiac action; a soft and irregular pulse in mitral disease; a hard, jerking, but regular pulse in aortic disease; epistaxis; hematemesis, or hemoptysis; pulmonary congestion, bronchitis, or other lung difficulties when mitral disease is present; when the right side of the heart is affected, dropsy is more common, as, œdema of the inferior extremities, anasarca, ascites, or hydrothorax; and in aortic disease, headache, ringing in the ears, vertigo, syncope, cerebral congestion or hemorrhage. The face is puffed, cheeks flushed and purple, lips congested, and eyes bright. There is usually more or less derangement of the digestive organs, with enlargement of the liver and spleen. Sleep disturbed, with frequent startings, and frightful dreams. There may also be pain in the cardiac region, varying from a slight aching sensation to a most intense pain.

The physical signs will be found to vary, according to the seat of the affection, its combinations, etc. The principal ones only will

be referred to. But first, as to the situation of the valves and orifices: A horizontal line drawn from the inferior margins of the third ribs across the sternum, passes through the pulmonic valves a little to the left of the mesial line, behind which, but about half an inch lower down, lie the aortic valves; the pulmonary and aortic orifices will be below these. A horizontal line drawn along the under edge of the sterno-costal articulations of the fourth ribs will cut across nearly the middle of the length of the mitral valve, when drawn outward and downward by its tendinous cords and columnæ carnæ, and will pass about two or three lines above that portion of the tricuspid valve which most nearly approaches it; the latter valve lying underneath the sternum, and the former immediately to its left. The mitral and tricuspid orifices will be above this line. The mouth of an ordinary-sized stethoscope will cover them all within the circle of an inch and a half or less. And in order to separate the murmurs, the instrument must be shifted an inch or two higher or lower, and then we may determine their character. The particular direction of a murmur is given to it by the orifice from which it is propagated. A murmur conveyed in an upward direction, along the course of the aorta, and which can be heard in the carotids, proceeds from the aortic orifice, and the valve there situated is the valve diseased. If conveyed downward and to the apex of the heart, the auriculo-ventricular orifice is its point of departure, and the valve there situated is the one diseased. If the murmur is conveyed both upward and downward in the directions just named, then it has two points of departure, and both the aortic and mitral valves are diseased. If the murmur be heard passing upward between the second and third ribs on the left side, and can not at the same time be heard in the carotids, it is taking the course of the pulmonary artery, and the pulmonic valve is diseased.

Mitral regurgitation from insufficient mitral valves, in which the blood regurgitates or flows backward, in its passage through the auriculo-ventricular orifices, from a dilatation of these orifices, or from some disease of the valves which prevents them from properly closing the openings. The impulse is strong, and irregular in force and rhythm; a permanent murmur, which may be soft, whispering, hoarse, musical, or whistling, is heard at the left side, being loudest toward the apex, "faintly audible, or inaudible at the ensiform cartilage, the mid-sternal base, and the pulmonary and aortic cartilages—or, below the line level with the nipple, and between the nipple and the left edge of the sternum; more or less clearly audible about and within the inferior angle of the left

scapula, and beside the dorsal vertebræ on the left, from the sixth to the ninth; audible or not round the lateral base of the chest from the cardiac to the scapular region." This murmur always attends the systole of the heart, and is not heard in the arterial trunks; the second sound is natural. The systolic sound at the apex may be more or less completely masked by the murmur, but is usually natural at the ensiform cartilage. The direction of the murmur, referred to above, is also a useful diagnostic mark; it is the one more often met with in practice. The pulse is small, often intermittent, the complexion is livid or icteric, with symptoms of pulmonary or hepatic congestion, and the urine is scanty, high colored, and depositing urates and purpurine especially.

If the orifice is contracted with other cardiac disease, the heart's action will be tumultuous and irregular, the pulse feeble and unequal, with symptoms of pulmonary congestion.—If dilatation and hypertrophy are present, which are the consequences of mitral regurgitation, the impulse and apex-beat will be carried outward and somewhat lower than natural; and the impulse will be augmented in force; and more or less of the symptoms of dilatation with hypertrophy will be superadded to those just named.

Mitral obstruction, in which there is an impediment to the onward flow of the blood, from contraction of the orifices, thickening of the valves, foreign growths, etc. The impulse is irregular and unequal in force; the murmur is of maximum force, is heard immediately above and about the left apex, and takes the same direction as in the preceding case; it does not occur with the systolic sound of the heart, but just previous to it, being pre-systolic or post-diastolic. The murmur is of a blubbering or purring character, generally somewhat rough, and is often confined within a small space, though it is sometimes heard over a considerable extent. However, mitral obstruction may exist, and this murmur be absent. In connection with this murmur, the characters of the pulse, and the symptoms of pulmonary congestion, will be the same as those named in mitral regurgitation.

Tricuspid regurgitation is frequently a result of dilatation of the right ventricle, giving rise to an impediment to the venous circulation. The murmur occurs with the systolic cardiac sound, is of a maximum degree of force just above or at the ensiform cartilage, (at the right apex), and proceeds toward the right, being faintly heard, if at all, in the left apex, and not at all in the left vertebral groove opposite the inferior angle of the scapula. It is usually soft, of low pitch, and seldom masks the systolic sound completely; sometimes it is rough, like sawing or rasping. The diastolic sound

at the right apex is feeble. Tricuspid regurgitation more commonly co-exists with dilation or hypertrophy; venous congestion of the cerebral capillary vessels, apoplexy, jaundice, congestive albuminaria, dropsies, and passive leucorrhea, are apt to attend this cardiac affection.

Tricuspid obstruction is rare; the murmur will be heard in its maximum force at the ensiform cartilage, and occurs with the diastole or second sound of the heart.

Aortic regurgitation presents a murmur which occurs with the diastolic sound of the heart, and is heard more distinctly near the left margin of the sternum opposite the third interspace or fourth cartilage; with a few exceptions, the murmur is conducted to the right, upward, and directly downward, The murmur may also be heard about the ensiform cartilage. The murmur is generally of low pitch, soft, blowing, or almost hissing, and well prolonged, filling the post-diastolic silence. The systolic cardiac sound at the base will be about natural, dull, and often obscured by a soft or harsh murmur. The pulse is large in volume, very compressible, of a splashing or collapsing character, sudden, abrupt, short, jerking, generally regular in rhythm, and, occasionally, attended with purring thrill; powerful palpitation is present, with visible pulsation of the arteries of the head and neck; bruit de soufflet in the ascending aorta, carotids, and subclavians, with *fremissement.* There is little or no dyspnœa, the urine is abundant and clear, and the complexion remains natural for a long time. The disease is more peculiar to the male, occurs during middle age, occasionally in youth or old age, and is attended with a want of vital energy, which disposes to anemia, fatty deposits, tuberculous formations, etc.

Aortic obstruction gives a murmur which occurs with the systolic sound of the heart, and which is heard more distinctly above the base of the heart, at mid-sternum, in the second intercostal space, and which is transmitted upward, more commonly to the right; it is of high pitch, loud, harsh and prolonged; occasionally twanging or somewhat musical and low-toned, and may generally be heard in the carotids of the neck. It indicates an obstruction from narrowness or roughness, etc., of the aortic orifice. When the heart is very weak or the contracted orifice quite smooth, the murmur may be faint or inaudible. The pulse is regular and natural, though if the narrowing be considerable, it will be small, hard, rigid, and concentrated. The effects upon the constitution are not generally observed until the ventricles become affected, or until the blood becomes impoverished, when anasarca may be developed.

A few *general remarks* may now be made relative to valvular diseases. When a murmur, no matter what is its peculiar quality, is heard occurring with, or nearly with, the systolic sound of the heart, it is in all cases, except of aortic disease, indicative of *regurgitation;* when it occurs with, or nearly with, the diastolic sound, it is indicative of *obstruction.* Aortic valvular lesion gives the murmur with the systolic sound of the heart, in obstruction; and with the diastolic sound, in regurgitation. The point at which the murmur is the most developed, as well as the direction in which it is propagated, should always be closely noticed, as we thereby learn the location of the affected part giving rise to the regurgitation or to the obstruction; and in order to ascertain this correctly, we must first determine the position of the heart itself. We must also be aware that two or more of these valvular lesions may co-exist either with or without morbid conditions of the walls and cavities of the heart, and that the sounds and murmurs may thereby be so masked, modified, or annulled, as to present a decided obstacle to a correct and satisfactory diagnosis. Besides, in all our examinations, the previous history of the case, the state of the system, capillary circulation, lungs, liver, kidneys, etc., should always be associated with the physical signs, as aids in forming a diagnosis.—And, again, occasionally valvular lesions may exist, without any murmur being detected. All these murmurs indicate organic lesion, with the exception of that of aortic obstruction, which may be due to anemia, or other inorganic causes, in which cases the murmur is usually soft, not permanent nor uniform, changeable, and there is no enlargement of the heart, and no aortic regurgitant murmur. Tricuspid and pulmonary regurgitant murmurs are usually, not so easily detected, as those of the aortic and mitral lesions.

M. Forget states that dilatation of a cavity always takes place behind the obstruction; and contraction of a cavity before it.

If the pulse beats with hardness and force, it is indicative of hypertrophy with constriction of an orifice. A sharp and compressible pulse, somewhat defective in volume, as well as in persistence when compared with the heart's impulse, is indicative of obstruction. A regular, very compressible pulse, large in volume, and of a splashing character, is indicative of regurgitation. In mitral disease, the pulse is small, and often intermittent; in aortic disease, large, collapsing, and regular. If other affections be present, as, hypertrophy, dilatation, etc., the pulse will partake more or less of the co-existing malady.

Palpitation, and pain in the cardiac region are more common in

aortic diseases than in mitral. Dyspnœa and general dropsy, are more common in mitral than in aortic diseases. Syncope attends aortic disease; apnœa, mitral.

As to the *prognosis*, all valvular lesions are serious, and almost always incurable. Aortic obstruction with a soft murmur, without enlargement of the heart, and without an aortic regurgitant murmur, is less serious than the other forms of valvular lesion. Death generally occurs slowly in all these cases, but it may take place immediately, by sudden syncope in aortic lesion, or by sudden apnœa in mitral; and, with the exception of the occurrence of syncope, life is more apt to remain prolonged in aortic than in mitral disease. As to the length of time a patient may live who is laboring under a valvular lesion, it is impossible for any physician to decide with certainty; the chances for continued existence are greater where the disease has not advanced toward its later stages, and where the patient rigidly observes the necessary hygienical and therapeutical measures. Dilatation renders valvular disease more unfavorable, so does hypertrophy. Indeed, it is to the existence of cardiac enlargement, that danger is to be apprehended, more than to the valvular lesion. Feebleness of murmur, of pulse, and of general nervous power, are very unfavorable signs when co-existent

Mitral disease gives rise to a dilatation, first, of the left auricle, then of the right ventricle, and lastly of the right auricle; and as these conditions gradually progress, augmented quantity of blood in the left auricle occasions pulmonary congestion, and in the right cavities, dropsy from venous congestion, the surface becoming blue or livid, and the veins of the neck being often swoln, with undulatory pulsations. Hypertrophy usually occurs along with the dilatation of the left auricle.

Aortic disease gives rise to a hypertrophy and subsequent dilatation, first, of the left ventricle, then of the left auricle, and, subsequently, if the patient continues to live, of the right side of the heart. The increased quantity of blood thrown into the left ventricle ultimately determines its hypertrophy and dilatation. When, during the progress of the disease, an increased amount of blood is suddenly thrown into the left ventricle, a feeling of distress, faintness, as if death were about to suddenly occur, is experienced by the patient, which continues as long as the partially paralyzed walls of the ventricle are unable to expel the surplus amount of blood in its cavity; and the patient either dies suddenly from an inability of these walls to remove the increased quantity

of blood, or, should the blood be expelled by the ventricular contractions, recovers from his distressing paroxysm and fear of sudden death. But, ultimately, he dies from a similar cause—the walls of the ventricle gradually become more and more feeble, from great distension, and, at last, so feeble and palsied that they cease contracting or are unable to expel accumulations of blood in their cavities.

The *post-mortem* appearances will vary very much according to the character of the disease and its combinations. The heart is usually enlarged, frequently fatty; cavities more or less dilated, and sometimes containing clots, which may likewise fill the aorta and pulmonary arteries. The affected valves may be variously diseased; in some instances, thickened; in others, hardened or ossified, rigid, contracted, with vegetations, etc.; the orifices may be contracted, natural, or dilated; and the cavities will generally be more or less dilated, with hypertrophy of their walls. Sometimes osseous masses of a rough character will be found upon the lining-membrane of the aorta, which vessel may be dilated or constricted. The pericardium will frequently be found adherent. Aortic valvular lesion is generally associated with hypertrophy; aortic regurgitation with dilatation and hypertrophy; and mitral disease mostly with dilatation. And, in connection with these diseased appearances, there will also be observed morbid conditions of the brain, lungs, liver, or kidneys, etc., according to the character and stage of the cardiac disease.

The *treatment* of valvular disease is entirely palliative, and although we may not expect to cure it, we may, by a judicious course, be enabled to ward off or relieve sudden serious attacks, as well as to prolong life. Everything must be avoided that will reduce the system, making use of measures to improve the condition of the blood, to impart nervous and muscular force, and to remove venous congestions or hydropic infiltrations whenever they are present. The agents employed will be similar to those named under Hypertrophy, and Dilatation, according as the symptoms of one of these predominate. The Elixir of Iron and Cinchona, or the preparation containing Soluble Pyrophosphate of Iron, referred to in the treatment of Chronic Peritonitis, will be found particularly suited to a great number of cases.

Cardiac pain, or palpitation may be treated as named under Hepertrophy; dyspnœa, as named under Fatty Degeneration, and Dilatation; dropsy, as named under Hypertrophy—and, in its commencing periods, the Saturated Tincture of Squills referred to under Fatty Degeneration, may be advantageously employed.

Pulmonary or other congestions will require the means referred to under Dilatation.

The Acetate of Potassa will in many cases be found a very excellent diuretic; and, in cases where, from congestion, the kidneys do not respond freely to the influence of diuretics, the congestion may be removed by purgatives, sudorifics, or by sinapisms, dry cupping, or wet cupping over and around the renal region. A combination of the Tinctures of Squills, Digitalis, and Senega will be found frequently beneficial in mitral lesions. This is also useful in congestion of the lungs, in which it acts as an expectorant; but in order to use Digitalis with safety, it must produce diuresis.

In palpitation, especially from aortic disease, without any serious complication, Dr. Barlow recommends a combination of Hyoscyamus, Nitric Ether, and Decoction of Senega. In dropsy, Elaterium will be found a valuable hydragogue, but care must be taken not to exhaust the system.

Stimulants will usually be found more beneficial in aortic lesion than in mitral; in the latter, although the pulse is much more feeble than in aortic lesion, they are apt to augment the palpitation without any corresponding increase in the strength of the pulse. In these cases, we can relieve the congested condition of the circulation better by cathartics, diuretics, and expectorants.

Syncope, which is more common in aortic lesion, is relieved by external and internal stimulants, and by placing the patient in a recumbent position with the head considerably lower than the body and limbs; it is attended with cerebral anemia, as witnessed in the pallid countenance, and the frequent premonitory attacks of giddiness and vertigo. If the face shows signs of vascularity or congestion, instead of these means, cool or tepid water should be applied to the head, together with warmth and stimulants along the spinal column and to the extremities. Likewise producing catharsis as soon as possible. Great care should be taken in syncopal attacks, as well as in apoplectic, to determine whether they be associated with some disease of the heart, as, hypertrophy, dilatation, etc. The region of the heart, as well as the character of the pulse should be ascertained; a strong action of the heart, with marked impulse, and a strong, full pulse, will indicate the complication of the cerebral with a heart disease in apoplexy. While a small, weak pulse, or a vibrating, jerking pulse, with pallid countenance, previous vertigo, or congested states of certain organs, together with signs of valvular lesion, also indicate a similar complication. But, in the first instance, the treatment will be more of a depletory character;

while the latter will require a more stimulating and sustaining plan of treatment.

Cardiac apnœa is a suppression of respiration, attended with darting or cramp-like pains in the chest, coldness and paleness of the surface, and sometimes more or less spasm, and even pain in the muscles in various parts of the body. The patient feels as if his chest were stiffened and compressed, and often manifests movements as if to procure relief, especially when the attack is not so severe as to prevent him. The heart acts irregularly. When attacked by apnœa, the patient should be placed in a half-sitting posture, and, if necessary, be removed to a situation where he can have an abundance of air. Warmth and stimulation should be freely applied externally, and stimulants be administered internally, especially alcoholic. Or, the following may be used: Take of Extract of Conium Maculatum, Camphor, Capsicum, each, one ounce, Oil of Cajuput one fluidounce, Hoffman's Anodyne one pint; mix, and form a tincture. The dose is from twenty to sixty drops, every few minutes, in a little sweetened water. It is an admirable diffusible stimulant, useful for many other purposes.—The Tincture of Cactus Grandiflora has been found of great service in these cardiac affections; it may be employed alone, or combined or alternated with the other remedies that are administered. Its dose is from ten to forty drops, three times a day, and continued for many months, as long as no injurious results follow its use.

The bowels must be kept regular in these valvular lesions, and the functions of the kidneys and of the skin be properly maintained. Purgation should be avoided as much as possible, (except to relieve congestion), until dropsical infiltrations occur. The diet should be the same as named for dilatation and hypertrophy, being careful never to have the stomach entirely empty, nor at all loaded at any time. Small meals frequently repeated are the best. Everything calculated to increase the action of the heart should be avoided; and, indeed, the principal and important object of the patient's life, paramount to everything else, should be, a rigid attention to, and close observance of, all therapeutical and hygienic measures, mental as well as physical, that are absolutely necessary to prevent serious and sudden attacks, as well as to prolong life to the utmost.

FUNCTIONAL DISEASES OF THE HEART.

PALPITATION.

Palpitation of the heart is a symptom of various diseases and conditions, often constituting so prominent and important a part of them as to require a separate consideration; it is characterized by an increase of the impulse and sounds of the heart; it may occur without any irregularity in the heart's rhythm, the palpitation being a simple, full, uniform, powerful beating of the heart; or, it may occur with irregular action of the heart, the palpitation being rapid, violent, confused, and irregular. In either case, the heart's action may be so severe as to visibly shake the patient, and even to produce distressing sensations. Palpitation, as we have noticed in the preceding pages, attends several organic diseases of the heart; but it may also be functional or sympathetic.

I. *Palpitation with regular cardiac rhythm* will be noticed in this section; that occurring irregularly will be referred to in the subsequent one.

The *causes* of palpitation are numerous; it may arise from deranged or impaired nervous power, the consequence of intense emotions or passions, excessive study, habitual use of alcoholic drinks, tobacco, strong tea or coffee, masturbation, venereal excesses, spermatorrhea, excessive or enfeebling discharges, lack of proper nourishment, etc., and frequently attends intercostal neuralgia, epilepsy, hysteria, chorea, spinal irritation, and other nervous maladies. It may also arise from sympathy with excited or irritated organs at a distance from the heart, or by a reflex action, as, in dyspepsia, irritable conditions of the stomach or bowels, certain kinds of food, hepatic irritation, worms, menstrual or ovarian derangement, etc. A plethoric, anemic, rheumatic, or gouty condition may also occasion palpitation.

The *symptoms* of palpitation are easily made out; the heart is found to act with greater force than natural, of which the patient is fully conscious, feeling its action, and often hearing its sounds; while the practitioner can detect it, both by the hand placed over the cardiac region, and by the ear. This excited action of the heart may occur previous to, during, or subsequent to more or less exertion, mental emotion, or meals, etc.; and it may take place suddenly or gradually. There are frequently associated with it, however, other more or less unpleasant sensations, as, a choking or smother-

ing sensation, or, as if the heart were jumping into the throat, præcordial anxiety, faintness, partial or complete syncope, more or less uneasiness, soreness, or pain in the region of the heart, a hurried breathing, protrusion of eyeballs, coldness of extremities, ringing in the ears, headache, vertigo, etc.

The physical signs are, an impulse felt by placing the hand on the cardiac region, which may be of a heaving character, or may resemble a blow or a slap; the apex being in its natural location. Præcordial dullness generally natural, but sometimes extending to the right of the sternum, never upward. The first sound is loud, abrupt, and short, and may be heard by bystanders; the second is of lower pitch than natural, and is often reduplicated. If anemia be present, a whirring murmur may be heard, termed *bruit de diable*, which somewhat resembles the noise made by a humming top; it does not correspond with the pulsations, nor does it intermit, as is the case with the murmur in organic cardiac disease, and it may likewise be heard in the vessels of the neck. "This murmur is usually louder at the left side, occurs with the systolic sound, and may be heard in the course of the aorta." (*Stokes.*) The pulse at the wrist may be natural, or less than natural, abrupt, quick, full, and heavy, or of a beating character, resisting in the vigorous, but easily compressible in those laboring under anemia.

Sometimes the paroxysms of palpitation occur at regular or irregular periods, from a few minutes to four or five days; at others, they only occur under the influence of mental or physical excitement; again, some persons are never perfectly free from them.

The *diagnosis* of functional palpitation is not so readily arrived at as some writers would lead us to believe, because similar symptoms to those described often occur in organic diseases of the heart, and if we rely upon these only, we may be sadly mistaken. In order to arrive at a satisfactory diagnosis, we must inquire into the previous history of the patient; whether his age, general appearance, and history favor or not the suspicion of chronic organic disease; ascertain the presence of anemia, spinal irritation, the tendency to epilepsy; the habits of the patient as to a sedentary or active life; his moral bearing, his temperate or intemperate habits, excessive nervousness, etc.; we must also observe the character of the vital symptoms present; the point where the murmur is heard the most distinctly, its duration; the state of the heart's general excitability, the extent of præcordial dullness; the presence of murmurs, the time of occurrence and character, the absence or presence of dyspnœa, congestions, dropsical infiltrations, etc.; as

well as the degree of accordance existing between the general condition of the patient's health, and the cardiac symptoms, supposing these latter to be due to organic disease. By this means, we will be enabled to arrive at a more correct and reliable diagnosis.

The *prognosis* of palpitation is favorable in all those cases in which the causes may be removed, as, when due to anemia, sedentary habits, excesses, nervous irritability, worms, etc.; and it is more or less unfavorable when it is due to, or is associated with, epilepsy, spinal irritation, masturbation, intemperance, or other causes which are less amenable to treatment, or less likely to be overcome.

The *treatment* of this form of palpitation will depend considerably upon its causes, or its association with other affections. If the palpitation be due to anemia, the continued use of some ferruginous preparation, as, Elixir of Iron and Cinchona, etc., will be of benefit,—or, if the patient be of a strumous habit, the iron may be combined with antistrumous agents, as, Iodide of Iron, Bromide of Iron, etc. The addition of Iron to the Compound Syrup of Yellow Dock, in a similar manner to the mode of forming Elixir of Iron and Cinchona, will be found a very valuable preparation in these strumous cases.* If epilepsy be present, no great amount of benefit can be expected until this disease be cured; and the same may be said of other attending maladies, as spinal irritation, worms, spermatorrhea, chorea, menstrual derangements, excesses, intemperance, etc. Sedentary persons must lead a more active life; and all exciting causes must positively be avoided.

Acidity of stomach must be neutralized by the use of Prepared Charcoal, Carbonate of Ammonia, or Magnesia. Antispasmodics and tonics may be employed to overcome excessive nervous excitability. The functions of the skin and of the kidneys must be

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*Take of Yellow Dock Root, in fine powder, *sixteen Troy ounces;* bark of the root of False Bittersweet, in fine powder, *eight Troy ounces;* American Ivy, Figwort, each, in fine powder, *four Troy ounces.* Mix these articles together, and thoroughly moisten them with Alcohol, and allow them to stand for twenty-four hours; then transfer to a percolator, and gradually add Diluted Alcohol, until the liquid passes but very little impregnated with the properties of the medicine. To this, add Glycerine *sixteen Troy ounces*, and distil or evaporate the mixture, by a gentle heat, to two pints; in which dissolve of the Soluble Pyrophosphate of Iron, *two hundred and fifty-six grains.* The dose is a fluidrachm, to be repeated three or four times a day. This preparation may also be made by percolating through the above powdered articles, a mixture of equal parts of Glycerine and Water, and when two pints have been obtained, add the iron preparation. It is valuable in all cases where a chalybeate, tonic, and alterative preparation is indicated. I now for the first time make it known to the profession.

properly attended to, and the bowels be kept regular. The diet and exercise must be in accordance with the condition of the system and the degree of cardiac excitability, as well as with the maladies with which the palpitations may be associated. All kinds and sources of excitement must be avoided. Wherever pain or soreness is found to exist upon pressure, either at the occipital region, or along the spinal column, active rubefacient liniments, and in some cases, even the Croton Oil Liniment, or Compound Tar Plastar, should be applied upon these tender points. To relieve the paroxysm of palpitation, the same treatment may be pursued, as named for relieving this symptom, under Hypertrophy, as well as Dilatation of the Heart. In persons who have led intemperate lives, the employment of the Trisnitrate of Bismuth, in conjunction with an infusion of equal parts of Quassia, Aletris Farinosa, and Asclepias Incarnata, slightly acidulated with Sulphuric Acid, will be found very useful in overcoming the abnormal condition of the stomach.

II. *Palpitations which are irregular in rhythm and force*, are of a much more serious character than the preceding variety, and generally arise from similar *causes*. Sexual excesses, masturbation, intemperance, and other irregularities, are among the more frequent causes. Much care is necessary to determine whether or no this affection be associated with some organic heart disease.

The *symptoms* of this form of palpitation are somewhat similar to those heretofore named; but, instead of occurring at the natural periods of the heart's contractions, the palpitations are irregular both as to force and rhythm. They may be remittent, regularly or irregularly intermittent, or present certain irregularities at fixed intervals. At one time the palpitations occur with an increased force, at another with a diminished; the motion of the heart is frequently more rapid at one time than at another; and the pulse will be found to be involved in these cardiac derangements,—thus, at one period the pulsations at the wrist may be natural or lower than natural, and suddenly rise to a hundred and fifty or more per minute, with an inequality of force, and an irregularity of rhythm. Indeed, all these conditions may be met with under the most varied forms.—In connection with the derangement of the heart's action, there may also be a sensation of heaviness, sinking, oppression, uneasiness, or more or less pain at the cardiac region, or pallid countenance, dyspnœa, thirst, nausea, vomiting, more or less disposition to syncope, ringing in the ears, dimness of vision,

a feeling of alarm, and a tendency to diarrhea, or profuse diuresis. If the difficulty is due to sexual excesses or masturbation, there will be tenderness upon pressure over the suboccipital region, as well as along all or a part of the cervical vertebræ, and a dull pain, or of an aching character, in the back part of the head, will be complained of by the patient.

The physical signs are a feeble, or irregularly forcible, fluttering impulse, which may be detected by the hand or ear; and, in some instances, the impulse will convey a jogging, rolling, or trembling sensation. Frequently, instead of the systolic and diastolic sounds being single, they will be double, and this reduplication may be heard at a limited spot, or over a considerable extent. The systolic sound is usually short and sharp; and the rhythm of the heart is not natural. These palpitations come on paroxysmally, and may vary in duration and in their periods of attack, the same as the preceding variety. They also require similar carefulness of investigation in regard to their *diagnosis*, which is not always easily arrived at.

The greater the departure of the heart's action from its normal force and rhythm, the more unfavorable will be the *prognosis*, as a general rule; for it is apt, in the more irregular instances, to be associated with some organic lesion, and especially among patients of middle age. Yet, instances may occur, in which no such lesion exists, and no immediate unfavorable results will take place; but, it is extremely difficult, if not impossible to isolate these instances. An abnormality in the force of the heart's action is more unfavorable than when existing in its rhythm. In forming a prognosis, all the symptoms, local, constitutional, and physical should be taken into account, carefully comparing them, and giving to them their proper value, both individually and collectively. For if we treat this symptom as a nervous affection when it is actually associated with an organic cardiac lesion, we may increase our patient's sufferings, and hasten his death.

If, after a careful investigation, we conclude that the affection is not connected with a structural disease, but is nervous or sympathetic, our *treatment* will depend considerably upon its cause. The first indication of treatment is, to remove the exciting cause of the affection, making use of the proper means to overcome intestinal irritations, mental overexertion, excesses, or intemperance, as well as other causes; and the various abnormal conditions resulting from these causes must also be remedied. The second indication is, to impart vigor to the system, and to give increased nervous energy to the heart; this is to be effected by tonics, gentle stimu-

lants, and nervines. To regulate the heart's action, as well as to relieve præcordial distress, the same means may be employed as named in the preceding variety. Nux Vomica, Citrate of Strychnia and Iron, Aletris, and Cimicifuga, form very excellent tonics; while Gelseminum, Kalmia, Veratrum, etc., are useful to diminish the palpitations. In many cases, I have derived much advantage from the following: Take of Sulphate of Quinia one drachm; Elixir of Vitrol three fluidrachms; mix, dissolve, and add, Tincture of Black Cohosh two and a half fluidounces; Tincture of Sheep Laurel ten fluidrachms, Tincture of Aconite three fluidrachms; mix. The dose is from twelve to thirty drops in a little water, to be repeated three times a day. In other instances, the Fluid Extract of Sumbul in doses of fifteen or twenty drops, will prove efficacious. The Tincture of Cactus has been found an admirable remedy in both the preceding varieties of cardiac palpitation. Anemia will require ferruginous tonics, and, in some cases, preparations of Manganese. When a burning sensation is complained of around the cardiac region, the following counter-irritant may be applied two or three times a day, on the surface over the affected part, viz.: Take Rect. Oil of Amber two fluidounces, Croton Oil half a fluidrachm; mix.

The skin, bowels, and kidneys, should be maintained in as normal a condition as possible; the diet must be nutritious, but properly regulated; and moderate exercise be taken daily, if the patient's condition will permit. When there is pain or tenderness on pressure along the spinal column or in the suboccipital region, counter-irritants must be applied over these painful points.

DIMINISHED ACTION OF THE HEART.

I do not here refer to the feeble action which occurs during the presence of organic cardiac lesion, but to that which is met with when there is no apparent structural change of the heart. The predisposing *causes* of this affection are, anemia, and a lack of proper nerve force, especially in the heart.

The principal *symptom* is syncope. But there may be premonitory symptoms, as, nausea, epigastric faintness, disturbed condition of vision and hearing, ringing in the ears, mental confusion, paleness of countenance, great muscular prostration, dilated pupils, diminished or suspended breathing, and eventually, syncope, which may last for a few seconds or even minutes, before recovery and a gradual return to consciousness occurs. During the syncope, the

cardiac impulse is greatly diminished, as well as the normal sounds, and sometimes these are hardly, if at all, distinguishable; the pulse at the wrist can not be felt, though that in the carotids beats feebly.

The exciting causes of the syncope are, principally, those that exert a depressing influence upon the vital powers, as, the use of tobacco, antimony, aconite, colchicum, arsenic, digitalis, oxalic acid, etc.; a great susceptibility or irritability of the heart; excessive galvanic stimulus applied to the roots of the spinal accessory nerve, to the first four cervical nerves, and to the cardiac sympathetic filaments; injuries to the brain, or other organs; extreme susceptibility to certain sounds, odors, or sights; prolonged stay in the warm bath; indigestible food; intense emotions; crowded rooms in which the blood becomes imperfectly oxygenized; profuse discharges; the introduction of a bougie into the urethra; fœtal movements, etc. Although any one of these causes may induce syncope, yet it is more often occasioned by a combination of several of them.

As syncope is the principal symptom in the affection under consideration, we may form our *diagnosis* of it by observing that during the syncope, the surface is pale without any lividity; the pulse at the wrist can not be felt; and the beating of the heart can not be heard, or, at all events, very feebly and indistinctly. More or less weakness of the heart's force, and of the pulse, will be present during the patient's natural state.

In those cases where there is a constant feeble action of the heart, *without* syncope, there will be shortness of breath, coldness of the extremities, languor, indisposition to exercise, lowness of spirits, deranged appetite, œdematous swellings of the ankles, constipation, etc. The impulse of the heart will be feeble; the diastolic sound will frequently be reduplicated; and the slightest exertion or excitement may occasion a paroxysm of palpitation.

The *prognosis* as a general rule is not unfavorable; and patients recover from the syncope without any injurious results. Syncope in cases associated with, or due to anemia, has sometimes proved fatal; also, when excited by gastric irritability, or indigestible substances in the stomach. But, in all cases, the condition of the heart should be carefully examined, for in subjects of middle age especially, a diminished action of the heart is very apt to accompany some serious organic lesion.

The *treatment* for diminished action of the heart will be the adoption of such measures as will remove any exciting cause or causes, and restore power to the nervous system. Quinia, Cimici-

fuga, and Aletris will be found excellent agents for the latter purpose, conjoined with daily frictions over the surface of the body, and a proper attention to the skin, kidneys, and bowels, and to the diet. Iron is seldom required unless in cases of anemia, in which the Elixir of Iron and Cinchona, or, as a substitute, the preparation containing soluble Pyrophosphate of Iron, named under Chronic Peritonitis, will be found the best preparation. Galvanism must be made use of, as it is apt to improve the enfeebled condition of the heart, or, Pulvermacher's Galvanic Belts may be advantageously worn by the patient. Moderate exercise will often be useful. If the urine constantly gives an abnormal deposit of phosphates, the Compound Infusion of Trailing Arbutus, the Fluid Extract of Hydrangea, or, the Compound Balsam of Sulphur may be given, in conjunction with the Hypophosphite of Lime. Among female patients attention must be paid to the state of the menstrual function.—When an attack of syncope comes on, it must be treated in the usual manner; it is unnecessary here to dwell upon the various methods to be pursued.

ANGINA PECTORIS,

Also called Breast-pang, Spasm of the Heart, Suffocative Breast-pang, and Neuralgia of the Heart. The pathology of this disease is not satisfactorily determined. It has been variously ascribed to ossification of the coronary arteries, to valvular disease, to polypous formations, to spasm of the diaphragm, fatty accumulation, cardiac spasm, to an impediment to the coronary circulation, or, to some derangement or abnormal condition of the *par vagum* system of nerves, etc. From the fact that nearly all of the above-supposed causes are present in a majority of cases without any symptoms of angina pectoris, and that remedies addressed to the nervous system appear to exert more favorable influences upon the disease than any others, the prevailing opinion among medical men of the present day is, that angina pectoris is a nervous affection, and may exist with or without organic cardiac lesion. Among those lesions which are met with in cases of angina pectoris, that of fatty degeneration is by far the most common.

The *causes* of angina pectoris are not well understood; irritation of the par vagum at its origin in the medulla oblongata, in its trunk, or in its visceral extremities, appears to be a predisposing cause, as well as a gouty, rheumatic, or apoplectic tendency. The immediate or exciting causes are rapid walking or running up

stairs or up hill; muscular exertion; indigestible food; strong mental emotions; and whatever excites an augmented action of the heart. Males are much more subject to the affection than females, and especially those who are habitually addicted to the pleasures of the table, the sedentary, and the corpulent. It is more frequently met with after the fortieth year of age, when it is almost certain to be associated with some organic affection of the heart; that which is occasionally met with among children and in early manhood, may be considered a pure neuralgia without any cardiac lesion.

The *symptoms* of angina pectoris are a sudden attack of most intense pain in the region of the heart, described as lancinating, gnawing, cramp-like., etc., which shoots through the chest to the spine, to the left side of the neck and occiput, and into the left shoulder and arm. Sometimes it may pass into both arms, and even into the left leg, involving the testes. This pain comes suddenly and goes suddenly, and is always accompanied with a sense of impending suffocation, great anxiety, and a feeling of approaching death. During the paroxysm, which may last a few seconds or a few minutes, the most intense anguish is marked upon the patient's general appearance; his face is pale, and his extremities cold, with cold, clammy perspiration. If he recovers, he experiences a sense of relief, with a feeling of more or less exhaustion. These symptoms recur in paroxysms, and at uncertain intervals, and will vary much in their severity, the intervals between the paroxysms usually becoming shorter and shorter, until the patient dies in one of them. The death may be sudden, occurring with the paroxysm; or, it may take place gradually, with labored respiration, tetanic or clonic spasms, insensibility, and dissolution.

The *diagnosis* of this affection is not difficult. The first attack is generally experienced after some unusual exertion, as, walking up a hill, ascending a flight of stairs, rapid walking after a full meal, etc., and the pain is less severe and of less duration than subsequently. After a more or less considerable interval a second paroxysm occurs, and as the case progresses, the pain becomes more and more severe, the intervals between the paroxysms become shorter and shorter, and these are finally induced by very slight causes, as, mental emotions, walking, riding, coughing, sneezing, straining at stool, overeating, sexual excitement, etc. In many instances, the paroxysms are preceded by yawning and a sensation of heat in the chest, and occasionally a paroxysm occurs as the patient drops off to sleep.—During the paroxysm the patient can take a full inspiration, but as this augments the severity of the

pain, he almost always compresses his chest, and refrains from any kind of movement; the functions of the brain remain undisturbed; and, unless there be some co-existing cardiac lesion, the impulse and sounds of the heart will be normal, without murmur, and the pulse will not necessarily be affected, or, to a very small amount at the farthest. A murmur, or disturbance of the heart's rhythm is indicative of the presence of organic disease. However, when the disease is chronic, we will very frequently find the pulse irregular, and intermitting, and there will be more or less cardiac palpitations.

The *prognosis* is more favorable when the paroxysms occur previous to the fortieth year of age, or rather, when there is no organic change of the heart, a change which is seldom met with in early manhood; and unfavorable after this age, as the disease is then very apt to be associated with some organic affection. If, with the angina, there is a lividity of the face, with dyspnœa, the heart is structurally affected. But it must be remembered that, whether angina be co-existent with an organic lesion or not, a person who has once experienced an attack of it is ever after liable, at any time, to a sudden and fatal recurrence.—In all cases, the practitioner should make a careful examination of the condition of the heart, to determine any co-existing lesions of this organ. Unfortunately, the most common lesions observed in connection with angina, viz.: fatty degeneration and ossification of the coronary arteries, are very difficult to diagnose with any degree of certainty; and, indeed, in many instances, their diagnosis is impossible.

Post-mortem examination reveals no special appearances in the tissues of the heart indicative of angina pectoris. There may be no morbid lesions whatever of this organ; or, what is still more common, we may find more or less structural changes of the heart, its orifices, or of its arteries. And although these changes may dispose more readily to angina, and render a fatal result inevitable, they can not be considered as necessary or invariable concomitants of the disease. And if any information regarding the cause of angina can be had at all from the anatomical conditions more frequently observed, it seems to me, to be that the disease is principally associated with, or dependent upon, a deficient nervous power in connection with a defective nutrition of the heart.

The *treatment* of angina pectoris may be divided into that required during the paroxysm, and that during the intervals. In the paroxysm, stimulants and antispasmodics must be given, and probably the most effective one among them is the Compound Tincture of Virginia Snakeroot, a teaspoonful or two of which should be adminis-

tered at once in a little water, repeating this dose every few minutes during the continuance or recurrence of the fit. Other preparations, however, have been used with success, as, equal parts of Ether, Laudanum, and Tincture of Castor, in teaspoonful doses; or, Ammoniated Tincture of Castor; or, the Compound Cajuput Mixture. In addition to these, dry cupping, or firing, should be freely applied along the chest, over the region of the heart, and along the cervical and dorsal portion of the spinal column; the patient should be kept perfectly quiet, and active frictions, with stimulating mixtures, should be applied to the extremities, to aid in recovering the accustomed action of the heart. Slight electro-magnetic shocks may also be passed through the direction of the heart; but great caution is required in the employment of electricity or galvanism, using only the gentlest amount of this kind of stimulus, because overexcitement or exhaustion of nerves and muscles by this agent serves only to enfeeble them to a still greater degree. If it can be obtained readily, Oxygen may be inhaled to obviate the danger from an insufficiently aerated blood. Should the patient faint, Ether, or Spirits of Ammonia may be sprinkled on the face, neck, and breast.

As soon after a recovery from the paroxysm as possible, a mild cathartic may be given to remove any accumulation in the bowels, and to act as a derivative; but if the face be pale and bloodless, this should be dispensed with. If the paroxysm occurs shortly after a meal, an emetic should be administered as promptly as possible.

The treatment during the intervals is the most important, as by it we are to cure the disease, or at least to prolong the intervals between the paroxysms, as well as to check the tendency to attacks from minor causes. To do this effectually, the general health of the patient must be carefully inquired into, and if it be found that he is laboring under gout, rheumatism, structural lesion of the heart, etc., these must be combated by their appropriate treatment.

The bowels should be kept regular daily; the surface of the body be frequently bathed with a weak alkaline solution; and the kidneys be kept in a state of healthful activity. Internally, the Compound Tincture of High Cranberry, in conjunction with the Compound Pills of Black Cohosh, will be found the best agents to lessen nervous irritability and give tone to the nervous system. The Compound Pills of Hyoscyamus, and, in some instances, the Compound Pills of Aconite will be found serviceable. Acidity of stomach, when present, is best removed by Carbonate of Ammonia. In all cases, active counter-irritation should be alternately applied over the region of the heart, and along the cervical and dorsal regions of the spinal column. All sources of irritation, mental inquietude, and

sudden gusts of passion, should be vigilantly guarded against; moderate exercise in the open air, of a passive character will be useful, and in ascending a flight of stairs or other ascent, the utmost care and deliberation must be taken. The diet should be nutritious, but of a simple character, easy of digestion, and be thoroughly masticated. All indigestible food should be prohibited, as well as whatever disagrees with the stomach; late suppers, as well as full meals at any time, must positively be avoided. Proper attention should also be paid to clothing, sleeping, etc.

One severe case of angina pectoris I treated successfully by attentions to the bowels, skin, kidneys, and diet, together with the internal use of the following: 1. Take of Iodide of Ammonium one ounce, Water one pint and a half; mix. The dose was a teaspoonful, repeated three times a day. 2. Take of Sulphate of Quinia one drachm, Elixir of Vitriol three fluidrachms; mix, dissolve, and add Tincture of Black Cohosh two and a half fluidounces, Tincture of Sheep Laurel ten fluidrachms, Tincture of Aconite three fluidrachms; mix, and give from twelve to thirty drops in a little water, repeating it three times daily. To relieve an intense burning pain in the right side of the chest, the following liniment was applied twice a day: Take of Rectified Oil of Amber one fluidounce, Croton Oil fifteen minims; mix.

CONSTITUTIONAL DISEASES.

UNDER this head will be embraced, at this part of the work, those diseases which can not be properly arranged in any of the other divisions herein given, and which, although manifesting themselves at some particular part or organ of the body, are generally supposed to be due to some morbid condition of the blood, or of the capillary vessels, or to some peculiar virus or taint, or other depraved condition of the fluids. A supposition, indeed, which may, in my opinion, be safely entertained with regard to the major part of chronic diseases. Some of the diseases more properly belong to the department of surgery, but as they are frequently brought before the chronist for treatment, I have judged it best to make a brief reference to them.

SCROFULA.

Scrofula or King's-evil is a form of tuberculous disease that is very common; as ordinarily understood, it consists of an enlargement of lymphatic glands, which inflame, suppurate, and give rise to ulcers discharging a white, curdy matter, and which are often very troublesome to heal. Tubercular disease, or tuberculosis, is a morbid condition resulting from mal-nutrition of certain tissues, in which there is a tendency to the local deposition and accumulation of an abnormal substance termed "tubercle." This deposit usually occurs at certain points, or within certain organs, which, from exposures, hereditary influences, or other causes, have had their vitality diminished, and are, consequently, more liable to assume this form of disease. Tuberculosis manifests itself in many parts of the system, and is named, according to the parts attacked, scrofula, white swelling, hip disease, tubercular phthisis, rickets, lepra, bronchocele, etc.—Probably about one-fifth of the human family are affected with scrofula; of which number about one-half perish in infancy and childhood; and but a small proportion of the remainder arrive

at adult age. In those who are free from it, it may be produced by the vices and follies of men.

The *causes* of scrofula are not definitely known ; it appears, however, to be due to an insufficient nutrition of the system, or of certain tissues, in consequence of which there is a deficient amount of vitality. It is well known that in scrofula the blood globules are fewer in number than in the normal state, are lighter colored, and often of irregular form ; there is also a deficiency of fibrin, and the blood slowly coagulates, giving rise to a soft and diffluent clot. The tubercular matter itself, when examined under the microscope, presents numerous minute granular bodies, irregular exudation corpuscles, a considerable quantity of oil globules, some albuminous shreds, disintegrated tissue, and, frequently, pus. The addition of boiling ether will remove the oily matter ; and of acetic acid will render a greater number of corpuscles visible.

The peculiar condition of constitution favorable to the development of scrofula may be originally produced by various causes. It may be transmitted from generation to generation, not manifesting itself in one generation of a family, while severely afflicting another ; yet it is not invariably the case, that children born of scrofulous parents are affected with scrofulous diseases ; for often but one child is affected, while the rest of the children, to all appearance, present no symptoms of it whatever. One of the most important points in the selection of a husband or wife, should be, that he or she shall be free from the scrofulous disposition, and thus secure one great means of not generating scrofulous children.*

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* A medical writer most justly observes,—"The end of marriage is domestic happiness, and the procreation of healthy children; and the former depends much upon the latter. The law is very particular about the forms of marriage, *but very indifferent about the results.* Rational marriages must rest with the parties themselves. Ignorance of the laws of constitutional health is one great cause of irrational marriages. The great motives to marriage are rank, property, fancy; to these should be added, morals, intellect, health, which are more important for happiness. The moralist has hitherto been too little of a physiologist. Physiology is the basis of morals as well as of health. The educator should be a physiologist as well as a moralist. It is only by the union of the two that the young can be judiciously trained, and prepared for real life. However persons may despise physiological warnings, before marriage, they are too sensible of their value afterward. Constitutional diseases not only produce unhealthy children, but often also disgust, aversion, and misery between the parties themselves. Marriage will not strengthen a weak constitution as some suppose, but will debilitate it still more. It is a common observation of females, 'I have never been well since I married.' Child-bearing and nursing demand more than a delicate and tainted constitution can bear. The strength gives way under the heat and burden of the day."

As a general rule, when adults are attacked with scrofula, tubercles at the same time exist in the lungs. Again, scrofula is often present among persons whose ancestors, as far as can be ascertained, were perfectly free from it; this fate is especially reserved for the children of those who marry after having abused their youthful powers, or exhausted their nervous energies by indulging too freely in veneral pleasures,—and is frequently met with among the offspring of those who have enfeebled the reproductive organs by masturbation, by frequent copulation during pregnancy, as well as of those parents who bear a blood relationship to each other, as, cousins, uncle and neice, etc. Children of a mother, and particularly of a father far advanced in years, often bring into the world a disposition to scrofula, which will be developed at an early period, and often under the slightest exciting causes. Syphilis is also an undoubted cause of scrofula; as well as premature marriage. Indeed, anything which will produce a defective vitality of the system, may be considered a cause of scrofula, if an exposure to it be persisted in for a sufficient period, or it be associated with other depressing circumstances. In this manner, one or several of the exciting causes of the disease may develop it in a system previously free from the slightest tendency to it.

The late Prof. W. Byrd Powell asserted that scrofula is the rule and not the exception among the offspring of those parents who are free from scrofula themselves, but with whom there is a marked incompatibility of temperament and constitution; and he sustains his assertion by the strongest possible evidence. His views are certainly deserving the closest attention of physiologists.

The exciting causes of scrofula are, artificial suckling; improper food; a free use of vegetable diet with little or no animal; the use of farinaceous preparations imperfectly cooked; too much succulent diet; excessive use of pork or fat meats; excessive use of acidulous articles; impure atmosphere; want of exercise; uncleanliness; exposure to too great a degree of heat; too early mental application; improper use of opium, mercurials, etc.; venesections; and a too early exercise of the sexual organs. Among those who are predisposed to it, it is frequently excited into action by certain diseases, as measles, small-pox, scarlatina, vaccination, etc., following as a sequel to the diseases. One great exciting cause of the disease, and perhaps a powerful predisposing cause, also, is a neglect of the skin; indeed, one writer considers tubercle to be "the solid matter of the cutaneous excretion, especially of the sebaceous

follicles. This secretion not being expelled by the natural emunctories, is retained in the blood, until, in the attempt to eliminate it through an unnatural channel, it is deposited in some other excretory organ, where its fluid matter being absorbed it becomes a tubercle." That there is some truth in this opinion may be granted—still, I have found scrofula in persons who, as well as their parents, made a proper attention to the various excretions of the body daily, a matter of duty.

The attacks of scrofula are much influenced by climate, and the seasons of the year; prevailing more extensively in temperate latitudes, where the climate is variable, and cool or moist, commencing generally in the winter or spring, and disappearing, or considerably amending in summer or autumn.

Authors generally describe certain *external appearances* in the general contour of the person; in the eyes, lips, nose, countenance, or complexion, by which, they say, scrofulous individuals may be distinguished from those who are non-scrofulous. That there are certain appearances which are frequently observed among persons who are supposed to have a predisposition to scrofula, is undoubtedly true; yet there are no certain signs upon which an implicit reliance can be placed. Even among those in whom there is an undoubted scrofulous taint, with enlargement of the subcutaneous ganglia, we find their external signs to present the greatest variety; thus, the complexion as well as the hair, will be observed in some, light, in others, dark; the lips either symmetrical, the lower one enlarged, or else the upper one; the alæ nasi may be somewhat contracted, or expanded; the countenance may be pale or ruddy; the constitution may present the appearance of being delicate or robust; the skin may be dry and hard, exhaling a greasy odor, or a fetid and acid perspiration; the abdomen may or may not be tumid; the eyes may be heavy, languid, inexpressive, or animated and sparkling. But, in cases where there is no tumefaction of the subcutaneous glands the above signs are uncertain, inconstant, and unsatisfactory. Indeed, the glands may be enlarged, and no scrofulous deposition exist in them, as is often observed from irritation; yet, when no irritation exists, and the glands are swoln, the evidence in favor of a scrofulous constitution is much stronger than that from the external signs above referred to. A medical writer observes truly: "The most certain evidence of the existence of a scrofulous disease, is afforded by the production of a soft, brittle, unorganized matter, resembling curd or new cheese, which is found mixed with the contents of abscesses, or deposited in rounded masses of different degrees of firmness, and varying in bulk from

the size of a millet seed to that of a hen's egg; sometimes it is enclosed in cysts, and occasionally it is diffused, as if by infiltration, through the natural texture of the part. To the rounded masses of this substance, the name of tubercle has been assigned, and the substance itself has been named tuberculous matter." Yet, notwithstanding this is the most certain evidence, and one of the most obvious and leading effects of scrofula, our ideas of the disease should not be improperly confined to it. It is but one effect or disease, among many, which arises from a common constitution. Scrofula undoubtedly produces certain diseases, the peculiar characters and symptoms of which depend upon the organs or tissues affected, and their offices and functions, as, tumors of the brain, hydrocephalus, epilepsy, insanity, hysteria, deafness, otorrhea, conjunctivitis, lippitudo, myopia from staphyloma posterior, ozœna, coryza, heart diseases, consumption, uterine and ovarian diseases, dyspepsia, nervous debility, lupus, cutaneous diseases, etc. It also exerts a modifying effect upon other diseases which occur in a scrofulous system, as, hooping-cough, scarlatina, measles, small-pox, syphilis, gonorrhea, etc., rendering them less amenable to treatment than if they had affected a system free from scrofula, or even rendering them positively incurable, or fatal.

Children who are evidently scrofulous, more generally have a soft, fine skin, waxy, delicate complexion, tumid abdomen, enlarged joints, blue eyes, long eyelashes, large, prominent forehead, and an appearance of freshness and plumpness which is due to hypertrophy of the cellular membrane, and is of a morbid and delusive character. On the other hand, scrofulous children will often present a coarse, pale skin, perhaps covered with numerous fine hairs, a dark complexion, dark eyes, no enlargement of the abdomen nor of the joints, but a great susceptibility to morbid conditions of the mucous membranes, as, of the eye, ear, nose, mouth, stomach, and bowels, and even in the mucous membrane of the genito-urinary system. Some are born with the disease fully formed; others are affected soon after birth with ophthalmia, though this may be present in non-scrofulous cases; while again, others have glandular enlargements, or present certain cutaneous eruptions, ulcerations, etc. With many children, the evidences or effects of malnutrition, imperfect assimilation, and enfeebled circulation and nervous energy, are so well marked, that the scrofulous taint is readily recognized.

The *symptoms* of scrofula vary somewhat according to the parts or tissues affected, some of which will be described hereafter under

the several names given to them, as, Consumption, White Swelling, etc. At this place I will confine my description to those symptoms which accompany the enlargement of the subcutaneous glands, and to which the name of Scrofula is more commonly applied.

The first, most common, and distinctive symptom of scrofula, is an enlargement of the glands referred to, especially those about the neck, forming what are termed "tumors," or "kernels," and which may remain in an indolent condition for a long time, neither increasing in size, nor diminishing (except under proper treatment, diet, or regimen, or under the re-invigorated powers of the system, and from these circumstances, they do sometimes disappear), and occasioning no pain or other unpleasant symptoms. After a longer or shorter time, and especially under the influence of one or more exciting causes, the affected glands, or at least some of them continue to enlarge, and a low form of inflammation is developed at the same time, with more or less pain, and, as the disease progresses, the pain and inflammation become more severe, the enlargement augments rapidly, the parts become hot, painful on pressure, and the neighboring tissues also become swoln, hard, and partake more or less of the inflammatory action. After a longer or shorter period, suppuration occurs, the matter formed burrows its way to the surface, occasioning an abscess or ulcer, from which is discharged a thin, ichorous pus, mixed with curdy or cheese-like flakes. This pus may be discharged from one orifice; frequently from several small ones, and when this is the case the sinuses eventually coalesce, and give rise to indolent ulcers with jagged and uneven margins, which heal slowly, leaving unsightly scars. Other tumors form in turn, pass through similar changes, and in this way the disease may be perpetuated for years until it becomes cured, or the system becomes destroyed by it. This pus can not produce scrofula in a healthy individual, even by inoculation.

The period of suppuration will be found to vary very much, in some cases forming an abscess in ten or twelve days, in others, not until several weeks have passed. The abscess may heal in a short time, but more frequently it will remain in an indolent condition, manifesting no tendency to heal, unless under the influence of local applications. It is rarely the case that the pus discharged is laudable.—In many instances, the enlargement and suppuration of the the scrofulous tumor progresses without any of the inflammatory symptoms.

During the inflammatory process there may be general febrile

symptoms, or symptoms of irritation, followed by rigors during the suppurative period; and these symptoms will be more or less severe, according to the severity of the scrofulous affection and the general tone of the system. Paleness of the surface, languor, debility, derangement of the secretory and excretory functions, impaired appetite and digestive powers, hectic fever, and night sweats, are commonly present as evidences of the degree of constitutional disturbance.

Hufeland observes that at first the swellings are "small, movable under the finger, elastic, not painful, and without any change of color in the skin. Those on the sides and back part of the neck are commonly the first to feel the influence of the scrofulous taint; the examination of these parts is, therefore, of the utmost importance in establishing the diagnosis. After these, and even sometimes before, the glands of the armpits begin to swell in their turn, then comes those of the groin, and, in some instances, those of the whole body. Their size and consistence gradually augment, engorgement of the surrounding parts take place, and thus they lose their mobility. It is uncommon for a single gland to be affected; the contagion ordinarily extends to several; indeed they are often confounded together, and form an enormous tumor, or become united without being confounded, so as to resemble a sort of chain. At length, when the disease has reached a certain height, the lymphatic vessels themselves are engorged, and feel like cat-gut. . . . . These tumors may remain in the same state during several years; but at the commencement they are variable, appearing and disappearing alternately. In proportion as the scrofulous taint increases, the glandular tumors become harder and less movable. In some cases they remain cold and indolent; in others, the skin above them reddens, pain is felt in the center of the gland, inflammation slowly takes place, and suppuration follows; but the pus is always of a bad quality."

The *prognosis* of scrofula depends much upon circumstances; the more vigor and strength there is in the constitution the more favorable will it be, and more especially so when the disposition to the disease is but slight; and, in cases where there is only a slight tendency to scrofula, with a strong constitution, the chances of cure are much greater than in the reverse conditions. A highly scrofulous constitution is rarely curable, unless treatment be commenced in childhood, and be persevered in for several years under favorable circumstances. In itself, scrofula can not be considered a mortal affection, but it may, and too commonly does, become so,

either by attacking organs that are essential to life, or, in effecting extensive disorganizations.

The *treatment* of scrofula is divided into therapeutical and hygienical. The therapeutical is subdivided into constitutional and local. The constitutional treatment consists in the administration of alteratives internally, which improve the condition of the blood and aid in the gradual removal of that peculiar morbid state of the system upon which the disease depends. The agent upon which I place the greatest reliance is the Compound Syrup of Yellow Dock, to which sufficient Iodide of Ammonium is added, so that a child ten years old may take with each dose, one grain of this salt; and, in most instances, I likewise add from one-sixteenth to one-eighth part of the saturated Tincture of Cimicifuga; the dose of the fluid mixture being a teaspoonful three or four times a day. Other agents may be used, as, Iodide of Potassium, Iodine Pills, Bromide of Potassium, Bromide of Ammonium, Compound Sarsaparilla Syrup, the preparation containing soluble Pyrophosphate of Iron, named in the treatment of Chronic Peritonitis, etc., which have frequently been found exceedingly beneficial. In some cases, the following preparation will have a most decided curative influence, viz.: Take of Chlorate of Potassa two drachms, Hydrochloric Acid forty minims, Distilled Water one and a half fluid-ounces; mix. The dose is a teaspoonful three times a day, for an adult. In all cases of scrofula, those alteratives will be found the most efficient that exercise an influence on the kidneys, increasing the quantity of urine and improving its quality.

It will sometimes be the case that no effect whatever will be exerted upon the scrofulous glands or abscesses, although a persistent constitutional treatment of several months has been pursued. I have met with considerable success in such obstinate cases, by arousing the susceptibility of the glandular system, by means of agents continued until a salivation has been effected. The agents employed are, a mixture of equal parts of Blue Flag Mandrake, and Prickly-ash Bark, given in doses of two, three, five, or ten grains every two or three hours, (not to act upon the bowels), and continued until salivation is produced. Or, doses of from one-eighth of a grain to a grain of a mixture of equal parts of Iridin, Podophyllin, and Xanthoxylin, may be substituted for the above. The salivation caused by this preparation is entirely different from that resulting from the employment of mercurials, and is entirely free from danger;—there are many other obstinate forms of disease, in which this effect will be followed by the most happy results. After the salivation has been produced, the ordi-

nary constitutional treatment may be pursued. This action may be repeated again and again, if the obstinacy of the disease should require it.

It may be proper to state that Protein has been recommended for scrofulous children, in doses of three grains for a child five years old, gradually increased to five grains, to be taken three times a day in sweetened water; and if the stomach be acid, it may be combined with two or three grains of dried Bicarbonate of Soda added to each dose. Oxide of Manganese, in doses of one-seventh to three-fourths of a grain for a dose, has also been highly spoken of as a remedy for young scrofulous children.

Acidity of stomach is frequently present in scrofulous affections, and should always be removed or neutralized by alkaline preparations, or by absorbents; otherwise, it will interfere with the action of the alteratives. The articles which may be used against this symptom are Prepared Charcoal, Lime-water, Hypophosphite of Lime, or, if there be much gastric irritation, Bromide of Potassium.—In cases where the appetite is bad, with imperfect digestion and biliary secretion, and constipation, laxatives and tonics may be employed; the following forms an excellent preparation for this purpose: Take of Bromide of Potassium one hundred and sixty grains, Alcoholic Extract of Aletris forty grains, Podophyllin ten grains, Strychnia four grains, Extract of Yellow Dock, a sufficient quantity to form a pill mass; mix, and divide into one hundred and eighty pills, of which one is a dose for an adult, to be repeated three times a day. For children, the pills will require to be divided each into one-half or one-fourth, and then be rubbed up with some agreeable excipient or draught. Wine, ale, iron, or Elixir of Cinchona and Iron, may also be used to aid in giving tone to the digestive organs, when feeble. Great attention must always be bestowed upon the digestive organs in the treatment of scrofula.

When the patient is greatly debilitated, much benefit will be derived from wineglassful doses, repeated three times a day, of a preparation composed of pulverized Cinchona two ounces, soluble Pyrophosphate of Iron sixteen grains, Port Wine one pint. Or, the Citrate of Iron, or, Citrate of Iron with Strychnia, Bromide of Iron, Iodide of Iron, etc., may be employed, especially when an anæmic condition is likewise present. Cod Liver Oil will frequently prove very beneficial, either alone, with wine, or in conjunction with an infusion of some vegetable bitter tonic. The selection of the particular agent must be left to the judgment of the practitioner, for what may prove serviceable in one instance may fail in another.

The local treatment will depend considerably upon the condition of the affected parts; if the enlargement be free from inflammation and from any great tenderness, its resolution may be promoted by one of the following mixtures: 1. Dissolve Hydrochlorate of Ammonia half an ounce, in two fluidounces of Distilled Water, and then add to the solution two fluidounces of a saturated Tincture of Conium. Moisten a linen or cotton compress with this, and keep it constantly applied upon the swelling. 2. Take of Saturated Tinctures of Belladonna, and of Stramonium, and Glycerin, each, one fluidounce, Iodide of Ammonium one drachm; mix, and use same as the preceding. 3. Take of Bromine twelve minims, Distilled Water half a pint; mix, and use as above; or, a drachm or two of Bromide of Potassium may be added to this elegant lotion. 4. The Compound Plaster of Belladonna will prove useful in many cases. 5. Take of Iodide of Ammonium one drachm, Spermaceti Cerate one ounce; mix, and rub upon the part several times a day. 6. Galvanism applied to scrofulous enlargements frequently produces absorption, and, in many instances, when applied at a later period, hastens their suppuration. 7. Take of Iodide of Ammonium one drachm, dissolve it in Distilled Water one fluidrachm, and then add to it Alcohol six fluidrachms, Cologne one fluidrachm; to be employed in frictions two or three times a day.

I now make known for the first time a measure that I have employed in many cases of scrofulous enlargements with the most marked success; it consists in injecting into the parts around the swelling, every day or two, by means of a hypodermic syringe, a solution composed of Chloride of Gold and Soda four grains, Distilled Water one to four fluidounces; if too great a degree of irritation be produced, the quantity of the Gold salt must be lessened.—Sometimes a solution of Permanganate of Potassa will be found useful.

If much heat, redness, pain, and inflammation are present, these must be subdued by the application of fomentations or poultices; as, a fomentation of Stramonium and Wild Indigo Leaves; or of equal parts of Stramonium and Lobelia; or one of the following poultices,—equal parts of Cicuta Leaves and Elm Bark; pulverized Indian Turnip mixed with Warm Water; equal parts of pulverized Blue Flag Root, Poke Root, and Elm Bark; or, equal parts of pulverized Elm Bark and Bayberry Bark. Sometimes, fresh Poke Root, roasted in hot ashes until soft, mashed, and applied, will be found to answer an admirable purpose. Whichever fomentation or poultice is applied, it should be renewed every three or four hours. Not unfrequently, a few leeches applied at the commencement of

the inflammatory action, followed by cold aplications, as, of Ice or Iced Water, will check the abnormal action and promote absorption; and, sometimes, this course may be pursued to prevent suppuration from being established,—great care must be taken, however, not to freeze the parts.

When suppuration has occurred, the earlier the pus is discharged the better; therefore, as soon as fluctuation distinctly proves the presence of fluid, with some attenuation of the skin, the abscess should be opened by the application of Caustic Potassa passed into the cavity of the suppurated tumor; this will give rise to less deformity than if the knife be used. However, when the pus is rather deeply situated, instead of waiting for it to pass toward the external surface, and at the same time burrow around and extend into the neighboring tissues, it will be better to use the lancet in order to promptly give exit to it, and the orifice thus made may subsequently be kept open by means of the Caustic Potassa, should it manifest a tendency to close. The orifice made by the lancet should be as small as possible, no longer in extent than is necessary for the passage of the pus. The pus should be allowed to flow out slowly, making no pressure to facilitate its exit; and at the same time, the abscess should be covered with one of the poultices hereafter named, in order to facilitate the progress of the suppuration.

When an ulcer or abscess has formed, and has been discharging for several weeks, the local treatment will be somewhat different from that of the preceding. As these abscesses are almost always of an indolent character, they must be washed or syringed daily, with a mixture of equal parts of Castile Soap-suds and Whisky, to cleanse them, followed by some sufficiently powerful stimulating preparation, as, a solution of Vegetable Caustic injected into the cavity; or, the powdered Caustic may be introduced on tents into the sinuses or openings; after which apply upon the ulcer, spread on some lint, the Ointment of Bayberry, Mayer's Ointment, or the Red Oxide of Lead Plaster. At night a poultice of equal parts of Elm Bark and Bayberry Bark may be applied, especially if some degree of inflammation be present. A very beneficial poultice for a scrofulous ulcer is made of equal parts of Frostweed, Figwort, and Wild Indigo Leaves. Whatever may be the dressing employed, it should be renewed and the ulcer be cleansed at least twice a day.

The hygienic treatment is fully as important as the therapeutical; indeed, an inattention to it will prevent the best remedial measures from being successful. The diet should be nourishing and easy of digestion, the patient eating full meals, but without offending or

overloading the stomach; but acids, indigestible substances, fat or greasy articles, and especially fat or lean pork, must be avoided. Salt may be freely used; it is very beneficial in this disease. The moderate use of wine, ale, porter, or even brandy is admissible and useful. Regular and moderate exercise in the open air, gradually increased, but never to cause fatigue, should be taken every day. The bowels, kidneys, and skin should be kept regular and in as normal a condition as possible, but they should never be enfeebled by over-stimulation. It is advisable to bathe the whole surface of the body and limbs, daily, with a mixture of Rain Water, Vinegar, each, half a pint, Whisky one gill, Sal Soda one drachm; and friction with flannel or with the flesh-brush should be applied to the body and limbs, once or twice a week, each time exciting a gentle glow of heat. A Spirit Vapor Bath every three or four weeks will be found of much service in establishing a healthy condition of the skin and capillary organs, and will likewise aid very much in facilitating the cure. The clothing should be sufficiently warm and comfortable, and the hours of sleep should be properly regulated.

WHITE SWELLING.

White Swelling, Hydrarthus, or Synovitis, is a very formidable and painful articular disease, which more frequently affects the knee-joint. It may be acute or chronic, but more commonly the latter. The term "white swelling" has been applied to the disease because, notwithstanding the inflammation and the enlargement of the joint, the color of the skin surrounding it remains natural, or pale and shining. Although other articulations may be affected with the disease under consideration, as, the ankle, wrist, elbow, finger, and toe joints, my remarks are especially intended for the knee affection.

The *causes* of chronic articular disease are various; it may be induced by an exposure to cold, by blows, falls, sprains, or other violence; it may result, likewise, from the employment of mercurials, or from syphilitic disease; but the more frequent causes appear to be rheumatism and scrofula; and those of a strumous or scrofulous constitution appear to be particularly liable to it, in which cases the disease assumes the characters of "tuberculosis."

The *symptoms* of chronic synovitis usually manifest themselves in a slow, insidious manner, frequently requiring months before the more advanced symptoms of the swelling are observed. At first an uneasiness is experienced in the joint, or a stiffness, which passes away after exercising the limb; the joint will present a slight degree of swelling, which gradually increases. Slight pain is soon felt,

which, after a longer or shorter time, becomes very severe; in many instances, pain will be the first symptom complained of. It often becomes so intense that the patient can not bear to move the limb; he does not place the sole of his foot firmly upon the ground, but merely touches it with his toes, while the knee-joint is kept constantly flexed. The central portion of the knee is, in most instances, apparently the part more especially affected, and if pressure be made upon this part, which will not exceed an area of six lines in diameter, the greatest pain will be produced. As the pain increases, so also does the swelling, and the skin presents a smooth, pale, glossy appearance, with enlarged veins running through it; great heat is also present. The joint may continue in this state for months or years without any considerable change, or it may proceed rapidly to suppuration, and which is the more common result when the inflammatory action is severe. Eventually suppuration takes place, which is announced by more or less violent rigors, and this is more common in the scrofulous variety than in the others. A number of orifices are formed, through which the pus escapes; and the ulcers may heal with or without other ones subsequently forming. The affected limb becomes wasted, and permanently flexed.

The constitution is very apt to sympathize with the local disease, particularly when this is severe; there will be more or less febrile excitement, nervous irritability, derangement of the appetite and digestive organs, sleeplessness, and impairment of the excretory functions. The pulse becomes small and frequent, hectic fever manifests itself, with night sweats, and, frequently, an obstinate colliquative diarrhea. Under the great constitutional irritation thus produced, the patient gradually emaciates, and finally dies.

There are three varieties of white swelling, termed *rheumatic* synovitis, *strumous* synovitis, and *syphilitic* synovitis.

Rheumatic synovitis may be due to an injury, exposure to cold, rheumatic or other acute inflammation, or to excess in diet. The disease may be attended from the commencement with the more active local and constitutional symptoms above referred to; or, it may progress so gradually as to render it almost impossible to point out its commencing period. The affection is more common in early life, rarely being met with after the thirtieth year. The pain is generally more of a gnawing character, is less severe at night, and the accumulation of serous fluid in the synovial sac may be so great as to constitute a true dropsy of the joint, or *hydrarthrosis*. The disease may terminate favorably, or it may proceed to suppurative destruction of the joint, more especially in scrofulous systems.

Syphilitic synovitis is met with in persons laboring under the ter-

tiary form of syphilis, especially those who have had their constitutions enfeebled by mercurials and intemperance. Considerable synovial fluid is usually effused, and the pains are worse at night. The disease is generally attended with evidences of syphilitic taint in other parts of the system. This variety rarely terminates favorably, and particularly if it be associated with a scrofulous constitution.

Strumous synovitis, or *tuberculosis of the knee-joint*, and which is the variety to which I have more especial reference when speaking of treatment, is a very common affection among children, though occasionally met with among adults. The disease may assume an active character presenting the symptoms above described. When it is of a very chronic character we find the affected joint becoming gradually rounded and enlarged, the swelling being uniform, doughy, semi-elastic, or pulpy. The limb wastes, the joint is held in a bent position, and much pain is not experienced unless the limb be moved. The disease has a strong tendency to suppuration, and it is only as it advances toward, and through this stage that the symptoms of irritation and hectic-fever are manifested. The disease is very apt to implicate the bones of the part affected.

The *prognosis* in chronic synovitis, is not, as a general rule, very favorable, and particularly if the osseous parts are involved. At an early period, before much change in the structures of the joint has been effected, the disease may frequently be checked in its progress, and the joint be saved; at a later period, if we can arrest any further advance of the disease, the patient will be left with a deformed and anchylosed joint. If suppuration has occurred, and the constitution manifests great sympathetic irritation, the prognosis is unfavorable, especially if the system is highly scrofulous, with a tendency to tuberculous deposit in other parts.

A post-mortem investigation reveals only the various effects of the disease upon the several structures forming the joint, and not the disease itself. The soft tissues surrounding the joint are more or less thickened and contain fatty and plastic infiltrations; the cartilages of the joint are soft, inelastic, and dull, or disintegrated, or wholly destroyed; the synovial membrane will be thickened, rough, vascular in some parts, more or less removed, or it may be replaced by a gray or brownish pulpy substance, or by a viscid fatty deposit; the ligaments may likewise be inflamed, softened, or destroyed; the synovial fluid will be in increased amount, somewhat normal, viscid, or thin, yellow, and purulent, containing more or less fatty matter, or flakes of lymph, and sometimes, thick and grumous. If the bones are diseased, their articular extremities may be

expanded or enlarged, the osseous structure thin and expanded, and the cancellated cells occupied with a bloody and fatty serous fluid. Tuberculous or fatty matter may be deposited in the bones. Caries or necrosis may be present. These various conditions will differ according to the variety of the disease, its severity and its duration.

The *treatment* of white swelling is both constitutional and local. The former consists in the administration of such remedies as will remove any rheumatic, syphilitic, scrofulous, or other condition of the system, improve the blood, and give tone and energy to the nervous system; and the agents for these purposes are more especially referred to under the heads of Rheumatism, Constitutional Syphilis, Scrofula, etc. As to local treatment, if there is much inflammation and pain present, the joint should be exposed to the action of hot vapor arising from a decoction of equal parts of Stramonium, Lobelia, Hops, and Wormwood—covering the knee lightly so as to retain the steam; this may be repeated two or three times a day, if the case be very urgent. The whole of the knee should also be painted two or three times a day, with the following, or some similar preparation: Take of Extract of Belladonna one drachm, Alcohol two fluidrachms; rub the two articles well together, and then add to them Iodide of Ammonium three or four drachms, Glycerin one fluidounce. Or, the Compound Belladonna Plaster may be used. Recent Stramonium Leaves, bruised, and applied will also be found beneficial. If the inflammatory symptoms are severe and obstinate, in conjunction with the above measures, it may become necessary to apply leeches freely. It must be recollected, however, that unless the symptoms are acutely inflammatory, these local measures will seldom be of service in relieving the pain. I have derived considerable benefit in pain and inflammation, by hypodermic injections of Muriate of Morphia, in the vicinity of the affected parts, even when all other means had failed to give any relief.

The most important part of the local treatment, both in the more active and in the chronic conditions of the disease is, to keep the limb constantly in a state of rest, being very careful when applying the local measures, to preserve a perfectly immovable condition of the joint. And for this purpose, it may become necessary to place the limb in splints, so adapted as to keep the joint motionless, and at the same time effect an extension sufficient to prevent compression of the bones from muscular contraction. The starch bandage will, in some instances, be found to answer a much better purpose than splints.

In the chronic stage, or after the acute inflammatory symptoms

have been subdued, there is probably no application that will have so beneficial an influence upon the disease, as the Compound Tar Plaster, which should be allowed to keep up a discharge as long as possible. In some cases, it will require to be applied intermittingly; and, in others, the patient will not be able to bear it at all, either from the soreness it produces, or because it develops inflammatory action which it is not desirable to have extend to the joint; in which cases, hypodermic injections of a solution of Chloride of Gold and Soda may be made daily, or every other day, in various parts around the swelling, into the more healthy tissue. About the thirtieth or fiftieth part of a grain of this salt, in solution, may be employed at one injection. If neither this, nor the Tar Plaster can be used, nor be borne by the patient, adhesive straps may be applied over the diseased part, provided there is no inflammatory action present, subjecting the part to as much pressure therefrom as the patient can endure, and without augmenting the pain. And these should be so arranged around the joint, as to admit of such fluid applications to the parts as the practitioner may desire, from time to time. Indeed, straps or bandages to the joint as firmly or as tightly as the patient can comfortably bear, should never be omitted in the chronic form of the disease, except when the Compound Tar Plaster is being employed. And should there at any time be a renewal of inflammation and pain, the same measures must be pursued to overcome them as advised above; omitting the other applications in the mean time.

A very useful preparation with which to paint the swoln joint, when straps or bandages are used, in the chronic stage, is the following: Take of Iodine one drachm, Iodide of Ammonium two drachms; Alcohol, or Glycerin, four fluidounces; mix, and dissolve the Iodine and Iodide. This may be applied, one, two, or three times a day, according to circumstances.

If suppuration ensues giving rise to the formation of abscess, this should be discharged as soon as practicable by an artificial opening; and the abscess should be washed or syringed once or twice a day with Castile Soap-suds, and immediately afterward with a solution of the Vegetable Caustic, as strong as can be borne; and any great amount of pain arising therefrom may be lessened by the use of the local vapor bath, or by anodyne fomentations. A weak solution of Permanganate of Potassa, injected, will frequently be of service; or, the treatment advised for scrofulous abscess may be pursued. This treatment should be faithfully persisted in as long as pieces of diseased bone are discharged, or as long as the ulceration continues.

An attention to the functions of the skin, bowels, and kidneys, are very necessary in this malady. And the diet should be the same as that recommended under Scrofula; sustaining the strength of the patient by tonics, should he become much enfeebled. This is a very troublesome disease, frequently requiring several months before any permanent benefit can be effected, and often proving intractable to any treatment; the above measures are the principal and more important ones to observe, but the disease may present itself in so many phases, and under so many circumstances, as often to require modifications and additions, which it is impossible to enter into here, not being within the scope of this work. However, these modifications, etc., may be readily and correctly made by any practitioner who is thoroughly posted in the general principles of Practice and Surgery.

HIP DISEASE.

Hip Disease, also named Coxalgia, Tuberculosis of the Hip Joint, is an affection more commonly occurring among scrofulous children under twelve years of age, though it may happen at any period of life, and among persons free from any scrofulous taint. Children from two to six years old are much more frequently attacked with it than at any other age. Both hip joints are seldom affected at the same time; and, as the disease advances, it sometimes becomes complicated with scrofulous disease in one or several other parts of the system.

The *causes* of hip disease are but imperfectly understood; the scrofulous taint is the predisposing cause. The exciting causes are, cold, dampness, residence in an impure atmosphere, improper diet, want of proper nourishment, profuse discharges, exhaustion from acute diseases, want of exercise, and, sometimes, severe injuries to the part from blows, falls, overexertion, etc. In many instances, the disease comes on spontaneously without any attributable cause.

The *symptoms* are often developed so obscurely and gradually as to mislead us relative to the true character of the affection; and, in some cases, many months may pass before our suspicions become aroused. At first, the patient complains of slight pain in the knee, but which does not interfere with the ordinary exercise and daily amusements. Ultimately this pain becomes more severe, is aggravated by any kind of motion, or exercise, and is worse at night. An examination of the knee will not detect any enlargement or redness of this joint, and pressure will not occasion pain in any of its parts. After a longer or shorter time the pain will be

felt in the hip joint, along the anterior, lateral, or posterior parts of the leg, in the heel, in the ankle, etc., often shifting from one of these parts to another. The pain will vary in severity from time to time; it is not constant, the patient often passing several hours free from it.—Sometimes the pain will be first observed in the hip joint; and, again, in both the hip and knee simultaneously. It may also be severe from the first, and the consecutive symptoms may progress more rapidly than is named here.

If an examination be made about the time the pain affects the hip, the leg on the affected side will be found from half an inch to two inches longer than the opposite one, and which will be more readily detected upon placing the patient in an erect position, when the knee will likewise be found more or less flexed, and the foot turned somewhat inward. If the limb be seized in both hands and pressed upward, as if to carry the head of the femur farther upward into the acetabulum, at the same time slightly rotating the limb, pain will be experienced in the hip joint. Pain will also be produced or augmented by percussing the knee when the limb is flexed at this joint, and also by pressing upon the region of the glutei muscles. The nates will generally be somewhat flattened.

As the disease continues to progress the general health becomes impaired; there will be a wasting of the muscles of the affected limb, together with spasmodic twitchings or jerkings; disturbed sleep; annoying or frightful dreams; startings from sleep in a state of mental confusion; deranged appetite; tendency to constipation; scanty and high-colored urine; febrile symptoms; peevishness; irritability; emaciation; profuse sweats, etc. These symptoms are not always present; but there is almost always a wakefulness or disturbed sleep, which produces its influences upon the constitution in a greater or less degree.

After more or less suffering, suppuration occurs, as, indicated by augmented pain, throbbing, rigors, high fever, profuse sweats, œdema of the subcutaneous tissue, and an inability to move the limb in the slightest degree, at least without experiencing the most intense pain. Occasionally, instances may be met with in which the more severe symptoms of suppuration will be wanting. The pus increasing in amount, gradually advances toward the surface, at some point of which it is discharged. It more commonly forms an opening behind the joint under the gluteal muscles, though other points are frequently met with, as, in the groin, in the posterior and superior part of the thigh, a little inferior to the great trochanter, etc. Not unfrequently the pus will be discharged from several orifices at different points; and the sinuses will be long and

tortuous, with false membrane lining their walls, more especially in long-standing cases.—The pus discharged is less consistent than ordinary pus, has a greenish tinge, and contains small granular bodies, minute sanguineous clots, sometimes cartilaginous or osseous debris, and is often very fetid. With the exit of the pus, the pain becomes greatly relieved, though the usual hectic symptoms accompanying profuse and long-continued discharges are always present, being more or less severe according to the character of the discharge as to quantity and quality.—After the first-formed pus has been discharged, that which follows is usually of an ichorous character, and sometimes tinged with blood.

At this period of the disease the limb of the affected side will be found greatly emaciated; the thigh will be more or less flexed toward the abdomen, and inclining toward the opposite side; the limb will now be shorter than its fellow; and, in the erect posture, the toes and ball of the foot only will rest upon the ground, while the heel will be raised more or less above it; more frequently the foot will incline inwardly,—occasionally, outwardly. The knee will also be more or less bent, the leg being flexed toward the thigh.

The *diagnosis* of hip disease, as a general rule, may be readily determined by a careful examination of the case. However, it has sometimes been mistaken for psoas abscess, rheumatism of the hip joint, or an injury, as, a sprain.—In *psoas abscess* there is hardly any pain in the knee, the pain being located in the lumbar region, and is greatly augmented when the patient stands erect, or extends the leg of the affected side; coughing, sneezing, etc., produces an impulse in the swelling which may be distinctly recognized; besides which, there is no elongation or shortening of the limb, and the disease is seldom met with until after adult age. In hip disease, the pain is in the knee and hip, the patient has a limping gait, the limb, at first, is elongated, afterward shortened, no impulse can be perceived in the swelling upon coughing, etc.; and the disease is more common prior to ten or twelve years of age. Psoas abscess is generally located above Poupart's ligament, and no pain is produced upon pressing the limb upward and slightly rotating it.

Rheumatism and *Sprain* may be distinguished by the history of the case, the absence of pain in the knee, the absence of pain upon pressing the limb upward and rotating it, the absence of stiffness in the hip after exercise, the want of alteration in the shape and position of the limb, the absence of constitutional disturbance, and by the want of obliteration of the fold of the nates. Besides, children are less liable to rheumatism than adults.

The *prognosis* of hip disease will vary according to the period at which treatment is commenced. In the first period of the disease, before the severe pain and the constitutional disturbance are developed, a cure may be effected, and the joint be restored to its original healthy condition. When the severe pain and constitutional disturbance are present before treatment is instituted, the further progress of the disease may be arrested, but in almost all cases there will remain a permanently rigid condition of the joint. Indeed, the same may be said of the period of suppuration,—an arrest of the malady will be followed by rigidity of the joint, shortening of the limb, and a loss of its function. In this last stage, recovery, if effected at all, will be very gradual, but the patient is more liable to loss of life from the constitutional sufferings and hectic irritation; the chances, however, are greatly better for children; adults almost invariably succumb.

The *post-mortem* appearances vary according to the period of the disease in which the examination is made. Although the disease never causes death until it has considerably advanced, yet, opportunities for post-mortem observations have occasionally been presented, where, patients suffering from the commencing symptoms of the affection, have died from some other cause. In its early period, inflammatory symptoms are observed; vascularity of the synovial membrane, with patches of opacity and softening, and sometimes a thickening from lymph deposits; the synovial fluid will be in somewhat larger amount; the articular cartilage may be softened, thickened, and of a grayish appearance, the round ligament will be red, swoln, and softened; vascularity, softness or brittleness of the osseous structure may also be present, with distension of its cells from deposition of semi-solid tuberculous matter. As the disease progresses, the morbid changes assume a more formidable character; there will be an augmented amount of lymph; partial destruction of the synovial membrane; ulceration of the cartilage; a carious condition of the bone; and evidences of an extension of the inflammatory action into other surrounding structures.

In the last period, besides the presence of pus, and the various canals through which it makes its exit, there may be an absence of the head and neck of the thigh-bone from absorption; or, necrosis of these portions of the bone; caries of the innominatum; perforation of the acetabulum, through which the pus passes into the pelvis and rectum; absorption of the ligaments; more or less complete destruction of the synovial membrane, the round ligament, and the articular cartilages; together with many other changes indicative of the destructive character of the disease. When the disease has

continued for a long time, fatty degeneration of the surrounding muscles has frequently been observed. The thigh-bone having lost its head and neck, will be found forced into some unnatural position. Evidences of tuberculous disease will also be found in other parts of the system.

The *treatment* of hip disease is divided into hygienical and therapeutical, and the latter is subdivided into local and constitutional.—In the early period of the disease, the local measures must be for the purpose of arresting inflammatory action, and consequently arresting the farther progress of the malady. The best means for attaining this result is, in the first place, to have the patient keep the limb and joint in a state of absolute rest and quiet; and this may be generally accomplished without the use of straps or splints. In the second place, the Compound Plaster of Belladonna, spread upon a piece of soft leather, about an inch or two in width, should be applied over the spinal column, extending from near the coccyx to the last lumbar vertrebra; this should be kept on all the time, changing it occasionally, and only removing it for a short period when symptoms indicating absorption of the narcotics entering into its composition are manifested. In the third place, the Compound Tar Plaster should be applied over the hip, extending from in front of the trochanter around and posteriorly to the nates of the affected side, covering a portion of it, and especially its central and inferior portions. By means of this Plaster a more or less persistent discharge should be kept up for six or eight weeks, according to the strength of the patient, and the obstinacy of the malady. In some cases, hypodermic injections of a very weak solution of Chloride of Gold and Soda, associated with a weak solution of Muriate of Morphia, will be found very beneficial. These injections may be made at various points upon the upper and inner part of the thigh, the groin, inferior part of the nates, etc. Or, any other sedative may be employed instead of Morphia; in some cases, the Gold salt will answer a much better purpose, after the more active inflammatory symptoms have subsided; and the hypodermic injection of the Morphia Solution alone, will be better adapted to relieve the pain and inflammation, if too much disorganization of the parts has not taken place.

At the commencement, it may be necessary to give an active cathartic; but, as a general rule, it is better to avoid catharsis, and endeavor to keep a daily free condition of the bowels, either by mild laxatives, or by the use of laxative articles of diet. Internally, to aid in subduing the inflammatory symptoms, the following preparation should be given: Take of Tincture of Black Cohosh,

Tincture of Gelseminum, each, one fluidounce, Tincture of Aconite one fluidrachm and a half; mix. The medium dose of this preparation for an adult is twenty drops, every one, two, or three hours; it should be given, at first, sufficiently often to produce an appreciable influence upon the system, after which, merely often enough to keep up this influence. This preparation exerts both a sedative and antiscrofulous effect, on which account I prefer it to other sedative agents. Sleep may be promoted by the administration of opiates or other anodynes. As soon as febrile symptoms have been overcome, one of the alterative agents named under White Swelling must be administered, as, Compound Syrup of Yellow Dock, etc. And the state of rest in which the hip must be kept, as well as the exhibition of the alteratives, must be continued for several weeks after all symptoms of the disease have disappeared.—The diet in the early period should be moderate but nutritious, and the surface of the body, should be bathed daily with a warm, weak, alkaline solution.

If, however, the suppurative action has advanced so far that the above measures prove inefficient, we must then endeavor to promote its maturation and the discharge of the pus formed. For this purpose, warm fomentations may be applied over the whole hip, as well as over the Compound Tar Plaster, which must not be removed from its usual position upon and around the hip; Hops, Lobelia, and Stramonium Leaves, form a very excellent fomentation for the purpose just named. And as soon as a tendency to point at some place is observed, this point should be opened by means of caustic, that the matter may be discharged as soon as possible. During the whole of the suppurative and ulcerative period, the treatment will be similar to that named for white swelling: as, for instance, injecting the sinuses with Castile Soap-suds, followed by a Solution of Vegetable Caustic, or other solution, repeating this once or twice every day,—but, at the same time, keeping up the use of the Compound Tar Plaster, which may now be kept discharging intermittingly, if the patient can not bear it constantly, or, in case it occasions too much irritation. Tonics, alteratives, nourishing diet, and hygienic measures similar to those named under White Swelling, are also to be employed. Moderate exercise in the open air is admissible, provided the hip is properly secured by a splint, to keep it immovable; and the patient may walk on crutches, or be moved about in a small hand-wagon. He should be carried in the arms as little and as seldom as possible. Many months may pass, in the most favorable cases, before a permanent arrest of the malady will be effected, particularly after the suppurative stage.

BRONCHOCELE.

Bronchocele, Goitre, or Big Neck, is a chronic enlargement of the thyroid gland, which is much more frequently met with among women than men; it is very common among the inhabitants of certain mountainous districts, where it exists as an endemic, as, in the valleys of the Alps, the Apennines, the Pyrenees, the Jura, the Hartz, the Carpathians, the Cordilleras, the Himalayas, and in the mountainous districts of Tartary, as well as of the New England States, New York, Pennsylvania, Michigan, Virginia, etc. In many places it is associated with cretinism, or a degeneration of the human species, characterized by more or less marked idiotcy, dwarfish size, misshapen head, and other physical malformations. Isolated cases in other sections of country are frequently met with, especially in moist places. And in countries where goitre is endemic, it is by no means uncommon to meet with the disease among certain domestic animals, as, dogs, hogs, horses, cows, etc. The disease has been considered scrofulous, but this is an error—the enlargement as frequently occurs among the non-scrofulous as the scrofulous.

The *causes* of bronchocele are not satisfactorily understood, though many reasons have been assigned for it, as, the use of snow water, or some particular saline or calcareous impregnation of the water in use as a common drink. It has also been attributed to the use of water in which there is an entire absence of iron, iodine, or bromine, this fluid being, at the same time, more or less stagnant and highly charged with lime. The disease is said to prevail in the older geological formations, as, in the silurian regions, and especially in the metamorphic, where the rocks consist of granular limestone, talcschist, talcose gneiss, micaceous schist, and other varieties, as is the case in the central Swiss Alps, and in places where the mica is so abundant that it is precipitated as a deposit from water when allowed to stand for a time. It also appears to exist endemically in magnesian formations, where the well water contains an abundance of magnesia. There is an apparent truth in these views, because, while bronchocele is seldom seen in systems of more recent origin, as, in the tertiary and cretaceous, as well as in coal meadows, which have more or less iodine, bromine, etc., well diffused throughout them, it is almost invariably met with in the older systems in which these non-metallic elements are wholly wanting.

Other causes have been named, and which may, undoubtedly, in many instances, tend to a development of the disease. Thus, it is frequently associated with derangement of the uterine functions, a

restoration of which to a healthy condition will very much facilitate the disappearance of the goitre. A prolonged residence in a moist location, conjoined with insufficient and innutritious food, sleeping in close, illy-ventilated rooms, or intermarriage of blood-relatives, may also occasion it. And rheumatism has been named as an occasional cause. The predisposition to the disease is often transmitted from parent to child.

There is no doubt but that goitre, especially in strumous, lymphatic, and bilious habits, is very frequently the result of a constant and excessive use of food of an amylaceous character, as, wheat flour, corn meal, beans, peas, etc., to the exclusion of a proper meat and albuminous diet. The amylaceous diet gives rise to a fermentation in the alimentary canal, and a consequent development of saccharine matter, carbonic acid, yeast plants, and others of low cryptogamic origin, etc., rendering the system highly glucogenic and fermentative, disposing it to goitre, intestinal irritation, flatulence, typhoid and enfeebling diseases, paralysis, cancer, etc.

The *symptoms* of goitre are readily made out. A small tumor is observed on one or both sides of the trachea, usually affecting both lobes, though unequally ; or, it may be confined wholly to the isthmus of the gland; or to the isthmus and one of the lobes; presenting the appearance of either a uniform tumor extending equally on both sides, or occupying but one side, or two tumors with a fissure between them. There is no pain, no fluctuation, no unnatural appearance of the skin, and no derangement of the general health. As the swelling increases in size it may be hard, smooth, and uniform, or hard and rough or irregular ; sometimes it extends back on each side so regularly as hardly to appear like a well-marked tumor. It generally increases very gradually, and not unfrequently it will remain stationary for a number of years, and then commence growing again, attaining an enormous size, and interfering with breathing. In most cases, the tumor is soft or spongy at first, and insensible to feeling, but as it enlarges it acquires a great degree of hardness, the skin becomes of a brownish or copper color, the veins varicose, and the voice assumes a coarser or husky tone. The face is also subject to flushings, with headache, giddiness, difficulty in respiration, and often shooting pains through the tumor. Severe or fatal cases are occasionally met with in this country ; but the deformity is the principal source of annoyance and mortification to the patient. When the tumor continues to enlarge, becoming harder, with blood-vessels ramifying through it, the constitution finally becomes affected, and the patient ultimately dies.

There is a variety of bronchocele termed "substernal," or "suffocating," in which the tumor is a prolongation, as it were, of the thyroid gland, which extends behind the sternum and clavicle, and these bones preventing its development in front, it is thrust down against the trachea and its neighboring nerves, occasioning suffocating symptoms, or, symptoms resembling those of an asthmatic attack, from compression of the surrounding viscera. It requires a very careful examination, during the expiratory and inspiratory efforts, to detect it.

Goitre may be *discriminated* from *aneurism* by its slow growth, the absence of bellows sound, and its immediate reduction in size under the influence of the electro-magnetic battery. From a *varicose* condition of the internal jugular vein, by the tumor of the varix being seated lower down, as far as the superior margin of the sternum, being soft, elastic, compressible, bluish, and lessened in size by pressing upon the distal part of the vein. From an *encysted tumor*, by this being of small size, painless, soft, and somewhat semi-transparent; and, in case of doubt, the exploring needle may be used. From a *scrofulous tumor*, by the scrofulous constitution present, the existence of similar tumors in other parts, and by the liability of the scrofulous swelling to inflame and suppurate.

An *examination* of the internal appearance of goitre will discover a soft, gelatinous structure filled with a more or less viscid fluid, with numerous enlarged cells or cysts varying in size from that of a pea downward, and which, in the older, harder, and more irregular forms of the tumor, contain a dark, bloody-looking fluid, or melicerous, steatomatous, cartilaginous, or ossific deposits.

The *prognosis* of the disease is favorable when the tumor is soft, becoming considerably reduced in size during exposure to the action of an electro-magnetic battery. When the tumor is of very long standing, very hard, large, and containing more or less blood-vessels, treatment will rarely prove profitable. The earlier treatment is commenced, the greater will be the probability of cure.

The *treatment* consists of local and constitutional measures. A small quantity of the following preparation should be rubbed over the tumor once or twice every day, viz.: Take of Iodide of Potassium, Iodine, each, half an ounce, Hydrochlorate of Ammonia two drachms, Distilled Water half a pint; mix. Or, the above articles may be formed into an ointment by thoroughly incorporating all the ingredients, with the exception of the Water, with half a pound of prepared Lard. Or, the Compound Plaster of Belladonna may be worn constantly over the tumor. In conjunction with this, an electro-magnetic current should be passed through the tumor daily,

of sufficient power to reduce its size at each application, and each sitting should last for ten or fifteen minutes. Internally, the following agents will be found very useful: 1. Take of Iodide of Ammonium one ounce, Water one pint; mix, and after the Iodide is dissolved, give a fluidrachm for a dose, repeating it three times a day, and continuing its use for many weeks. It should be administered about an hour before each meal.

2. Take of Oleo-resin of Blue Flag one scruple, Baptisin five grains, Citrate of Iron and Strychnia eighty grains, Alcoholic Extract of Aletris eighty grains; mix thoroughly together, and divide into eighty pills. The dose is one pill, to be repeated three times a day, about an hour after breakfast, an hour after dinner, and at bed-time. I have frequently succeeded in effecting cures by the internal use of the Iodine Pill. Iodide of Potassium, Bromide of Potassium, Tartrate of Potassa and Iron, Citrate, or Bitartrate of Potassa, are agents that will frequently be found beneficial, when their use is persevered in for several months, in conjunction with the other local and constitutional measures.

A change of residence to a dry, pleasant spot, is always advisable; the liberal use of Iodurettted Salt with the food will be found very beneficial,—about twenty grains of Iodide of Potassium or Iodide of Sodium, to a thousand grains of common Table Salt. Rain-water, or spring water that has been boiled and then allowed to cool, will afford the best fluid for drink among those who reside in goitrous districts. In other respects the hygienic measures may be similar to those named under Scrofula. Eggs, oysters, fresh meats, milk, onions, cabbages, carrots, turnips, chicken, beef, and oyster soups, are important articles in the diet of a goitrous patient. Beans, peas, and all dry amylaceous food should be prohibited. Albuminous diet is highly proper.

The treatment for Suffocating Goitre is surgical. The tumor being transfixed by curved needles is to be raised, and then it is fixed in its new position by inducing an adhesive inflammation, which also aids in its partial resolution.

An ointment of the Biniodide of Mercury, five to ten scruples to the ounce of Lard, has been highly recommended by Dr. J. F. Mouat, Bengal, it having cured, as he states, from sixty thousand to seventy thousand cases of goitre. Some of the ointment is to be rubbed in well, over the tumor, for at least ten minutes, and then the goitre is exposed to the influence of the sun as long as the patient can bear it. In an hour or two, more of the ointment is rubbed in, and the case is left for several days, when the tumor generally disappears, or, at all events, is considerably diminished in

size, in which case the same operation can be repeated. It is very rarely the case that a third inunction has been required. The exposure to the sun is followed by a blister, but no pustules. I do not know whether any beneficial result has been obtained from this ointment in this country, but believe the treatment above laid down will prove fully as successful in effecting permanent cures, and with less danger of injury to the constitution. Besides, the question is, whether the beneficial results are wholly due to the iodine, and not to the mercury? Again, if we allow the Doctor fifty goitrous patients per week, it would require about twenty-three years to get through with the sixty thousand successfully-treated cases.

RICKETS, OR RACHITIS.

Rickets is a disease of the general system, which ultimately leads to a disease of the bones, characterized principally by a softening due to a deficiency of the calcareous or earthy deposits natural to them, and to a condition of the animal matter of the bones differing somewhat from that of healthy bone, there being frequently a partial or entire absence of gelatin. It is especially a disease of infancy, commonly appearing between the third and fourth month, though it is sometimes developed in the fœtus previous to birth, even when the mother manifests every appearance of health. Sometimes it may not be developed until at a more advanced period of childhood.

The *causes* of rickets are not understood. It appears to be more especially a disease of cold and damp places, and where there is an absence of the solar rays. The exciting causes are stated to be, raising infants by hand, feeding children who are suckling, insufficient, inappropriate, and unassimilable food, impure air, a cold and damp residence, want of exercise, uncleanliness, and bad nursing. The disease is rarely associated with tuberculosis or scrofula, though such association has generally, heretofore, been held to exist.

The *symptoms* of the disease usually come on very slowly, and it is only after it has considerably advanced that we can recognize it. The child appears dispirited, is not disposed to move or be moved, suffers from pains in the bones during the night, and also whenever handled, crying out whenever it is touched or moved. Febrile attacks and abundant perspirations are common; paleness of the face, sallow and wrinkled appearance of the skin, deranged digestive functions, diarrhea, and calcareous deposits in the urine,

are also present. After a longer or shorter time, other symptoms are observed, the flesh becomes flabby; the body emaciated; the abdomen prominent; the face pale, swoln, or bloated; the head appears unusually large, and the sutures and fontanelles are preternaturally open. The pains in the bones become more acute, and the child cries out more vehemently, and especially during an examination of its limbs.

In connection with these symptoms, the bones, being unnaturally soft and unable to support the body, undergo various modifications or curvatures, especially those upon which there is much pressure or weight; the ribs lose their convexity; the sternum is thrown forward, forming a ridge; curvature of the dorsal and lumbar vertebræ is common, especially antero-posterior curvature; the femoral and tibial bones are generally curved forward and outward; the long bones of the arms may also be curved, and usually outwardly; the pelvis becomes distorted in various ways, and deformity of the female adult pelvis is sometimes owing to this disease in early life. Various other distortions appear, depending upon the well-marked character of the rachitis. The epiphyses at the several joints of the long bones enlarge, while the limbs between the joints appear very slender. There is always a prolonged delay in the appearance of the teeth, and they are apt to fall out early, not from their structure being altered by the disease, as they do not participate in the general osseous softening, but from the changes which the maxillary bones undergo. All these symptoms are not always present; and, in most cases, the softening of the bones is incomplete. The disease usually commences in the bones of the legs, to which it may be confined; or, it may gradually advance upward to the pelvis, vertebræ, etc. If the child is not eventually destroyed by great constitutional disturbance, and should live to adult age, the diseased bones may remain soft and yielding; more generally, they become very firm and solid, resembling ivory, but the deformity remains as at first.

The *diagnosis* of rickets can not be determined with any degree of certainty, until the limbs become painful and curve spontaneously or under pressure; when dentition is observed to be arrested; when the joints become enlarged; and when the fontanelles remain open. The spinal curvature may be determined from that due to other causes, by the distortions present in other parts, especially in the lower limbs.

According to Dr. Jenner, the leading features of rickets are, "mental capacity and powers small; muscular force deficient; mind and body inactive; figure short; closure of the fontanelles

retarded; face small, but broad; skin opaque, often set with downy hairs; the child is late in cutting teeth, in ruuning alone, in talking, and its teeth drop early from their sockets." The leading pathological tendencies are, "softening of the bones; enlargement of the ends of the long bones; thickening of the flat bones, and deformities consequent on these conditions of the bones; so-called hypertrophy of the white matter of the brain; chronic hydrocephalus; pulmonary collapse; laryngismus stridulus; convulsions; albuminoid infiltrations of the liver, spleen, lymphatic glands, etc."

The *prognosis* of rickets is favorable at its commencement, for it is then more easily cured; but when there is extensive softening of the bones, and considerable deformity, it becomes more serious; for, notwithstanding the arrest of the disease, spontaneously or under treatment, the deformities remain unchanged, in many instances interfering with important functions, which may eventually terminate life. Rickets rarely proves fatal, except in those instances where the distortion becomes so great as to affect the functions of the heart, or lungs, or other vital organs; or when it it is associated with mesenteric disease. Occasionally, the softening, and the associated constitutional symptoms, continue to increase, until every function of the system is affected, and death ultimately ensues. Infants at the breast are more exposed to peril than those who have reached three or four years.

Post-mortem examinations of the bodies of those who have died while still affected with rickets, have detected more or less important changes affecting the nutrition of one or several organs, as, of the brain, liver, spleen, lymphatic glands, etc. Sometimes, the ventricles, or cavities of the arachnoid, and of the spine are filled with a limpid fluid; the lungs may be compressed or displaced, when the disease has occasioned an alteration in the form of the thorax; the thymus gland may be enlarged; the muscles of the body and limbs may be pale, flabby, and wasted; and in many cases, both the liver and spleen will be found enlarged.

In the affected bones, the softening may be so great that they may readily be cut with a knife. The bones are enlarged at their extremities, from great development of the spongy tissue, and of the epiphyses. The spongy cells are filled with spongy matter, are enlarged, and contain a dark, bloody, gelatinous fluid, which may be removed by washing with water; at a more advanced period, this fluid becomes less black, more reddish and consistent, pulpy, adheres to the osseous walls, and becomes organized similar to the manner of false membranes, by means of capillary vessels of new formation. The calcareous granular deposit is wanting. The

periosteum of the affected bone is often more vascular than natural, and thickened. Thickening of the flat bones is due to this condition of the periosteum, together with the profusion of nucleated cells, and blood from the pulpy matter which occupies all the interstices of the bones. Free fluid fat may also be detected in the heads of the bones, especially in the reddish, semi-transparent pulp.

In the *treatment* of rickets, the first thing to be done is to secure a good bed, upon which the child can lie comfortably all the time, so as to relieve it from pain, and the diseased bones from pressure. One composed of equal parts of Dogwood and Sweet-fern leaves, will be found to have a very salutary influence; it should not be too hard, nor so soft as to yield much to the weight of the body. The body and limbs should frequently be bathed in a solution of Salt in Water, or in Brandy; and frictions with the open hand, or with warm soft flannel, should be frequently made. The bowels should be kept regular, without purging, and a good nourishing diet should be given, according to the age of the child; allowing the use of salt, cod liver oil, and butter. The child should be talked to in a cheerful way, frequently, so as to attract its attention, and excite and invigorate the brain; it should also be exposed as much as possible to the dry open air and sunshine, for which purpose it may be taken out on every pleasant day in a small wagon, adapted for this purpose.

As a constitutional remedy, a Syrup of Hypophosphite of Lime with the addition of a small portion of Hypophosphite of Iron, will be found an excellent remedy. A favorite agent of mine is the following: Take of the roots of Buckhorn Brake two ounces, Solomon's Seal Root one ounce, Comfrey Root half an ounce; bruise these roots, and add boiling water to them sufficient to form a paste or mucilage somewhat thicker than the white of egg. To this, when prepared, add the following mixture: Take of the Bark of the Root of False Bittersweet, Yellow Dock Root, Prickly-ash Berries, Caraway Seed, each, in fine powder, half an ounce; White Sugar one pound, good French Brandy one and a half pints. Let the whole stand for fourteen days, frequently shaking it, when it is ready. Of this compound, the dose is from a teaspoonful to a wineglass half full, according to the child's age, to be repeated every three or four hours. In addition to this, the whole length of the spinal column, the affected joints and limbs, and the abdomen, should be rubbed two or three times daily, with some stimulating preparation, as, the Compound Tincture of Camphor, or a lotion composed of two parts of Linseed Oil, and one part, each,

of Oil of Sassafras, Oil of Wintergreen, Oil of Origanum, and Camphor.

If the child is at the breast, the mother or nurse should be placed on tonic treatment, good animal diet, the use of the hypophosphites, and, when gastric acidity is present, prepared Chalk or Lime-water. As the disease is disappearing, and the child's health is improving, great care must be taken not to allow it to use its limbs too soon, nor at any period to exercise them too long at a time.

RHEUMATISM.

Chronic Rheumatism may be the result of an acute attack, or, it may manifest itself as a primary disease. When it occurs as a sequence of the acute form of the disease, the joints are usually affected, as well as the heart; when it exists as an idiopathic disease, the heart is rarely affected by it, and the joints frequently remain free from pain and swelling. The disease is much more frequently encountered among males than females, in the proportion of eight or ten to one. Generally, it is a tedious and obstinate disease to cure, from the fact that during the absence of actual suffering treatment is almost invariably neglected. The mere absence from pain during pleasant weather, or other favorable circumstances, is by no means a proof that the disease is eradicated, as patients who neglect treatment during the intervals of freedom from pain, generally learn to their cost, upon the approach and presence of damp and cold weather. If the disease be early and properly attended to, it is as readily curable as most maladies. It appears to be a disease of the fibrous, serous, and fibro-serous membranes more especially; and although any of these may be attacked by it, yet, as a general rule, certain localities are more obnoxious to it than others. Ordinarily, acute rheumatism affects the articular structures more especially; and chronic rheumatism, the muscles, their fasciæ, and tendons. The former is principally a disease of youth and early adult age, seldom occurring after forty years of age, unless it had existed previously.

As to the *causes* of rheumatism, there is no doubt but that exposures to damp or cold, or to sudden changes from a high to a low temperature, and vice-versa, very frequently occasion the disease, or, more properly, call it into activity—these being merely exciting causes, with many persons already predisposed to it; indeed, we observe that these exposures are often made, and to a very great extent, without a subsequent attack of rheumatism. Besides, the disease frequently occurs among persons who have

not been exposed to these exciting causes in the least degree. I have frequently seen it well developed among individuals, where the only apparent cause was the daily and continued use of alcoholic (spirituous and vinous) drinks in small doses, keeping the system constantly in an irritable condition; I have also known the use of acids, indigestible food, and functional derangement of the liver to be followed by severe attacks of this malady. A dry skin, a derangement of the renal functions, a night's dissipation, a constant exposure to a dry heat, etc., are frequently followed by an attack of rheumatism.

But, whatever may be the exciting causes of rheumatism, I have long considered it to be wholly a disease of the blood, and, probably, of those elements in this fluid upon which the integrity of muscular, or fibrous and serous tissues, depends. This abnormal condition of the blood may be a diminution of some of its alkaline constituents, or an excess of its acid. Fuller considers this abnormality of the blood to depend upon the presence of an acid, perhaps the lactic; and this may be the case—indeed, the perspiration of rheumatic patients has a more acid odor and reaction, than that of others, beside which, the urine is almost always more decidedly acid. The presence of lactic acid is supposed by some to occasion rheumatism, while gout may depend upon excess of uric acid in the circulation. It would be a very desirable matter to ascertain whether the injection of a small proportion of a solution of uric or lactic acid into the synovial fluid of the joints, would cause the active characteristic symptoms of gout or rheumatism.

Dr. Francis T. Bond objects to the lactic acid theory, upon the ground that it has not been shown to be in excess in the blood of rheumatic patients—that even supposing it to be present in excess, it would be difficult to trace the connection between this circumstance and the exudations in and about the different fibrous structures of the body—that an excess of other acids may be as much the cause of the phenomena as lactic acid—that as to the theory attributing the disease to suppressed perspiration, it is doubtful whether it is preceded by greater suppression than the prodromata of all inflammatory diseases bring with them—and that the tendency to sweating may be better explained by another theory. He considers that a hyperinotic condition of the blood exists from the first, and the excessive fibrin having a special affinity for the fibrous structures, is specially deposited in and about them. The weakness of a joint or its depressed nutrition, renders it more liable to be attacked. The increase in the perspiration and in the

acids, etc., of the urine, he attributes to the metamorphosis of the fibrin. The excess of fibrin in the system he considers due to imperfect primary assimilation—to a metamorphic process, normal in nature, but extreme in amount—and to defective elimination of the fibrin by the excretory processes provided for the purpose. The blood-poison, whatever it may be, effects more or less derangement and morbid changes in the fibrous and serous tissues of the system.

As damp weather approaches, nearly all persons experience certain unpleasant sensations of stiffness, fullness, relaxation or languor, and (when, at the same time, certain maladies exist), even pain—and with some, this sensitiveness to atmospheric changes exists to so great an extent that they are termed "living barometers." Among the rheumatic, as damp weather approaches, more or less expansion of fibrous and serous tissues occurs, these expanded muscles or tissues press upon their accompanying nerves, producing more or less pain, according to the degree of pressure, as well as to the degree of sensitiveness of these nerves; and, as soon as clear, pleasant weather approaches, the muscle or tissue returns to its original condition, the pressure upon the nerves is removed, and the patient then becomes free from pain, and imagines himself well. When in addition to this peculiar susceptibility to the influence of atmospheric changes, the system is exposed to one or more of the exciting causes, this occasions more or less debility of the parts attacked, and renders them more sensitive when the rheumatic attack occurs, the symptoms being then more or less severe and persistent, according to the degree of debility and sensitiveness resulting from the exposure, and also according to the resisting power of the system.

The pain of rheumatism, although considered by many as the disease itself, is but a symptom of it—the disease is in the blood. If we press deeply between the dorsal part of the bases of the third and fourth metacarpal bones, so as to reach that branch of the median nerve lying in this location, at first, a rheumatic pain will be produced; continuing the pressure, a severe neuralgic pain will arise; and if the pressure be maintained sufficiently long, provided the person can endure it, the pain will gradually cease, a numbness will follow, and a subsequent paralysis, which will require several hours, or even days, to thoroughly remove. A somewhat similar effect is produced when persons accidentally hit the elbow on some prominent object, in which the ulnar nerve is suddenly pressed, pain is produced, and often a slight paralysis for

a few minutes. And these results are more readily and severely experienced by persons disposed to rheumatism.

The principal *symptom* of chronic rheumatism is a dull, aching, or gnawing pain, and which, even when articular swelling is present, is not attended by febrile or inflammatory disturbance. Every part of the system is liable to an attack, but the hips, loins, knees, ankles, shoulders, etc., are its more ordinary preferences. The pain may be confined to one particular part, or it may shift from one location to another; again, while some patients are hardly ever wholly free from pain, others suffer only on the approach of damp or cold weather, or from improper exposures. The pain in this disease is generally worse at night, while the person is in bed; while syphilitic or mercurial pains, which are seated in the long or flat bones, usually commence at three or four o'clock in the afternoon. In not a few cases, however, the warmth of the bed will be found to alleviate the pain. The joints are never swoln to the same degree as in the acute form of the disease, and the skin is pale, cold, stiff, and dry, with none of the redness of the inflammatory variety. If the affected part is allowed to rest for a short time, it will become stiff, and more or less pain will be produced upon attempting to move it; but, as the exercise continues, and the body becomes warmed, the stiffness and pain disappear.

In many instances, chronic rheumatism may be so mild in its character as to effect no appreciable influence upon the system, except it has existed for a very long time; while in others, its severity will produce some constitutional disturbance, as manifested by a quick and tense pulse, deranged appetite, variable appetite; irregularity of the bowels; coldness of the hands and feet; numbness of the limbs; and often, a partial impotency. If the disease be not cured, it will eventually occasion organic disease of the tendons, permanent stiffness of the joints, and an atrophy of the muscles adjacent to the affected part, with considerable deformity.—Persons laboring under rheumatic affections will generally have more or less soreness or pain produced by pressure upon the muscles on the sides of the neck, and frequently on pressure along the second, third, fourth, fifth, sixth and seventh cervical vertebræ, and upon the sacral nerves.

Chronic rheumatism has received several names, according to the parts attacked, among the principal of which, together with certain maladies strongly resembling, and heretofore confounded with it, are the following:

1. *Lumbago*, when the muscles in the lumbar region are affected.

In this form there is comparatively but little, if any suffering, until the patient attempts to move his body, when the pain becomes very severe; a sudden movement is especially painful. The patient can not stand erect, but assumes a bent position, inclining forward in walking. If the attack be very severe, he may not be able to move his body at all, without great pain, and will consequently be obliged to remain in a recumbent position for a number of days. In severe cases there will be some constitutional disturbance. It is a very obstinate malady, often resisting treatment for months. The lower limbs and joints are rarely affected.

It may be determined from *neuralgia*, by the absence of painful points on pressure along the affected nerve; from *lumbar abscess*, by the absence of any prominence, fluctuation and fever; from *disease of the kidneys*, by the character of the urine, and the pain excited by movements of the body; from *rheumatism affecting the vertebral articulations*, by an absence of swelling around the spinous processes, and no soreness upon pressure thereon. (*See Pains in the Loins*, page 294.)

2. *Muscular rheumatism*, the essential character of which is pain. The pain is not so severe as in neuralgia, is increased by pressure or movement, and is more persistent in its character. Lumbago, referred to above, belongs to this class. But it may attack any of the muscles of the body. When it affects the scalp, or the muscles of the head, as, the occipito-temporal, the masseters, temporals, or muscles of the eyes or cheeks, it is termed *epicranial rheumatism*, or *hemicrania;* the pain is greatly augmented when the muscle or muscles affected are suddenly moved, and is limited to these muscles. The malady is generally worse in the morning, especially in moderately cold and damp weather, at which periods it is more prevalent.

When it affects the muscles of the neck, it causes a "stiff" or "wryneck," "crick in the neck," termed *torticollis*, or *cervical rheumatism*. The pain is augmented by motion, the neck is sore, stiff, and is held inclined to one side.

When the the thoracic muscles are affected, it is termed *intercostal rheumatism*. The pain or stitch in the side or chest, resembles that of pleurisy, but is unattended with fever, and is aggravated by motion and by the act of breathing. Cough is not necessarily present; there is soreness on pressing externally; increase of pain upon elevating the arm above the head; and no febrile symptoms. It has also been termed *pleurodynia*.

A very obstinate form of muscular rheumatism is that which affects the muscles of the shoulder, and which, like the other

forms, has the pain aggravated on motion, and, in some instances, only when the arm is elevated. The muscles of the thigh or arm are likewise often attacked, and may become atrophied, giving rise to an emaciated limb, which is the result of disease of the painful muscles, allowing them to diminish in size and to ultimately have their nutrition impaired. Not unfrequently the rheumatism extends to the skin, occasioning a *rheumatic dermalgia;* the pain may be persistent, and mild, or it may be intermittent and severe, resembling the prick of a pin, or an electric shock, recurring frequently. Friction of the part with the fingers, or when the patient's dress passes over the affected part, always aggravates the pain, and sometimes occasions an acute burning sensation. The intermittent pain is worse at night.—Rheumatism may also affect the uterus and ovaries, at any period during pregnancy or non-pregnancy, more frequently the former; it gives rise to severe pains occurring in paroxysms; tenderness of the abdomen on pressure; and if the disease occurs near the parturient period, may lead to the erroneous idea that the pains are those of labor. If the uterine neck be examined per vaginam, the os uteri will be found closed, and exceedingly tender to the touch. Any motion aggravates the pain, and the patient lies upon her back, keeping as motionless as possible. After the pains pass away, they are succeeded in many instances by a profuse perspiration, or urination. If the pains come on at the time of labor, or near the parturient period, they become of an expulsive character, and may be a cause of difficult labor, by giving rise to irregular uterine contractions.

3. *Articular rheumatism*, or when the joints are affected, more commonly involves the ligaments and fibrous structures around the joints. There is no heat, redness, nor swelling, but a dull aching sensation, which becomes a more or less severe pain when the joints are suddenly moved; prolonged exercise of the joint lessens the pain. "When the bursæ and the synovial membrane lining the joint are affected, and effusion takes place into their cavities, the pain is usually less severe and less constantly aggravated by sudden motion; but it is more certainly increased by continued exercise, and is most felt when the limbs are in those positions in which the irritated membranes are put upon the stretch. Thus, when there is effusion into the capsular membrane of the knee, pain is sure to be induced by full flexion of the leg, and is greatly relieved by keeping the limb in a horizontal position, and straight, or very slightly flexed. And when the bursæ and the adjoining tendinous sheaths are the seat of effusion, any action which tends to bring the parts into play is certain to be accompanied by an increase of

suffering. The wrist is one of the common situations of these enlarged bursæ, and excessive pain is sometimes occasioned by long-continued use of the affected joint and of the tendons connected with it. In the chronic state, however, which I am now describing, although the swelling may be considerable, there is no remarkable febrile disturbance, no discoloration of the skin, and but little if any perceptible increase of local action." (*Fuller.*)

4. *Gonorrheal rheumatism* is the name given to a form of rheumatic affection of the joints, which manifests itself in connection with a urethral discharge; it is a very peculiar affection, the precise nature of which is not clearly established. Dr. F. C. Skey, in speaking of the disease, says: "There is no such thing as gonorrheal rheumatism, though there may be rheumatic gonorrhea." Fuller doubts its rheumatic origin. He observes—"My own conviction is, that the disease is due to the action of a specific poison, and has nothing in common with rheumatism as typified by rheumatic fever, except pain in the limbs and occasional swelling of the joints. Its origin is manifestly connected with a gleety discharge from the urethra, resulting, as I believe, from some peculiar form of vaginal poison distinct from that which occasions ordinary gonorrhea. Its course is unlike that of true rheumatism, ... and it is unattended by any of the general symptoms which characterize true rheumatism." And he is, probably, correct in this view.

Although gonorrheal rheumatism presents the shifting character proper to all rheumatic affections, yet it manifests a greater disposition to localize itself, appearing to prefer the knee-joint, and may in some constitutions give rise to white swelling and anchylosis. The disease occurs among those persons who are laboring under a discharge from the urethra, or who, several years before, were attacked with rheumatism while suffering from gonorrhea. And persons who have once been attacked by this form of rheumatism are very liable to have a renewal of its symptoms whenever a urethral discharge is produced by any cause whatever, or shortly afterward, and sometimes even upon the slightest irritation of the urethra. It is more common to young persons of spare habits and energetic dispositions; and is, undoubtedly, a distinct affection having no connection with true rheumatism.

At the third or fourth day after the appearance of the urethral discharge, and sometimes not until two or three weeks have passed, the patient experiences chilly sensations, pains in one or several joints, especially the knees, shoulders, ankles, elbows, and wrists, and swelling from excessive synovial effusion, and inflammation of the ligaments and the adjoining bursæ and sheaths of tendons. As

the articular malady comes on, the urethral discharge may become diminished in quantity, or cease altogether. The pains are very severe and obstinately persistent, are generally aggravated by motion, but not upon pressure, may be more troublesome at night, and are often accompanied by wandering pains in the limbs. There may be some slight febrile disturbance at first, but this soon disappears; and the external surface of the affected part seldom presents any redness or inflammation. In the chronic form of this malady, more especially, there is little or no increase of the temperature of the external surface, the tongue is not necessarily furred, being often clean, the pulse is natural, the urine clear or natural, the appetite unimpaired, and, whether it be acute or chronic, it is never marked by inflammation of the heart. One symptom peculiar to this disease is an inflammatory condition of the eyes, or a conjunctivitis. The chronic form of the disease is, more particularly, very intractable to treatment.

As the disease progresses, the muscular and adipose tissues become wasted, which, in conjunction with the enlargement of the joints, gives a deformed appearance to the limbs. It may terminate by resolution, or it may continue a long time, eventually inducing serious organic changes in the affected joint, effusions into the areolar tissue, thickening of the periosteum, perichondrium, and other structures around the joints, especially around the ankles, occasioning permanent disability of the joints.

5. *Periosteal rheumatism* is commonly met with among the cachectic, the scrofulous, and those of impaired constitutions; it is the result of syphilitic or mercurio-syphilitic affections, or may arise from other causes. The parts of the periosteum, or fibrous covering of the bones, more especially liable to this malady, are those which, from having a thin tegumentary covering, are more exposed to changes of weather and of temperature, as, the cranium, the bridge of the nose, the sternum, the clavicle, the ulna, and the tibia. The disease is first noticed from the pain in the part, which is deep-seated, dull, and constant, and feeling to the patient as if seated in the bone; pressure over the part increases it. At first, there may be no redness nor swelling observed; but, sooner or later, a careful examination, passing the finger slowly along the bone, will detect a fullness or puffiness of the part, quite sensitive to firm pressure, which eventually disappears and is followed by a thickening of the periosteum, giving rise to distinct protuberances or nodes, which are frequently apparent to the sight alone. These nodes vary in size, seldom exceeding an inch and a half in length, have a rough feeling, are painful on pressure, and are a constant source of suffer-

ing. When located on any of the cranial bones, the pain may be mistaken for that of headache. In severe cases the system also suffers, the tongue becoming furred, the excretions deranged, etc. When the disease is located near or in a joint, as, the hip, or the shoulder, any movement of the joint will aggravate the pain.

The previous history of the case will enable the practitioner to determine its association with mercurio-syphilis, and generally other signs of the presence of this taint will be found to exist; the nocturnal pains will also be more severe, and the nodes will be larger, and usually more numerous. When the disease is of rheumatic origin, the pains and the periosteal malady are confined to one point, or to defined portions of one or more limbs; whereas syphilitic pains are shifting, affect a greater number of places, and are rarely confined to one part until nodes have formed. (See *Nodes*, *Osteocopic Pains*, etc., under Constitutional Syphilis.)

6. *Rheumatic gout* is a disease so closely allied to rheumatism that by some it has been considered a peculiar form of rheumatism; by others, a combination of rheumatism and gout; while a third class view it as a distinct disease, and which, in my opinion, is the true view. It may present itself in an acute form, and be with difficulty detected from acute rheumatism; or it may assume a chronic form. Persons who are debilitated or depressed from any cause, who are the offspring of tuberculous, gouty, or rheumatic parents, or in whom the function of nutrition is illy performed, are especially liable to it; either sex may be attacked, and at any period of life, but more commonly after the age of thirty, and especially among females. It is a very obstinate disease, passing from joint to joint, inflicting more or less injury upon them in its progress, often continuing for months, or even years, and producing changes in the structures of the joints which are irremediable.

The chronic form of rheumatic gout may follow the acute attack, or it may occur independently of this, presenting *symptoms* of languor, chilliness, and want of appetite, at the commencement, soon followed by a sense of fullness and stiffness of the joint attacked, and an aching or gnawing pain, which is aggravated by motion. All the joints are subject to attacks of the disease, but it usually prefers the knee, or the joints of the toes and fingers. The affected joints swell, from fullness and distention of the synovial membrane; the swelling is tight and elastic, and, as it were, protrudes through the spaces between the tendons and ligaments by which it is in other parts bound down and restrained,—and fluctuation, especially in the superficial joints, is distinctly perceptible. The periosteal covering of the ends of the bones, the ligamentous structures and other struct-

ures surrounding the joint gradually become more and more thickened, and more or less permanent stiffness and enlargement of the joint is produced. The soreness, stiffness, and pain generally extend from the joint along the fibrous structures to a greater or less extent, giving rise to severe pain in the limb. Eventually the cartilages become involved, they gradually disappear from absorption, and leave the articular surfaces of the bone bare and unprotected; while, at the same time, a morbid enlargement of the bone is going on, from expansion of its osseous tissue, and osseous deposit around the joint. The result of these morbid changes is distortion of the parts affected from the bones being partially dislocated, or being apparently drawn to one side or obliquely, usually toward the ulnar side of the hand, when the distortion is in the fingers.

When this disease affects the hip joint, there will at first be pain and stiffness of the joint; the pain becomes increased in severity; the affected limb becomes much shorter than the other, so that the patient appears lame; in some instances he merely rests the toes on the ground, or the foot is everted. Rotation of the limb is very painful and difficult, so that while walking there will be circumduction of the pelvis with the affected limb; the weight of the body on the diseased joint produces severe pain; the foot and the muscles of the limb become wasted from use; and the nates of the diseased side become flattened. When the hip is affected, the disease rarely extends to the other joints. This may be mistaken for some other malady of the hip, unless great care be taken in the examination, and inquiry be made to ascertain whether there have ever been previous pains or temporary swellings in any of the other articulations of the limbs. Males are more liable to the hip affection than females.

The general system is always more or less affected, the complexion may be florid but more commonly sallow or dingy; the skin is usually sluggish, with but little if any perspiration; the conjunctiva is yellow; the bowels more or less disposed to constipation, with a pale abnormal appearance of the feces; urine, pale, but generally turbid; pulse feeble; digestion may be good, but flatulence is very apt to be present, especially after meals; the temper is peevish, fretful, or irritable; the extremities cold; and a depressed state of mind, etc.

The *anatomical changes* in rheumatic gout, will depend upon the stage of the disease. At an early period the affected tissues lose more or less of their natural elasticity and brilliancy, and become thickened, opaque, and altered in color. Subsequently the synovial membranes become thickened, and, ultimately, gradual absorp-

tion of the cartilage takes place, this tissue apparently dividing into numerous fibers, forming depressions or grooves, which slowly enlarge, unite, and leave portions of the bone uncovered. The naked surfaces of the bones being thus exposed, are rendered smooth by pressure and friction against each other, and present a white, polished surface, having an appearance like ivory. The bony parts near the joints are also enlarged from osseous matter irregularly deposited about them. The thickened synovial membrane is prolonged at various points, forming soft, red, villous processes or fringes, which occupy the various depressions around the neck of the bone. Sometimes irregularly-shaped cartilaginous bodies, small, but of varying sizes will be observed attached to the ligaments or articular surfaces by pedicles formed of thickened synovial membrane; or, they may be loose in the cavity of the joint. If the disease be located in the hip joint, an alteration in the shape of the acetabulum and femur may be observed, from irregular osseous depositions, the acetabulum becoming wider and deeper than natural, while the femur becomes flattened and expanded, becoming shaped like a turnip, or lengthened into the form of a cone. The cartilages are absorbed, and the neck of the femur is shortened. Not unfrequently, the whole of the articulatory surfaces will be studded with a white pulverulent deposit; or, this may pervade their entire structure as well as the cells of the subjacent bone; or, it may be limited to a few parts only. This deposit is composed of lithate of soda, mixed occasionally with other lithates, chloride of sodium, and calcareous salts, and is probably due to the existence of true gout at some period during the patient's existence; it is not a necessary accompaniment of rheumatic gout.

In the *diagnosis* of chronic rheumatism great care is required to determine it from renal or vertebral affections, from gout, from simple or scrofulous inflammation of the joints, from neuralgia, and from syphilitic pains. To make the proper discrimination will often be a very difficult matter, and in some instances, it will be absolutely impossible, unless the practitioner is well posted in all the symptoms and peculiarities attending both the disease under consideration, and the various maladies with which it may be confounded. The diagnosis of the disease is, however, not always difficult, for its rheumatic character is frequently sufficiently well marked. Where the pains are wandering, first in one joint, then in another, and do not locate themselves in one place until after the presence of the shifting pains for some time, and not until a swelling of the part in which it fixes itself is apparent, there being

no febrile nor inflammatory symptoms present we may consider the affection of a rheumatic nature; if, however, there have been no previous attacks of rheumatism, no wandering pains in the joints, and the pain and swelling is located in some fixed place from the commencement, and especially if constitutional symptoms are present, the rheumatic character of the disease will then be doubtful. Pressure on the intervertebral spaces of the cervical vertebræ, or on the immediate neighboring muscles, most always gives rise to pain or soreness in rheumatic affections.

In most cases of chronic rheumatism, the *prognosis* is favorable, especially when the disease has been promptly and properly treated from the commencement, and when it is not the sequence of an acute attack. The malady rarely proves fatal, except when the larger joints are affected and abscesses are formed; but, when from improper treatment or long continuance, structural changes are effected in the tissues surrounding the joints, a cure is out of the question, and palliation is all that can be afforded. Besides, instances will occasionally be met with, in which, from some unknown cause, all our therapeutical and hygienical measures will be of no avail, even in cases, otherwise of an apparently mild character.

One great difficulty in effecting permanent cures of rheumatism, in any of its forms is, that patients instead of pursuing a curative course of treatment, direct their attention solely to a removal of one of its symptoms, *pain*, and when this has been effected, all further medication is dispensed with, until a second attack of pain occurs, when this symptom is again the only one attended to; and this course persisted in for several times, by not removing the diseased condition around the joints, permits the tissues of the parts to undergo such abnormal changes as to render a permanent cure entirely out of the question. As a rule, rheumatism is as curable a disease as any other, to effect it, however, not only must a treatment be adopted to relieve its accompanying pain, but the disease itself must be treated at an early period before structural changes have taken place, and especially must that condition of the fluids of the system upon which the disease depends be removed by appropriate medication.

The *pathological appearances* of parts which have suffered from chronic rheumatism will be found to vary, according to the nature, degree, and long continuance of the malady. Thus, there may be only an increase in the quantity of synovial fluid; or this fluid may become viscid, or even purulent; the synovial membrane and ligaments may be thickened, or roughened, with false membranes or

coagulable lymph deposited upon their surfaces. Softening, erosion, or entire destruction of the cartilages of the joints are sometimes present; with, perhaps, enlargement of the articulating extremities of the bones, and a relaxed or contracted condition of the muscles, tendons and ligaments. In some instances, thickening of the periosteum to a greater or less extent will also be observed. Indeed, whatever parts have suffered any considerable length of time from the disease, will be found to have their structures materially changed from that of a normal condition.

The *treatment* of chronic rheumatism is local and constitutional. The local measures are to remove pain, stiffness, and swelling, as well as to produce derivative influences; the constitutional are, to effect such changes in the system, not only of the essential rheumatic causes existing in the fluids, but also of other conditions or complications, as will prevent a recurrence of the attack, or modify its severity, and ultimately cure the disease.

Among the external measures, the Spirit Vapor Bath holds the first rank, particularly if the slightest degree of febrile excitement is present; free perspiration should be produced by it, and then after some one, two, or three hours, some stimulating application should be well rubbed in over the affected parts, as well as along the whole course of the spinal column. Ordinarily, if the pain and stiffness can not be removed by simply rubbing the parts, and by exercising them; or, if exercise should augment the pain; or, if the patient be too feeble, or can not from any cause, take a Spirit Vapor Bath, much benefit will be derived by exposing the diseased part to the vapor of hot water so as to produce and keep up a perspiration for thirty or forty minutes, after which the parts should be thoroughly dried, some stimulating application be well rubbed in, and the parts be covered with warm flannel.—When the Spirit Vapor Bath is employed, on no account must the patient be allowed to perspire freely for more than an hour at a time, on account of the debility occasioned by a prolonged diaphoresis. As the vapor bath is also an accompaniment of the constitutional measures, it should be repeated every week or two, according to circumstances, but the local stimulant need only be applied during the presence of pain or stiffness.—Hypodermic injections of a solution of Muriate of Morphia will frequently relieve the pain of rheumatism, in both the acute and chronic forms; they should be repeated every day or two.

There are are many stimulating mixtures in vogue for this disease, but I ordinarily prefer the Compound Tincture of Camphor, or, the following, which slightly resembles it: Take of Tincture of

Capsicum, Tincture of Camphor, each, six fluidounces, Oil of Turpentine two fluidounces, Tincture of Aconite Root, Tincture of Stramonium, each, one fluidounce; mix. While the local stimulant is being applied with considerable friction, shampooing the diseased parts at the same time, when it can be borne, will be found exceedingly advantageous. Firing, over the affected joints, and over those parts along the spinal column which are tender on pressure, will also prove a valuable method of stimulation and counter-irritation, particularly in obstinate cases, and where the joints are deep seated, as, in lumbago, when the hip is affected, etc. And in very obstinate and painful cases, the Compound Tar Plaster over the suffering parts will be found decidedly beneficial; this plaster will prove very serviceable in cases where slight thickening or enlargement has taken place. Dry cupping or cupping with scarification along the lumbar vertebræ, and on the loins is frequently of great value in lumbago; so is the application of a Compound Belladonna Plaster; or the following may be applied: Take of Extract of Belladonna, or Stramonium, one drachm, Fluid Extract of Aconite four drachms, Compound Tincture of Iodine four drachms, Glycerin one ounce and a half; mix. And when the urine is high colored and scanty, with more or less constipation, cholagogue cathartics will frequently relieve the sufferings of the patient.

During the treatment, especially after the subsidence of pain, a gentle current of electro-magnetism should be passed through the parts daily, continuing the application for fifteen or twenty minutes each time. This agent, it must be remembered, is used only as an auxiliary measure to facilitate the action of the constitutional means; it will rarely, if ever, effect permanent cures by itself. It is of no value in the periosteal and synovial forms of the disease, but only in muscular rheumatism, and also in those instances where the pain assumes a neuralgic character. And, in such cases, hypodermic injections will often prove advantageous in relieving pain, as, of Sulphate of Morphia in solution, Sulphate of Atropia, etc.; they will also be often of service in the other forms of the disease.

In some instances much benefit will be derived by pouring tepid water upon the affected part, from a height of five or six feet, continuing this for five or ten minutes, then drying the part, and applying a stimulant with considerable friction. It may be repeated if desired.

Other local measures are frequently of service,—thus, the following will frequently remove the pain when other measures fail:

Take equal parts of Laudanum, Tincture of Camphor, Chloroform, and Fluid Extract of Aconite; mix. Or, take of Fluid Extract of Aconite, Chloroform, each, one fluidounce, Benzole two fluidounces; mix. Another very powerful agent is composed of Strychnia one drachm, Aconitina four grains, Oleic Acid two drachms; mix and dissolve the alkaloids, and then add to it Olive Oil or Simple Cerate one ounce. A small quantity of this may be rubbed over the painful part; but it must not be employed where the skin is cut, scratched, or in the least abraded, and none of it should be allowed to come in contact with the eye or mouth. The Ethereal Oil of Horse-chestnuts has also been valuable as a local application. The internal use of Chloride of Propylamin, in doses of six or eight grains, has also effected a removal of the pain, but in my own practice it has never appeared to have any influence toward effecting a permanent cure.

The constitutional treatment will vary somewhat, depending upon the patient's temperament, the disposition to scrofula, the presence of syphilitic taint, anemia, dyspepsia, etc.; and it should be faithfully and perseveringly pursued for many months, perhaps for a year or two, or, until the disease is cured. Of course, when structural changes about the affected parts have taken place, all that can be expected in most instances, is, palliation. Among the compounds which I have used with the greatest success, for neutralizing or removing the rheumatic poison, are the following:

1. Take of Poke Root, Blue Flag Root, Prickly-ash Bark, Black Cohosh Root, Bitter Root, each, in powder, one ounce; Whisky, two quarts; mix, and form a tincture; the dose of which is a tablespoonful in a glass of sweetened water,—repeating the dose three or four times a day. 2. Take of Black Cohosh Root, Prickly-ash Berries, Pipsissewa, and Sassafras Bark, each, one ounce; good French Brandy, two quarts; mix, and form a tincture. The dose is the same as the preceding. 3. Take of Compound Syrup of Stillingia, twelve fluidounces; Tincture of Black Cohosh, four fluidounces; Hydrochlorate of Ammonia, two ounces; mix. The dose is the same as the preceding. In periosteal rheumatism, one ounce of Iodide of Potassium, or Iodide of Ammonium, may be substituted for the Hydrochlorate of Ammonia. 4. Take of Black Cohosh Root, Bark of Sassafras Root, Prickly-ash Berries, Sulphur, each, in powder, one ounce; Guaiac, Poke Root or Berries, each, in powder, half an ounce; Colchicum Seed, two drachms; good Whisky or Gin, two and a half pints. Mix, form a tincture, filter, and add to it Precipitated Carbonate of Iron, half an ounce. The dose is the same as the preceding; shaking the preparation well, each time

before using it. 5. Take of Twin Leaf Root, Turkey Corn Root, Stillingia Root, Guaiac Resin, each, in powder, half an ounce; good Gin or Whisky, two pints; mix, and form a tincture. The dose is the same as the preceding. 6. Take of Alcoholic Extract of Black Cohosh four drachms, Xanthoxylin, (oleo-resin), Apocynin, each, one drachm; Whisky or good Gin, one pint. Mix, and dissolve the articles in the liquor. The dose is a tablespoonful, to be repeated three times a day, or sufficiently often to keep the head very slightly affected. The Ammoniated Tincture of Guaiacum, Compound Syrup of Poke, and Compound Pills of Poke, have also been found valuable remedies. Many other efficient agents have been used, but it would occupy too much space to name them all here; the above are such as I have preferred in my own practice. Perhaps, it would be proper to merely refer to such means as, acupuncturation, bathing in hot springs, Pulvermacher's Belts and Chain Batteries, Sulphur, Sulphureted Baths, etc., which have proved efficacious in the hands of other practitioners. In my own practice, the Iodine and Sulphur Bath has proved very successful in syphilitic periosteal rheumatism, aided by the internal means recommended under the treatment of Secondary Syphilis.

But, in connection with these local and constitutional measures, the greatest attention should be paid to the general health. Any impairment of the digestive apparatus, any morbid condition of the liver, kidneys, or other organs, any nervous weakness, anemia, or torpidity of the cutaneous functions must be overcome by the appropriate treatment for such conditions; and the practitioner should always make it an important part of his examination to carefully mark each deviation from health, as may from time to time be developed, by the several methods of investigation at this day pursued by scientific medical men. Indeed, in the treatment of chronic rheumatism, much, very much, will depend upon the watchfulness and skill of the physician in early detecting these deviations and administering the proper remedies.

The bowels should be kept regular, daily; the kidneys should be maintained in as normal a condition as possible; and the skin should be bathed every day or two with a weak alkaline and stimulating bath, followed by considerable friction in drying. The body should always be comfortably clad, and every care be used to avoid cold and dampness; silk under-clothing may be worn in summer, and flannel during cold weather. Moderate exercise should be taken every day, and during pleasant weather, in the open air, but it should never be carried to fatigue. The diet should be moderate but nutritious, avoiding acids and fats, as well as vinous and malt

liquors. Sitting or standing near a fire, for any length of time, must be avoided.

Epicranial rheumatism may be removed by the employment of the local application above named, consisting of Chloroform, Fluid Extract of Aconite, Laudanum, etc.; or, by the application of a solution of Cyanuret of Potassium, one grain to eight grains to a fluid ounce of Distilled Water, and rubbed upon the parts, or applied by means of compresses moistened with it; internally, the agent for constitutional treatment, No. 3, will be advisable, in connection with cool affusion, and keeping the head covered in cold weather with a cap.

Cervical rheumatism may be relieved by the application of the chloroform preparation named in the preceding paragraph; or, frictions with some anodyne liniment, and then covering the part with warm flannel. If the uterus, ovaries, or other internal organs be attacked with rheumatism, the Compound Powder of Ipecacuanha and Opium, or, the Compound Tincture of Virginia Snakeroot, will be found to afford the most speedy relief, in conjunction with anodyne fomentations across the abdomen, or a Belladonna Plaster to the sacral region; or to such parts as will more decidedly influence the organ affected, when it is other than the uterus or ovaries. A mixture composed of Tincture of Black Cohosh, Tincture of Gelseminum, each, one ounce, Tincture of Aconite three drachms, will frequently be of benefit, in doses of twenty drops, repeated every two or three hours. Anodyne hypodermic injections will often afford prompt relief.

Gonorrheal rheumatism requires treatment to check the urethral discharge, for which purpose the means named under Gonorrhea or Gleet may be pursued; and internally, Iodide of Potassium, Iodide of Ammonium, or the Chloride of Gold and Soda, may be administered; in some instances, the following will be found efficacious: Take of Sulphate of Quinia twenty grains, dissolve in Elixir Vitrol one fluidrachm, and then add to the solution, Tincture of Black Cohosh twelve fluidrachms, Tincture of Aconite two fluidrachms. The dose is twenty drops every two or three hours in a tablespoonful of water. When the joints are painful and swoln, they may be painted once or twice a day with a preparation composed of Iodide of Ammonium one drachm, Iodine one scruple, Glycerin one or two ounces. Or, the Compound Plaster of Belladonna may be applied over them,—in all cases previously exposing the joint to hot vapor, as heretofore named. Hypodermic injections of dilute Solution of Chloride of Gold and Soda, will also prove beneficial in many instances. I have found the

continued use of genuine Harlem Oil, to afford much benefit in gonorrheal rheumatism. The Tincture of Larch (*Abies Larix*), in half drachm doses, repeated three times a day, is reported to have proved efficacious in this form of the disease. The conjunctivitis, that is usually present, may be treated by applications of a cool or tepid infusion of Hops, of flowers of St. John's Wort, or of Poppy Leaves, etc., renewed every few minutes, and continued for an hour at a time.

Periosteal rheumatism will require similar local applications to those named for the gonorrheal form; internally, Iodide of Potassium, or Iodide of Ammonium will be of service, and if the disease be connected with a syphilitic taint, measures must be adopted to remove this from the system; if the patient be scrofulous, or cachectic, the necessary remedies to overcome these conditions must be conjoined with those prescribed for the rheumatic affection.

Rheumatic gout, requires great attention to the condition of the digestive apparatus; when the tongue is coated brown or dark, emetics are indicated, to be followed by lemon juice in cachectic or scorbutic patients, in whom the gums are spongy, and the urine high colored and scanty. If gastric acidity be present, this must be removed by alkalies combined with tonics; as, for instance, a mixture of Bicarbonate of Soda, White Indian Hemp, and Aletris Farinosa, in powder—to which, in cases where the stomach is feeble, a small proportion of Capsicum may be added. Torpor of the liver may be overcome by the administration of a pill, repeated three times a day, consisting of three grains of dried Oxgall, one grain of Leptandrin, and one grain of soft Extract of Rhubarb. And every means must be employed to prevent the stomach from becoming so deranged that it will not tolerate the medicines prescribed for the rheumatic disease.

The Compound Syrup of Sarsaparilla with Iodide of Potassium forms a very excellent remedy in this affection, but it requires to be used for a long time, and this syrup may occasionally be substituted by the Compound Syrup of Stillingia. Phosphate of Ammonia, in doses of eight or ten grains, repeated every six or eight hours, has been recommended by many physicians, but I have never employed it; it is stated to be especially useful in those cases where there is an excess of uric acid. Local applications, similar to those heretofore named must be frequently used, with thorough frictions over the affected parts. The frequent use of the flesh-brush will also be found very advantageous.

In all the forms of chronic rheumatism, great benefit will be

derived from the use of thin paper-like sheets of gutta percha, or, vulcanized caoutchouc, being placed over the affected part after the application of the stimulating or sedative lotion employed; this is to be constantly worn. These sheets induce great local transpiration, and sometimes slight cutaneous irritation, and facilitate the action of the local application; they should be thin enough to be worn without inconvenience, about the thickness of paper. They are also useful to aid in allaying gouty pains. Free and regular exercise, active employment, an avoidance of all dissipated or intemperate habits, and the hygienical measures heretofore named, will be found of immense importance toward effecting a cure. Frequent applications of vapor to the joints affected, should be made. Where there is great debility of the nervous system, the Syrup of the Hypophosphites will be of service; if anemia be present, the Elixir of Cinchona and Iron may be taken with advantage.

In any of the forms of rheumatism herein named, there may exist either with or without swelling, a chronic thickening about the joints, or an effusion into the capsules, the bursæ, or the sheaths of the tendons, with more or less stiffness of the joints, especially the larger ones. The means to be employed to produce absorption of the effused fluid, and to prevent permanent contractions, are, applications of vapor to the joint, followed by electro-magnetism, considerable friction or shampooing, and painting the surface of the affected part with a preparation of Iodide of Ammonium and Iodine in Glycerin, referred to under Gonorrheal Rheumatism, over which a compress of soft lint moistened with the solution is to be placed, and a bandage should then be firmly applied. The bandage favors absorption. This may be repeated once or twice every day. The joint should likewise be gently moved backward and forward, and the limb be extended more and more every day, in order to prevent adhesions, which may ultimately give rise to permanent anchylosis; and, if required, some degree of force, gradually employed, may also be used to favor the extension of the affected limb. By a perseverance in this course for several months, many contracted limbs may be straightened. But if the anchylosis be permanent or bony, and the joint be distorted, no means will be of any avail. If, after the physician has explained to the patient the necessity for perseverance and long-continued treatment, the latter will not agree to continue under his care at least for some four or five months, it would be better not to commence treatment at all, unless, indeed, the practitioner has no regard for his reputation as a successful physician. For, usually, a much longer period will be required in cases

where a cure is at all possible; in some instances ten, or even fifteen months.

Rheumatism of the diaphragm is an affection of no uncommon occurrence, and may be mistaken for neuralgia, stomach disease, heart disease, pleurisy, etc., if not carefully investigated. The principal symptoms are pain in the region of the diaphragm; uneasiness or pain on a full inhalation; difficulty of breathing; asthmatic symptoms; rapid, irregular, and very forcible or bounding pulse, sometimes of one side only, and noticed more particularly in the neck, especially on the right side; cough; fainting; hiccough; palpitation of heart; and sense of constriction. The remedies are Iodine Pill, Irritating Plaster, Electro-magnetism, and some of the agents already advised in rheumatism, as, Compound Tincture of Black Cohosh, etc. The *hiccough* may be removed by inhaling Chloroform and repeating the inhalation as often as the symptom returns.

GOUT.

Gout is a painful disease, strongly resembling rheumatism in several of its symptoms, and is more usually met with among males, especially those of idle, indolent, sedentary habits, who live generously, using freely of animal food, rich sauces, wines, malt liquors, etc. It is not so common a disease in this country as in Europe. Three varieties of gout have been described, namely, the acute, chronic, and nervous. I shall briefly occupy myself here with the last two.

The *causes* of gout are not well understood; the disease appears to be due to an excess of uric acid in the blood, the result probably of some defect in the depurative function of the kidneys, or, perhaps, to a fault of assimilation, either primary, secondary, or both. Others doubt this view, from the fact that uric acid has been found in the blood during a rheumatic attack. Dr. Gairdner considers venous congestion to be the first condition essential to the formation of the gouty diathesis. The former view, viz., that there is an excess of uric acid in the blood, is the one ordinarily adopted at this day; this acid exists in the blood in the form of urate of soda, and can be separated from it, either in the form of the crystalline salt in acicular needles, or as rhombic crystals of uric acid. It has been noticed that just previous to an attack of gout the uric acid in the urine is diminished, but is accumulated in the blood, and during or subsequent to the attack, the acid is largely found in the urine. But whatever may be the proximate cause of the disease, it

is generally conceded that it may be excited into action by exposure to cold and damp, want of rest, violent mental emotions, improper diet, free use of acid wines and fermented liquors, constipation, digestive derangements, gastric acidity, sedentary and studious habits, or an indolent life conjoined with luxurious diet.

The *symptoms* of chronic or irregular gout, which is sometimes, but not always, a sequence of the acute, are, less severe pains than in the acute form, the pains being irregular and wandering, faint redness of the surface of the affected part, impaired power of motion, permanent distention and œdema of the part, derangement of the digestive organs, sluggish circulation, and general nervous irritability. Sensations of heat and coldness are apt to alternate in the part affected, particularly at night; there is also experienced numbness and a fullness and weight which is more or less annoying. The muscles and joints are weak; cramps in the legs are apt to occur when falling asleep; the surface of the part may be pale red, natural, or of a purplish tint; the parts are tender; motion is difficult and painful; and œdema is generally present with more or less varicose appearance of the veins. After walking, in almost all cases, a sense of heat and aching is felt in the ankles. In connection with these symptoms there will be constitutional ones, varying according to the temperament and habits of the patient, and other surrounding circumstances. Various dyspeptic symptoms may be present; hepatic derangement; transient pains or spasms in the muscles of the body; hemorrhoids; epistaxis; palpitations; disturbed sleep; irritable temper; depressed spirits; hypochondria; sallowness of skin; pale urine, of low specific gravity, in increased quantity; with diminution of uric acid, presence of albumen, and sometimes deposits of urates or colored rhombs of uric acid on cooling. Not unfrequently, the kidneys will be diseased, as determined by the presence of albumen, casts of the renal tubes, and disintegrated epithelium, in the urine, with diminution of uric acid. The affected joints are stiff and swoln, the limbs become painful and more or less deformed; deposits, principally of urate of soda, take place in the joints, and which are termed "chalky concretions," or "tophaceous deposits," forming small, hard swellings, called "nodosities."

Chronic gout may assume the retrocedent form; and it is often associated with some cutaneous affection, as, erythema, prurigo, formication, eczema, lichen, psoriasis, etc. When gout attacks nervous persons, and those who have been somewhat careful in their habits, it is termed *nervous gout*. The pain is usually dull and lancinating, and may be confounded with neuralgia; it may be limited to a sin-

gle joint, or shift about, and may also be associated, like the preceding form, with dyspepsia, troublesome cough, difficult breathing, palpitation, etc.

In the *diagnosis* of gout, we must remember that rheumatism principally occurs among young persons, or those of middle age, while gout chiefly selects the elderly; rheumatism occupies the larger joints, and is very liable to shift about, while gout seizes the smaller joints, especially those of the feet and hands, and is not so liable to change about; rheumatism is seldom preceded by dyspeptic symptoms, gout almost invariably. The kidneys are more liable to be attacked by disease, in gout; the heart, in rheumatism. In gout, the chalky concretions are frequently found deposited in the joints; in rheumatism, this never occurs. An excess of uric acid in the blood is always present in gout, but not in rheumatism. This excess of acid may be determined by placing in a broad, flat watch glass, about three inches in diameter, a fluidrachm or two of the serum of the blood, fresh, or of the fluid procured from a freshly-blistered surface, and to each fluidrachm of fluid add six minims of ordinary strong acetic acid. When the fluids are well mixed, introduce into them a fine thread of unwashed linen, about an inch in length, and consisting of from one to three ultimate fibers. Now set the glass aside in a moderately warm place, not above 75° F., and allow the serum to become dry; but the drying must not take place too rapidly to interfere with crystallization, nor should the glass be disturbed until the drying is effected; it must also be protected from the dust. If uric acid be present in the fluid, its crystals will line the thread, and may be examined under the microscope, and under polarized light. If the serum be overdried, the operation will require to be repeated; and the part blistered must not be actually inflamed, or the result will be null. Oxalate of lime found in the perspiration, by a somewhat similar process, is also a characteristic of the gouty diathesis. In chronic gout, even when there are no tophaceous deposits in the joints, they may be observed on the helix of the ears, forming one or more little white spots, which, when recent, discharge a semi-fluid cream-like exudation, when punctured with a lancet; this, covered with a piece of thin glass, and examined under the microscope, will show, with a high power, a great number of needle-like crystals and a few blood disks. If a little of this exudation be heated with a small drop or two of diluted nitric acid, in a porcelain dish, and, when almost dry, be exposed to the vapor of ammonia, a beautiful purple color will be produced from the formation of purpurate of ammonia. If the deposit in the helix be

quite hard, as is apt to be the case when it has existed some time, it may be crushed, treated with water, and be experimented on in a similar manner. These deposits consist principally of urate of soda, vary in size from a pin's head to that of a split pea, are usually seated about the fold of the helix, numbering from one to ten or twelve, resemble small pearls, and when of long standing, possess a gritty hardness. (*A. B. Garrod.*)

Chronic gout is the disease of a degenerated or impaired constitution, its *prognosis* is unfavorable as far as relates to a cure; but although as a general rule it is absolutely incurable by any of the medical means at present known, it may be materially benefited by a proper attention to hygienic measures. As with the acute form, the chronic and nervous varieties may be translated to some one of the internal organs, as, the stomach, brain, or kidney, occasioning alarming symptoms, and even death. In forming a prognosis, the state of the constitution and of internal organs, the habits of the patient, the effects produced by treatment, and the surrounding circumstances should all be taken into account.

The principal *pathological appearances* are thickening and consolidation of the tissues of the affected part, and hard tophaceous concretions in the cellular membrane, the sheaths of tendons, the bursæ mucosæ, or, in the cavities of joints; if seated within the capsular ligaments, the cartilage will be absorbed, and one or more phalanges be distorted. In some instances, especially where the general health during life had been broken up, phosphates will also be found in the deposits, and, in plethoric or inflammatory conditions during life, the gouty concretions will contain more or less albuminous matter. And these deposits may often be observed in other parts of the body, as, in the fibrous envelops of the brain, nerves, fibrous coats of the arteries, fibrous tissues of the lungs and air-passages, fibro-serous membranes of the heart, in various muscular aponeuroses, in the fibrous coat of the testicle, etc.

In the *treatment* of chronic gout, the first thing to overcome is, the several constitutional symptoms, or derangements of organs, with which it may be associated, as, cachexia, nervous debility anemia, digestive, biliary, or renal derangements, etc.—employing the appropriate therapeutical measures therefor. At the same time a well-directed course of hygienic management must be rigidly pursued if the patient really desires benefit. And however useful medicines may be, hygienic measures are of much greater importance; a rigid, persevering attention to them has effected thorough cures.

*The principal hygienic means are exercise, temperance, and a spare regimen. A gradual approach toward a frugal and temperate style of living must be made, taking moderate and regular exercise daily, increasing it from time to time as the strength and condition of the patient will permit; late night hours and heavy suppers must be positively avoided. The patient must never sit down to a meal in a state of fatigue, or mental or physical exhaustion, because, in such case, his functions must necessarily be imperfectly performed,—and he must never overtax his strength. The body should be frequently bathed with a weak alkaline and stimulating wash, and, if the strength will permit, a Spirit Vapor Bath may be taken every six or eight weeks. The bowels must be kept regular, either by diet or medicine; any abnormal condition of the urine must be corrected by the proper remedies; and high living, indolence, sensual and intemperate habits must be positively prohibited. And, unless a patient laboring under chronic gout will agree to pursue these measures to the letter, a physician would not be justified in undertaking the treatment of his case.

Among the agents which may be employed to regulate the bowels, in very obstinate cases of constipation, the following will sometimes be found useful: Take of Acetic Extract of Colchicum, Extract of Nux Vomica, each, sixteen grains; Bicarbonate of Potassa twelve grains; Croton Oil three minims; Extract of Hyoscyamus twenty-four grains; Compound Extract of Colocynth one drachm; mix thoroughly, and divide into twenty-four pills, of which one or two may be taken at bed-time, whenever required. Lartigue's Pills have also been recommended. (*See page* 312.)

Several agents have been recommended internally, as possessing solvent power for urate of soda, but I do not think they exert any influence in removing the tophaceous deposits, although they may be beneficial in the early or acute form of the disease, in preventing these deposits in the joints. The principal ones which have been advised, are,—1. Silicate of Potash in doses of ten and fifteen grains dissolved in six or eight ounces of water, and repeated

*Dr Garrod gives the following as the indications necessary to be fulfilled in the treatment of chronic gout, viz.—1. Use less heroic means than those employed in the acute form; 2, purify the blood by augmenting the various secreting functions, more especially of the skin and kidneys; 3, restore the powers of the digestive organs, which are usually much impaired in chronic gout; 4, attend to the local mischief which the long-continued gouty inflammation induces in the articular structure; 5, regulate the diet, and pay proper attention to the hygiene of the patient.

twice a day. (*Ure.*) 2. Phosphate of Ammonia, ten or fifteen grains dissolved in a tablespoonful of water for a dose, and repeated three times a day. (*T. H. Buckler.*) 3. Benzoate of Ammonia, prepared by dissolving five grains, each, of benzoic acid and sesquicarbonate of ammonia, in two ounces of boiling water; this when cool is a dose, which may be repeated three times a day, with a little syrup. It is good in cases of irritable stomach, acts as a diuretic and diaphoretic, and diminishes the albumen in renal dropsy. 4. Iodide of Potassium is considered by T. S. Wells, superior to any other article as a chemical solvent, in doses of from four to eight grains three times a day. 5. M. Brian recommends Benzoate of Soda fifty-one grains, Hydrochlorate of Ammonia thirty-four grains, Senna thirty-four grains; mix, and keep in a close vessel. Fifteen grains is a dose, to be taken in water, and repeated three times a day, gradually increasing the dose to thirty grains. Acid food and drinks must be avoided, and exercise be enjoined. This also augments the urinary secretions, the cutaneous transpiration, and obviates costiveness. 6. Carbonate of Lithia in doses of one to four grains dissolved in water, and repeated three times a day. It is a most powerful chemical solvent of urate of soda. (*Garrod.*) If the affected joints could be kept constantly moistened with one of these solutions, probably, its absorption might aid in the removal of the gouty deposits. When the gouty deposit is not connected with the articulation, and has a pulpy feel, it has been advised to make a small subcutaneous puncture, slowly press out the pultaceous substance, and touch the exposed surface freely with Nitrate of Silver, which has the property of decomposing both urate of soda, and phosphate of lime. Fistulous ulcers may be injected with a solution of Nitrate of Silver.

When tonics are required in the treatment of chronic gout, the Citrate of Iron and Quinia, in doses of five grains a day; or, the Citrate of Iron and Quinia with Strychnia, in doses of from two to five grains, three times a day,—may be given either alone or in pill form with the Alcoholic Extract of Aletris. An infusion of the leaves of Ash (*Fraxinus Excelsior*) has been recommended in the treatment of chronic gout, in doses of four fluidounces, repeated three times a day. One ounce of the powdered leaves, made into an infusion, is the quantity required for a dose. Although highly extolled, it has not come into general use.

The following forms an excellent preparation for affording relief in an attack of gout: Take of Sulphate of Quinia two scruples, Extract of Colchicum one scruple, Digitalin one grain, Alcoholic Extract of Black Cohosh, a sufficient quantity to form a pill mass

mix, divide into twenty-four pills, of which one pill is a dose, to be repeated three times a day.—For agents which diminish or increase urea or uric acid in the urine, *see Gravel.*

CONSTITUTIONAL SYPHILIS.*

When the constitution is affected by syphilis, the result of a

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* PRIMARY SYPHILIS. Although not comprised within the scope of this work, a few remarks relative to the treatment of Primary Syphilis, without entering into a description of its history, symptoms, etc., may not be amiss at this place.

Chancre. For more than thirty years past, when a chancre existed in the vesicular or pustular form, or unbroken, in which condition it is not acted upon by the atmospheric oxygen, I have been in the habit of rupturing the vesicle or pustule with a needle, and then at once applying a drop or two of strong Nitric or Hydrochloric Acid. I do not believe that absorption of the syphilitic virus occurs to any extent, until after the exposure of the open ulcer to the atmosphere.—Occasionally, this application of the acid will cause pain for a short time, but in most instances the pain will be slight. No other treatment will be required, unless to allay any fears the patient may entertain in regard to a perfect cure, for which purpose the chancre may be kept in contact with the Tincture of Chloride of Iron, on lint, as named hereafter. I have treated some hundreds of cases in the above manner, and have not yet heard of any return of the disease in a constitutional form.

When the chancre is open, as a general rule, the Tincture of Chloride of Iron will be found the most efficient application; I have used it with success, in by far the greater number of cases I have treated, since 1834. It should contain a sufficient quantity of Hydrochloric Acid, to enable it to be added to water without giving any deposit on standing for twenty-four hours, and which deposit may be prevented from occurring in the Tincture of the shops, by the addition of a sufficient amount of the Acid to it. The chancre having been first gently and carefully washed with Castile Soap-suds and as carefully dried with a piece of lint, is then to have the Tincture gently applied over its whole surface, by means of a feather or piece of lint, being careful not to rub or treat the ulcer roughly. This application is to be repeated two or three times a day, and during the intervals, a piece of lint moistened with the tincture must be kept in constant contact with the chancre. Sometimes this application gives rise to severe pain, when it should be diluted with as little water as possible; but, in most cases, after the second or third application, patients hardly notice it. It keeps the surface of the ulcer clean and soft, and prevents any absorption of syphilitic virus, by neutralizing or destroying it as fast as formed. Care must be taken not to allow a scab to form over the ulcer, as this will prevent the virus from being reached by the application. In a few days after its use, the chancre becomes changed into a simple ulcer, and it will often be difficult to detect it from the surrounding integuments, but which appearance must not mislead the practitioner and cause him to cease treatment too early. One thing must be especially attended to. as it is of great importance, which is, the parts and surrounding surfaces must be kept in a constant state of cleanliness. A filthy, unclean, careless patient is more exposed to constitutional symptoms than any other.

primary disease, it is termed "Constitutional Syphilis," and has been subdivided into two varieties, known as the *secondary* and *tertiary*. These varieties are due to absorption of the venereal virus into the general system, either from a chancre or bubo, and

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Since I made the above method known, I find it has become adopted more or less, not only among the physicians of our own school, but also among those of the old school, etc.—Permanganate of Potassa employed as an escharotic at the commencement of a chancre, will also frequently destroy it.

In some cases of open chancre which appear obstinate and intractable, advantage will be derived by applying upon it a small portion of Fell's Chloride of Zinc Caustic (for Cancer), and then covering it with a piece of sticking-plaster; in two or three hours remove the plaster, and carefully wash out the caustic, and dress the part with some simple dressing, as, Nitrate of Bismuth, etc. In about three or four days, the slough can be removed, and the ulcer left may be treated with Nitrate of Bismuth, Tannin, or other simple dressing. This is painful but efficient. (*Prof. A. J. Howe.*) There are other applications which will sometimes be beneficial, as:—1. Take of Chloride of Zinc eight grains, Chloride of Gold and Soda four grains, Water one fluidounce; mix, and apply four or five times a day; if too severe, dilute with more water. 2. Take of Sulphate of Quinia twenty-four grains, Distilled Water three fluidounces, Sulphuric Acid, a sufficient quantity to dissolve the Quinia; mix, and apply on lint, first washing the chancres with Castile Soap-suds. Bear constantly in mind, that with whatever agents we treat a chancre, after it has become ulcerated, we must treat it kindly, and not irritate it and render it intractable by rough or harsh treatment. Constant irritation must positively be avoided.—If the glans penis be swoln, with more or less pain, a poultice of equal parts of Elm, Blue Flag, and Stramonium or Belladonna Leaves, must be kept constantly applied, renewing it every three or four hours. In one case, I derived prompt benefit from the constant application of ice water; the inflammatory symptoms disappeared rapidly.

Bromine has been recommended by Dr. J. J. Black, Philadelphia, as an application to chancre, acting as a caustic. It must be thoroughly applied to the chancre by means of a small glass rod, and an oiled rag be laid upon it for three or four hours; then remove the rag, and treat the part by the Potassio-tartrate of Iron mixture mentioned below under Phymosis, and which I prefer to the black-wash of Dr. Black. The eschar is eliminated in a little time, and exposes a healthy surface full of granulations. One or two applications of the Bromine are usually sufficient, and it is equally efficient in any form of chancre, especially the phagedenic.

Chancre is sometimes complicated with *phymosis* or *paraphymosis*. If it be phymosis, the following should be injected beneath the foreskin, so as to come in contact with the surface of the chancre: Take of Potassio-tartrate of Iron half an ounce, Syrup, Water, of each, three fluidounces, Wine of Opium one fluidounce; mix. This should be injected every hour or two; and if the patient desires to get thoroughly cured he *must* attend to himself. Glycerin may be substituted for the Syrup. In the intervals between the injections, the following mixture should be frequently applied upon the swoln prepuce, and, if necessary, even injected between the glans penis and prepuce: Take of Alcoholic Extract of Belladonna one drachm and a half, Oil of Lobelia forty-five minims, Glycerin one fluidounce; mix. The greatest cleanliness of the parts must be observed, in order to prevent gangrene.

may occur subsequently to a treatment of the primary affection, either with or without the use of mercurials. A thorough cure of the primary affection without mercurials, has never in my experience been followed by the constitutional disease, and I have treated

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Cold water, or cooling applications, should also be kept constantly applied to the part.

If it be not positively known whether an ulcer be situated on the glans, in phymosis, we may determine it by giving a slight curvature to the end of a probe, cover it with a thin layer of lint, and then pass it carefully around between the glans penis and foreskin; pain will generally be produced when the ulcer is touched by this, and, on withdrawing the probe, some portion of the lint will be found stained by the chancrous matter; but if no ulceration exists, merely a discharge from the glans, no pain will be occasioned, and the lint will be stained with the simple discharge all over its surface.

Paraphymosis should be promptly reduced, by properly pulling the prepuce over the glans; thus, if it be considerable and painful, first give chloroform to produce anæsthesia; then apply Fell's Chloride of Zinc Caustic, in the manner named above, to the chancre, and afterward pull the foreskin over the glans, before the patient recovers from the anæsthesia; this is much better and safer than cutting the constricted part. Subsequently treat the phymosis by the anodyne and relaxing mixture named above; or by iced water, which will often be found to answer an admirable purpose. In the treatment of phymosis and paraphymosis, prompt measures should be adopted, as delay will render the case more difficult, and if the swelling remains for two or three weeks without being benefited, a very troublesome indurated enlargement of the prepuce, from hardening of the infiltrated matters, may result. The prepuce, it must be recollected, must be carefully and properly pulled over the glans, in paraphymosis, or the difficulty will be augmented. If it be impossible to reduce the paraphymosis, it may sometimes become necessary to divide the preputial ring, so as to relieve the constriction upon the penis, or to wholly overcome the paraphymosis.

If the chancre be seated *within the urethra*, it will generally be somewhere in that part of it passing through the glans; it should be treated by frequent applications of one of the above-named preparations somewhat diluted, which may be injected, or passed in upon some lint. A mixture of Sulphate of Iron five to ten grains, Water, Glycerin, each, half a fluidounce, has sometimes been found beneficial, when dropped into the urethra several times a day. Chancre in the urethra is frequently of difficult detection, and the discharge therefrom may render it liable to be mistaken for an obstinate gonorrhea; sometimes the ulcer may be seen by opening the lips of the meatus: when seated further back, the probe with lint, as named in phymosis, may aid in detecting it, as well as the slight degree of scalding in urination, the absence of chordee, the character of the discharge, and the interval which existed between the coitus and the appearance of the disease, which is generally from twelve to fourteen days, while that of gonorrhea is from three to six. Yet a person may, at the same time, have both a urethral chancre and a gonorrhea, the latter being developed some days earlier than the former.

Phagedenic chancre may be treated by the above-named solution of Potassio-tartrate of Iron; by a strong solution of Sulphate of Zinc; by Bromine; or by a Solution of Permanganate of Potassa one hundred and seventy grains, to Water

hundreds of cases, and also witnessed the treatment of many others by the means usually pursued by our class of medical men. These constitutional varieties appear to depend upon an imperfect

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two fluidounces; apply every two hours; in the intervals keeping on lint moistened with a weaker solution. In phagedenic chancre, if the constitution be feeble, debilitated, broken-down, or adynamic, Quinia, Iron, Elixir of Iron and Cinchona, Procter's Compound Syrup of Hypophosphites, Porter, Ale, nourishing diet, mental and physical quiet, and all other means to nourish, strengthen, and invigorate must be pursued. Debilitating or lowering measures must absolutely be avoided.—*Serpiginous chancres* have been cured by applications of strong solutions of Iodide of Ammonium, or of Chlorate of Potassa.

Chancres in females require similar applications; they should all be treated under ocular inspection; the parts should be kept clean; the sores should be kept isolated by introducing pieces of lint moistened with one of the preparations used; and the female should be kept quiet in the recumbent position for several days.

Gangrene sometimes occurs, more especially among males; it must be treated with applications of Sulphate of Zinc; Solution of Permanganate of Potassa, etc.; and poultices of Marsh Mallow Root, to which Compound Solution of Iodine is added in small quantity. Attention must also be paid to the condition of the system, whether there be a typhoid state, or one of excitement, treating it according to indications, the same as is usually pursued in gangrene when attacking other parts, without the existence of a syphilitic virus. And when the sloughs have separated, healthy granulation may be promoted by stimulants, etc., locally applied, the same as in similar ulcers situated elsewhere.—*Hemorrhage* occurring during the treatment of chancre must be promptly checked; Tannin, or Perchloride of Iron may be applied, and, if these fail, torsion of the bleeding vessel with forceps, or ligature.—Troublesome and painful *erections* should be treated the same as chordee in gonorrhea.

Bubo should be dispersed as speedily as possible, on account of the many inconveniences attending its suppuration. If the tumor comes under notice before suppuration has commenced, it should be freely painted with Tincture of Iodine, or the Compound Tincture of Iodine, applying this six or seven times a day, and then covering with a pad or compress so worn as to make pressure upon the center of the bubo; or the Iodized Oil of Juniper may be used instead. If much inflammation be present, the constant application of iced water will be found sufficient. Fresh Poke Root, roasted in hot ashes until it is soft, then mashed and applied to the bubo, will disperse it, unless suppuration has advanced too far, in which case it will hasten its progress, but with considerable pain; on which account a cataplasm of Elm Bark, Lobelia, and Stramonium Leaves is then preferable.

In case of non-dispersion of the bubo, as soon as the suppurative stage has reached a proper degree of maturity or fluctuation, the bubo should be opened by Caustic Potassa, instead of the knife; the latter gives rise to everted edges which heal with difficulty, while the former disposes the abscess to heal readily. Some physicians prefer Vienna Caustic, cauterization with Nitric Acid, actual cautery, etc.; and others prefer the knife to the caustic. When the bubo is opened, it should be injected once or twice a day, with a mixture of three parts of Castile Soap-suds, and one part of Whisky, followed by an injection of Tincture of Chloride of Iron, diluted or not, Solution of Permanganate of Potassa, or the Solution of Potassio-tartrate of Iron named under chancre. Any sinuses which are present, if not too deep or extensive, should be laid open, and dressed

cure of the original disease, or from its treatment by mercurials, in certain constitutions.

The *Secondary* form of Syphilis is principally confined to external parts, and usually appears from two weeks to six months subsequent to the appearance of the primary symptoms. The *Tertiary* form is hardly ever manifested until after the sixth month, and sometimes, not until after several years, and attacks the deeper-seated tissues. Ricord states that, in cases where no mercury has been given, if secondary symptoms do not manifest themselves for six months subsequently to the appearance of the primary symp-

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the same as the rest of the ulcer; and any fungous granulations may be removed with Sulphate of Copper, Nitric Acid, Tannic Acid, or by snipping them with scissors. In scrofulous patients, the Compound Solution of Iodine, or a Solution of Iodide of Ammonium may be employed to inject with; and these solutions may be made with water, or with equal parts of Glycerin and Water. These injections should be made two or three times every day, and the benefit will be much more prompt and rapid if the patient will keep quiet, on his back for the first four or five days of their employment.

If the bubo be *indolent*, a Solution of Vegetable Caustic, or other stimulating liquid may be injected; or Nitric Acid may be touched upon its surface by means of a soft piece of wood. If the bubo is *not open*, and is *very indolent*, showing but little disposition to disperse or suppurate, the application of a Compound Tar Plaster over it, keeping up a discharge for some time, will be very apt to remove it. *Phagedenic bubo* may be treated by applying lint to the whole surface of the ulcer, having previously moistened it with a strong Solution of Sulphate of Zinc, changing it two or three times a day; or with a Saturated Solution of Borax; or with the Potassio-tartrate of Iron Solution referred to heretofore.—If patients having bubo present enfeebled, adynamic constitutions, they will require the same tonic, nourishing, and invigorating measures as are advised under Phagedenic chancre.

As to internal remedies in these affections, whether they occur singly or together, I more generally employ the Syrup and Gold preparation recommended in the treatment of constitutional syphilis. I have also derived benefit from the Iodide of Ammonium in two to four grain doses, repeated three or four times a day, in solution. And sometimes from a mixture of Compound Syrup of Stillingia, Saturated Tincture of Poke Root, Saturated Tincture of Sheep Laurel, each, six fluidounces; the dose varies from a teaspoonful to half a tablespoonful three times a day, according to the effects of the Sheep Laurel on the system.—Iodide of Sodium two drachms, Cinnamon Water one fluidounce, in doses of twenty-five drops, repeated three times a day, has also proved successful.

The patient's diet should be generous, nutritious, and of easy digestion, avoiding acids, greasy food, stimulating or alcoholic drinks, and much exercise. Exposures to damp and cold must be carefully avoided, and the body should be very comfortably clad in cold and damp seasons. The use of salt is not prohibited, its prohibition in past times having originated from the fact of its decomposing the mercurial preparations which were so freely administered to remove the disease. Great care should be taken to prevent any of the virus from coming in contact with the lips, nose, or eyes.

toms, they never will be present. Sigmund, of Vienna, remarks that, secondary symptoms never appear if the chancre be thoroughly destroyed during the first four days.—The particular period at which the secondary or tertiary symptoms will develop themselves, will depend much upon the constitution and temperament of the person, his degree of resisting power to disease, mode of living, exposures, and other surrounding circumstances.

Although the *cause* of constitutional syphilis is an infection of the system from absorption of the virus of the primary disease, yet it often appears among individuals who never had the primary disease. Thus, it is generally conceded that the fœtus in utero, having secondary syphilis derived from its male parent, may communicate the disease to the mother, without her having ever suffered from the primary symptoms; and this communication of the secondary disease may occur as well in cases where from ultimate destruction of the fœtus abortion occurs, as in instances where it is born living. And it may be proper to state here, that abortion is by no means an uncommon occurrence, under the circumstances named; it usually takes place about the fourth or fifth month of utero-gestation, and a disposition to it, from the cause named, may frequently be cured by a proper treatment for the syphilitic taint.

It is not positively settled whether secondary syphilis is communicable by direct natural or artificial inoculation; yet from certain results from vaccination with matter taken from a person laboring under the constitutional disease, I am strongly inclined to believe that there may exist circumstances under which the disease is communicable by inoculation.

Indeed, there is more or less discordance among writers as to the contagiousness of the constitutional varieties. Ricord, who tried both natural and artificial inoculation without any results, believed that it was never contagious; others, in opposition to this view, believe it to be contagious,—that primary syphilis, by contamination, will produce primary syphilis, secondary, will develop secondary symptoms, and tertiary, tertiary. The matter requires still further investigation to satisfactorily determine it.

But, however this may be, it is well known, not only that the disease may be transmitted from parent to child, as stated above, and from the male to the female parent, but that, as frequently occurs, a child inheriting syphilis may, under certain circumstances, infect the nurse it suckles; and, on the contrary, as occasionally happens, a diseased nurse may communicate the malady to the child. There is also no doubt but that secondary syphilis may be

be communicated to a woman, without the intervention of pregnancy, by the semen of a diseased man being deposited in the vagina, and from thence absorbed, and that too without the presence of a chancre or any open sore on either of the parties. And, although it has been doubted whether the tertiary lesions can be transmitted to offspring under their peculiar type, yet that such transmission has occurred is, at present, a fixed fact.

The *symptoms* of constitutional syphilis vary very much, probably depending upon the difference of constitution, the medicines employed in the treatment of the primary form, the difference in constitution of the several parts attacked, etc. The disease may affect the brain and its meninges, the œsophagus, the bronchial tubes, the lungs, liver, kidneys, testes, and other organs.

Secondary syphilis is usually preceded, and sometimes accompanied by, more or less severe febrile symptoms, a dull earthy hue of the surface, loss of mental vigor, dryness of the hair, giddiness, headache, and uneasiness about the neck, followed by pains in the ends of the long bones, violent supra-orbital pain, lassitude, want of appetite and sleep, enlargement of the posterior cervical glands, weakness of the pulse, falling out of the hair and eyebrows, and anemia. The syphilitic poison diminishes the number of blood-globules, sometimes to such a degree as to give rise to anemia, with a bad complexion, dullness of the eyes, physical and mental depression, etc. These symptoms are eventually followed by some cutaneous affection in the form of dry eruptions, as large or small papulæ, scaly patches, and maculæ, which will be referred to under *Syphilides* in Diseases of the Integumentary System, *which see*. One peculiarity of these cutaneous eruptions, is, their yellowish or copper color, and their being almost always attended with a deficient sensibility of the surrounding skin, and, if they give rise to ulcers, the peculiar disagreeable odor emitted from them; occasionally, the eruptions will be met with, attended with itching and burning pain. In debilitated patients there may be red, inflammatory tubercles, gradually proceeding to suppuration, and giving rise to deep, irregular ulcers, which are more frequently met with at the alæ of the nose, or on the cheeks; this is an unfavorable form of the disease.

Reddish tubercles or broad rose-colored elevations, and occasionally excavations, often exuding a thin, acrid, and offensive fluid, termed mucous tubercles, mucous patches, or condylomata, frequently present themselves in the neighborhood of the genitals, upon the tongue, or in any place where two surfaces come in contact. These have an excoriated appearance, and may communi-

cate the secondary affection to healthy persons. These mucous patches are particularly apt to be present, and to prove extremely intractable to treatment, among uncleanly persons, and those who smoke or chew tobacco; among the latter, the patches are apt to be seated at the angles of the mouth, or upon the parts within. They are readily changed into ulcers, when exposed to friction. They have sometimes been observed upon the laryngeal mucous membrane, and upon the epiglottis. They frequently present a grayish-white appearance from the adventitious deposit of a grayish pellicle. Alopecia; onychia; ulcerations of the mouth and throat, of the meatus auditorius externus, of the lips and angles of the mouth, of the nose and palate, of the tonsils, of the gums, of the tongue, of the larynx, of the pharynx, of the eyelids, of the roots of the nails, with thickening and nodulation of the nails themselves, of the rectum and large intestines, and between the toes; excoriations and fissures of the surface of the tongue, or induration of its substance; excoriation of these several parts just named; iritis, sclerotitis, dysentery, etc., may all occur as secondary symptoms; and it is rarely that they appear singly, two or more of them being usually associated together.

The various affected parts of the mouth may present a swoln and ulcerated condition, or, a rawness and redness, and covered with a white secretion; the ulcer of the throat or tonsil will present an excavation, with a foul, yellow surface, with raised, ragged, and swoln edges; or, there may be a sloughing ulcer, with irregular edges, ash-colored base, and dark, livid, and swoln surrounding mucous membrane, which may extend to various parts about the throat and nose, destroying them, and even endangering life from hemorrhage of the lingual artery. This ulcer is generally attended with febrile symptoms and considerable pain. These affections of the mouth and throat cause a soreness and difficulty in swallowing, and give rise to an offensive breath. If ulcers be at the angles of the mouth, they are apt to form scabs, and to bleed whenever the mouth is fully opened, as, in gaping.—When the nasal membrane is affected, it may terminate in caries and exfoliation of the nasal bones; or, from extension of the disease, the uvula may be destroyed.—When ulceration attacks the larynx, there will be more or less pain or soreness, huskiness, low whispering, or loss of voice, suffocative cough, and expectoration of a puriform matter streaked with blood. Deafness also frequently accompanies the ulcerated condition of the air passages.

These ulcers on the mucous membrane, wherever seated, proceed more or less rapidly, destroying the surrounding parts, giving

rise to more or less pain and fetor, and often denude the periosteum of the bones of the parts affected, which afterward exfoliate. With these symptoms, the countenance assumes a more unhealthy aspect, the patient becomes more and more enfeebled and emaciated, is disturbed in his sleep, suffers from dull pains in various parts, and if not benefited, hectic fever will come on, followed by death. In ulceration of the larynx, death is frequently occasioned by suffocation. The improved treatment of the present day prevents us from seeing as many cases of this malady in its worst forms, as were commonly encountered some forty or fifty years ago.

In the hereditary syphilis of infants, we usually meet with pemphigus, and other cutaneous diseases; affections of the nasal and buccal mucous membranes; abscesses of the thymus gland; abnormal conditions of the liver, lungs, etc.

The *tertiary form* of syphilis* is known by the presence of tubercles, or gummy tumors, in the skin, cellular tissue, muscular and fibrous structures, and in other parts, passing into phagedenic ulceration. Among the abnormal changes effected, are, inflammation and enlargement of joints, inflammation of the periosteum, and disease of the testes, as, inflammation, enlargement, atrophy, etc.; osteitis; pains in the bones; exostoses; caries; inflammation and structural lesion of the eyes, eyelids, or lachrymal apparatus; serpiginous ulceration of the skin; deep ulcer of the fauces; phagedenic ulceration of the scalp, with or without disease of the pericranium and subjacent bones; phagedenic ulceration of the pharynx, which may extend into the larynx, cartilages, trachea, etc., or upward to the bones of the nose, face, and palate, or to the cervical vertebræ, causing caries; general syphilitic cachexia, with or without any prominent visceral disease, as, of the lungs, liver, etc., with paralysis, or dropsy, etc. And, as in the secondary form, although all these symptoms will not be present in any single case, several of them are apt to be associated. Secondary and tertiary symptoms may also co-exist; or the one

* Recently, a German physician has asserted that tertiary syphilis never occurs except in cases where the primary disease had been treated by mercurials; or, in other words, tertiary syphilis is a mercurio-syphilitic disease, partaking, however, more of the mercurial than of the venereal influence. He has found that persons working in mercurial mines, or otherwise constantly exposed to mercurial emanations, and who never had suffered from syphilis in any form, were very liable to diseases presenting, in every respect, the characters of what has long been termed tertiary syphilis—thus proving the truth of what has long been upheld by our class of practitioners, that constitutional syphilis was more of a mercurial than a venereal disease.

may pass into the other, and sometimes so insensibly as to render it difficult for a time to draw the line of demarcation between them, or determine which form has the predominance over the other. Other diseases, or tendencies to disease, frequently complicate the syphilitic affection.

The gummy tumors (*gummata*) are small, elastic tumors, conveying a sensation to the touch, as if they were filled with a gummy matter; they rarely appear before the fifth or sixth month from the period of infection, and frequently not until several years after. They may exist upon any of the external parts of the body, but are principally met with upon the head, neck, testes, and extremities, and vary in size from a large pea to a walnut. They commence as hard swellings, without pain or inflammation, and progress very slowly, ultimately becoming softer, tender under pressure, and as they reach the stage of suppuration, the skin over them becomes dark-red or livid, finally ulcerates, and discharges a thin unhealthy pus. The suppuration always begins at their center, and the ulcer produced by them is deep, the external orifice being partially covered by the thin and irregular margin of skin; the cicatrix left, is of a dirty white color, resembling that following a severe burn. Similar tumors are frequently observed in the muscles, viscera, tendons, liver, lungs, heart, brain, nerves, tongue, bones, periosteum, around the joints, etc. When located near the bones they are apt to produce caries or necrosis.

Syphilitic periostitis and osteitis present more or less tenderness and pain, especially in the more superficial bones, as, the clavicles, cranium, tibia, ulna, and nasal bones, which symptoms are augmented at night, and very much diminished or wholly absent during the day. The periostitis, after a longer or shorter time, is followed by painful swellings or nodes, which have a doughy feel, and an obscure sense of fluctuation; pressure upon them causes more or less tenderness, and the skin over them is pale and movable, at least until the swellings have progressed considerably. These nodes are due to an elevation of the periosteum from the bone by the infiltration of lymph and serum, or of pus; and the periosteum itself is more or less injected. Nodes present several characters according to their seat, and the character of the effused fluid; when they spontaneously ulcerate and discharge pus, the exposed bone is apt to become carious and exfoliate; and if the cranial bones are the ones affected, an extension of the disease to the dura-mater, or, a protrusion of the brain through the orifices formed in the skull, occasions death. The bones which are more apt to become carious, are those seated superficially, as, the nasal

bones, or frontis, etc., though no part of the skeleton is exempt. The symptoms of syphilitic cachexia, consist principally of pallor, sallowness, flabbiness of the tissues, anemia, mental and physical debility, emaciation, cutaneous diseases, loss of appetite, hectic fever, night sweats, want of sleep, diarrhea, aphonia, and finally death. This condition is now rarely observed, but it does occasionally present itself, in cases of syphilitic dyscrasia, as a result of the syphilis itself, of complication with a scrofulous or other weak constitution, of improper treatment, and of any cause which enfeebles the vitality of the system, as, sexual excesses, masturbation, dampness, cold, etc.

Syphilitic retraction of the muscles is occasionally met with in persons laboring under the tertiary form, the flexor muscles of the fore-arm, and especially the biceps, being more commonly affected: this symptom comes on without any warning, the first notice of it being a contraction or shortening of the muscles which the patient can not overcome, and there may be pain with it, which is worse at night. A proper therapeutical treatment for the syphilitic disease, will restore the muscles to their normal condition.

The *diagnosis* of constitutional syphilis is not always an easy matter, especially when it appears in the form of cutaneous eruptions, and when the patient will not acknowledge impure sexual contact, or the previous existence of the primary disease. In rare cases, the disease may exist, and the patient have contracted it without having been guilty of either of the above circumstances. Eruptions, either of an erythematous, scaly, papular, or pustular character, of a copper color, or reddish-brown with a tinge of yellow, soreness of the throat, osteocopic pains, loss of hair, enlargement of the glands around the occiput, the existence of nodes, an unhealthy aspect, dullness of the eyes, loss of flesh and strength, the indolent character of eruptions or ulcers, the deficient sensibility of the skin surrounding the eruptions and ulcers, and the presence of gummy tumors, are among the chief diagnostic symptoms; and the diagnosis is rendered more positive in case of a previous primary disease having existed. The cutaneous affections more generally observed, are, erythema, psoriasis, lepra, rupia, and ecthyma.

Dr. Brodrick refers to substernal tenderness as a symptom indicative of the existence of constitutional syphilis, which he has observed in numerous cases. If a patient supposed to be affected with the disease, does not, in reply to the question whether he has pain in his breast-bone, answer in the affirmative, the medical man should then press upon, or rather *knead* the sternum carefully and

gently along its whole course, with the fore and middle fingers, from the manubrium to the xyphoid cartilage; if tenderness be found, it will generally be located at the commencement of the lower third, and occasionally in the upper third. This tenderness, probably due to slight periosteal inflammation, may be considered a safe and unerring indication of constitutional syphilis, and is a sign that will furnish a clue to many anomalous symptoms. But a person may be constitutionally syphilitic, and this particular sign be absent.

In the diagnosis of the syphilitic dyscrasia, the practitioner should inquire into the previous history of the case, and not only ascertain the previous existence of a chancre, but the time of its appearance, its location, its character, and its duration; he should also remember that cases often happen where the patient may suppose he was only affected with gonorrhea, when, in reality, there may have existed a chancre in the urethra, or, in the vagina or cervix uteri of the female. The existence of a bubo at some previous time, or simultaneously with the chancre, should also be ascertained; indurated chancre is rarely attended by suppurating bubo. The penis and groin should also be carefully examined to detect any traces of indurated chancre or bubo.—Engorgement, not induration, of the lymphatic glands in the lateral and posterior parts of the neck, is considered by Ricord as probably the most constant, earliest, and characteristic symptom of constitutional syphilis. This engorgement may generally be detected about six or seven weeks after the primary symptoms, in most cases. Lymphatic glands in other regions may also be similarly affected.

Inherited syphilis is generally detected very readily in the infant, but in young persons and adults it is not always so easy to trace the disease. Mr. J. Hutchinson gives, as the most reliable symptom, the peculiar appearance presented by the permanent teeth,—especially the *upper central incisors* of the permanent teeth, *not* of the first set, or milk teeth. "In syphilitic patients these teeth are usually short, narrow from side to side at their edges, and very thin. After a while, a crescentic portion from their edge breaks away, leaving a broad, shallow, vertical notch which is permanent for some years, but, between the ages of twenty and thirty, usually becomes obliterated by the premature wearing down of the tooth. The two teeth often converge toward each other, and sometimes they stand widely apart. In certain instances, in which the notching is either wholly absent or but slightly marked, there is still a peculiar color, a dirty brownish hue, and a narrow squareness of form, which are easily recognized by the practised eye."

He also describes other inferior but still important signs: "The skin is almost always thick, pasty, and opaque. It often shows little pits or scars, the relics of a former eruption; and at the angles of the mouth are radiating linear scars running out into the cheeks. The bridge of the nose is almost always broader than usual, and low; often it is remarkably sunk and expanded. The forehead is usually large and protuberant in the regions of the frontal eminences; often there is a well-marked broad depression a little above the eyebrows. The hair is usually dry and thin, and now and then (but only rarely) the nails are broken and splitting into layers. If the eyes have already suffered, a hazy state of the corneæ, and a peculiar leaden, lusterless condition of the irides, with or without synechiæ may be expected. If, however, the eyes have not yet been attacked by a syphilitic inflammation, they will present no deviation from the state of perfect health and brilliancy. The occurrence of well-characterized interstitial keratitis is now considered by several high authorities as pathognomonic of inherited taint. It is almost invariably coincident with the syphilitic type of teeth; and when the two conditions are found together in the same individual, I should certainly feel that the diagnosis was beyond doubt."

As a general rule, the *prognosis* of constitutional syphilis is favorable; much, however, depends upon the more or less advanced condition of the disease at the commencement of treatment, as well as upon the health and constitution of the patient, or, in other words, his degree of vitality. When the patient is young, and originally of good constitution, and not intemperate, the chances for recovery are in his favor, and especially if treatment be commenced at an early period. With an intemperate, dissipated person, or one given to excesses, or of irregular habits, or of a strumous tendency, the disease is always very difficult of cure, and in such cases the prognosis must be given with some degree of reserve. The prognosis is also less favorable when the constitution is much enfeebled, when the patient has passed middle life, and when the disease is complicated with other affections. Ulcerations of the pharynx are not always to be viewed favorably; and when they attack the larynx are very apt to prove serious. The more severe secondary symptoms, also, require a guarded prognosis.

In the tertiary form of constitutional syphilis the prognosis is not so generally favorable as in the secondary, although cures are frequently effected. When the mucous ulcerations assume a phagedenic character, or extend to the larynx, bones of the face, nasal bones, or to the eye, or if the cranium, or the cervical vertebræ become implicated, the case is very unfavorable. And the more

extensive the ravages of the disease the greater is the danger. In this variety of syphilis, the same as in the secondary, the patient's habits, health, degree of vitality, etc., should always be taken into consideration.

A *post-mortem* examination of a person who has died while laboring under the visible effects of constitutional syphilis, will reveal one or more of the several conditions described under "symptoms," together with whatever ravages, in the way of ulceration, caries, necrosis, etc., may have been effected. Internal organs will sometimes be found attacked by the disease, as, the brain, nerves, muscles, heart, bronchii, lungs, liver, spleen, and other viscera; exudations of lymph, gummy tumors, fibroid nodules, or deposits in the internal organs containing fibro-plastic elements, small nuclei, fatty granules, and some amorphous matter may be detected, with more or less disorganization of the surrounding tissues. A more minute investigation will almost invariably detect mercury in some of the tissues of the system.

The *treatment* which I have found the most successful in eradicating constitutional syphilis in either of its varieties is, the internal administration of alteratives, persisted in for *one*, *two*, or *three years*, according to the character and extent of the affection. And the statement made by various writers that Iodide of Potassium, and other agents, effect permanent cures in forty, fifty, or sixty days, must be received with great caution; my own experience, certainly, does not warrant any such statement, except in the less marked, milder, and more early symptoms of the disease. *A longer period is almost invariably required.*

The agents I prefer are the following: Take of Compound Syrup of Stillingia, Compound Syrup of Sarsaparilla, Tincture of Sheep Laurel, each, five fluidounces, Iodide of Potassium one ounce; mix. The dose is a tablespoonful, to be repeated three times a day, about an hour after breakfast and dinner, and at bed-time. In conjunction with this, I also administer the following: Take of Chloride of Gold and Soda ten grains, Hydrochlorate of Ammonia one ounce, Water one pint and a half; mix. The dose of this is from half a teaspoonful to a teaspoonful, repeated three times a day, about an hour before each meal. With these as internal measures, aided by local means hereafter stated, I have cured many cases of constitutional syphilis in this city and elsewhere, of several years standing, and which had previously resisted several thorough courses of mercurial treatment, in conjunction with Iodide of Potassium, under various physicians, without any benefit whatever.

Other practitioners have effected cures with other agents, as, the

Iodide of Ammonium; Arseniated Bromide of Potassium; Iodide of Arsenic; Iodide of Sodium, which is stated to have a less disagreeable taste than the Iodide of Potassium, to be less apt to occasion iodism, to be better borne than the Potash salt, and to have effected cures where this last named salt had failed, etc.

But whatever agent be used as a constitutional remedy, the bowels must be kept regular without active purgation; the surface of the body be bathed every few days; the renal functions be kept in as normal a condition as possible; and the condition of the stomach be closely watched, for if this be allowed to pass into a morbid or unhealthy state, it will materially interfere with the efficiency of the remedies administered; the diet should be generous, nutritious, and easy of digestion, avoiding all fats or greasy food, acids, alcoholic drinks, and active exercise. Exposures to cold or damp must be carefully avoided, and the body should be very comfortably clad in cold and damp seasons.

The local treatment of the secondary eruptions will be referred to under Diseases of the Integumentary System.

Alopecia will generally disappear under the constitutional treatment, but if any local application be required, a wash composed of Castor Oil two fluidounces, Tincture of Cantharides two fluidrachms, Tincture of Sheep Laurel two fluidrachms, Cologne one ounce and a half, may be well rubbed into the roots and scalp, daily. Tincture of Cinchona, or of Stillingia may be substituted for that of the Sheep Laurel.—*Syphilitic onychia*, and *whitlow* may be treated, by keeping the parts constantly moistened with a solution of Iodide of Potassium, or of Ammonium, in equal parts of Glycerin and Water. Hypodermic injections of a dilute solution of Chloride of Gold and Soda, in the neighborhood of the parts, will often be found effectual. If much pain is present, Opium, Belladonna, or Stramonium may be added to the application.

Mucous patches whether ulcerated or not, and *condylomata*, as well as the *deep ulcers in the fauces* and adjacent tissues, and syphilitic ulcerations of the mucous membranes generally, are best treated by Nitric Acid. A piece of soft wood, whittled down to the required size, is dipped into concentrated Nitric Acid, then wiped off with a piece of soft paper, and immediately applied upon the diseased part, holding it there for two or three seconds; this may be applied every day or two, according to circumstances. In some cases, the Tincture of Chloride of Iron, or, Tincture of Iodine may be similarly applied, with advantage. I have little or no confidence in the Nitrate of Silver, as a local application. If there is an *inflammatory condition of the throat* present, it will be found

advantageous to steam the throat, and apply anodyne fomentations externally. If the ulcers assume a *phagedenic character*, they may be touched with Tincture of Chloride of Iron, or with a solution of Potassio-tartrate of Iron one or two ounces to six fluidounces of Water; and, at the same time, half a tablespoonful of this latter solution, may be taken for a dose, internally, and be repeated three times a day, in conjunction with the constitutional treatment. A dilute solution of Permanganate of Potash, has also proved valuable and efficacious as a local application. Chlorate of Potassa, used both locally and internally, will frequently be found to exert a very beneficial influence in syphilitic *sore throat* and *sore mouth*. Gargles are likewise frequently of service, as, solution of Tannic Acid, equal parts of infusions of Black Cohosh and Wild Indigo, solution of Chlorate of Potassa, infusion of Geranium and Black Cohosh, equal parts, etc. *Deep fissures in the tongue* may be treated by Tannic Acid in solution, by Liniment of Verdigris, by Nitric Acid, or by solution of Chloride of Gold and Soda. If there are any *swoln glands about the throat*, a solution of Iodide of Ammonium, one scruple to an ounce of Water, or, the Compound Ointment of Iodine, should be well rubbed in the part, twice a day.

Gummy tumors when hard, may be treated by painting them with Tincture of Iodine, or, by keeping the parts constantly moistened with a solution of Iodide of Potassium, or Iodide of Ammonium, in equal parts of Glycerin and Water. Hypodermic injections of a dilute solution of Chloride of Gold and Soda, may also be made into or about them. When they are soft, fluctuating, they may be opened, and the ulcer be frequently injected with one of the above solutions; or, if they have a phagedenic tendency, the above-named solution of Potassio-tartrate of Iron may be injected; or they may be treated in the same manner as other phagedenic ulcers. These tumors frequently yield to repeated blistering.—*Syphilitic affections of the nasal passages*, if they can be reached, should be touched with Nitric Acid; otherwise, a solution of Chlorate of Potassa may be injected, composed of Chlorate of Potassa two drachms, Concentrated Hydrochloric Acid forty minims, Water one pint; mix. A dilute solution of Perchloride of Iron; of Tincture of Chloride of Iron; of Permanganate of Potassa; and a solution of Arseniate of Soda, one, two, or three grains to a fluidounce of Water, have likewise proved of efficacy; but I do not recommend the last-named agent.—*Ulceration of the larynx* requires to be carefully treated by touching with Nitric Acid; this may be effected by means of the laryngoscope, and a curved porte-caustic, carrying a small piece of soft wood saturated with the

concentrated acid; the application should be repeated every day or two, and the throat should be gargled in the interval, two or three times a day, with the solution of Chlorate of Potassa; or with one of the heretofore-named gargles. At the same time, the Compound Iodine Ointment may be rubbed upon the parts, immediately external to the ulceration. Inhalations of warm medicated vapors, containing anodyne and balsamic substances, may often be employed with advantage.

Syphilitic affections of the *eyes* and *ear*, are treated upon under Diseases of the Eyes, and also, of the Ears.—*Osteocopic pains* may sometimes be benefited by the use of a pill composed of one or two grains of Inspissated Juice of Poke, (or the Alcoholic Extract), and one-fourth of a grain of Alcoholic Extract of Stramonium; two or three of these pills may be given daily. I have frequently found great relief, in cases of severe osteocopic pains, to follow the use of a mixture, thoroughly rubbed over the affected parts three or four times a day, composed of Iodide of Ammonium, Iodide of Cadmium, each, half an ounce, Fluid Extract of Aconite, Alcohol, each, four fluidounces,—mix; and in the evening, when the pains come on, also apply a rag moistened with the following preparation over the affected part, then cover it with a dry compress, and repeat the application as often as desired: Take of Chloroform, Benzine, Alcohol, each, two fluidounces,—mix.—Hypodermic injections with Sulphate of Morphia, every day or two, in the neighborhood of the painful part, has also been used by Prof. Scudder with excellent results. Painting over the part with Tincture of Iodine, or, the application of the Compound Plaster of Belladonna, and, in some instances, the use of blisters, will frequently give relief. With the exception of the blisters, a similar local treatment may be pursued for *nodes*.

It is not advisable to open nodes, unless they are large and painful, or give distinct fluctuation, in which case, a free incision should be made, bringing the knife in contact with the bone; and applying some anodyne and stimulating preparation to the ulcer thus formed, if it becomes indolent, showing but little tendency to heal. *Nodes* on the *lower part of the tibia*, and *syphilitic affection of the ankle joint*, may frequently be benefited by friction, twice a day, in the warm Nitro-muriatic Acid Bath, without the use of iodine paint or blistering; the bath may be made by adding nine fluidrachms of Hydrochloric Acid, and six fluidrachms of Nitric Acid, to each gallon of Water employed.—In both the secondary and tertiary forms of syphilis, I advise Vapor, or rather Fume Baths, two or three times a week, of a combination of Sul-

phur and Iodine; when these are taken in conjunction with the constitutional treatment recommended, it is astonishing to witness how rapidly the osteocopic pains, nodes, etc., disappear. These fume baths, and the internal treatment, should be persevered in for several months, and ought never to be neglected in the treatment. (*See Periosteal Rheumatism*, page 430.)

Caries and *necrosis* require the ordinary treatment for these conditions.— *Warts* may be cured by a solution of Chromic Acid, one hundred grains, in Water one fluidounce; this should be applied by means of a glass rod,—it produces a slight burning pain, and one application usually removes the wart in the course of six or seven days. Other remedies have been recommended, as, Savin Leaves, Muriate of Ammonia, Nitric Acid, Manganic Acid, etc.

If there is any suspicion of a syphilitic taint, during pregnancy, or where frequent abortions occur from this taint, or where the offspring are born inheriting it, one or both parents should be subjected to the above treatment. Infantile syphilis may be treated by the constitutional remedies above named, being careful to so regulate the doses as not to disturb the stomach or digestive functions; the disease is always a serious one, and requires much care and judgment in its management. Minute doses of Arseniate of of Soda have been highly recommended in this disease, by those who have tried it, but I feel confident that the disease can be cured without it.

PURPURA HEMORRHAGICA.

Purpura Hemorrhagica, or Land Scurvy, is a disease consisting of an exudation of blood, forming reddish, purplish, or livid spots or patches in the cutaneous surface, of various sizes, and irregularly scattered over various parts of the body. There are three forms of this affection, viz.: 1. *Purpura simplex*, or purpura without hemorrhage, in which the petechial spots are minute, varying in size from a point to that of a small pea, distinct, purple, not itching, not disappearing on pressure, and distributed on various parts of the external surface, being preceded and accompanied by languor, muscular debility, pale and sallow complexion, yellow coat on the tongue, impaired appetite, nausea, headache, constipation, etc., and which under ordinary circumstances may be readily cured by pure air, nutritious diet, regular exercise, moderate use of wine, quinia, and the mineral acids. If the disease be neglected, it may pass into the second variety. 2. *Purpura hemorrhagica*, the

one under consideration, and which is the most dangerous form. 3. *Purpura senilis*, or scurvy of old age, which is a rare disease, and is more frequently observed on the inferior extremities among elderly persons, especially females.

The *symptoms* of purpura hemorrhagica may be manifested suddenly, or the disease may be preceded, for some days or weeks, by great debility, and by the constitutional symptoms referred to above, but in a more marked degree, so that the patient is incapable of any exertion. The petechial spots are frequently quite large, more numerous, more irregular, and of darker color, than in the simple form, often resembling the marks left by a severe bruise, *ecchymoses*, or the stripes resulting from blows with a whip, *vibices*. They more generally commence on the extremities, and extend to the body, but are rarely observed on the hands or face. The spots are at first bright red, soon become dark or purple, and, before disappearing, become of brown or yellowish tint. The cuticle is not elevated, except in some rare cases, in which the elevation resembles a blister or vesicle containing dark blood. The least pressure on any part of the surface of the body will produce an exudation of blood, and purplish spots or patches like those already present.—Exudations of blood, from mucous surfaces especially, take place, and more or less profuse hemorrhages, or oozing of blood from either one or more of the following organs, as, the mouth, gums, nostrils, lips, tongue, fauces, ear, conjunctiva, urethra, vagina, etc., are usually present; and, sometimes, profuse, and even dangerous hemorrhages from the internal surfaces are met with, as, from the stomach, bowels, kidneys, lungs, bladder, uterus, etc.—The disease is often attended with febrile symptoms, but almost always with extreme debility, depression of spirits, deep-seated pains in various parts, constipation, emaciation, feeble or rapid pulse, bloating of the extremities, impaired digestive functions, etc. The urine is generally of a dark color, of an alkaline reaction, containing a large amount of earthy phosphates, emitting an ammoniacal odor, and soon becoming offensive.

The *causes* of purpura hemmorhagica are not well understood. It appears to be due to any cause that will impair the vital tone of the system, of the capillaries, and of the blood. Living in cold, damp, or crowded places, impure air, depressing moral emotions, use of animal food, and especially without salt, diseased animal meat, dissipation, intemperance, want of proper nourishment, etc., have been named among the causes; though I have met with two cases in which the patients were previously apparently healthy, and were not, as far as I could ascertain, exposed to

any of the causes just named,—in one of them, a young girl about fifteen years of age, it accompanied an attack of amenorrhea.—The disease is sometimes met with following other diseases, as, scarlatina, measles, small-pox, intermittent and remittent fevers, diseases of the liver and spleen, as, atrophy or hypertrophy, etc.

This malady may occur at any period of life, being more common among women, and in males just arriving at puberty. Its duration is very uncertain and irregular; it may disappear in a few days, or may remain for months or even years, eventually causing death by a sudden and profuse hemorrhage from some important organ, or, by a less profuse but constant hemorrhage from two or more organs simultaneously.

The *diagnosis* may be readily made out by the symptoms already described. In *true scurvy* the ecchymoses are larger, more marked on the extremities, the gums are more prominently soft and spongy, and there is a greater degree of mental and physical debility toward the latter period of the disease, than is met with in purpura. (*See diagnosis of Scorbutus.*)

The *prognosis* is more favorable in the variety attended with petechiæ, than that with ecchymoses; although both varieties are of a serious character. The unfavorable symptoms are, small, rapid, and weak pulse, frequent recurrence of hemorrhage, thin and watery, or non-coagulable blood, presence of anemia, or cachexia, vomiting of black, grumous matters, diarrhea with grumous or bloody evacuations, faintness after the evacuations, hemorrhages from the tongue, lungs, or urinary organs, and, when they do occur, lethargy, coma, or apoplexy. Death is usually due to the amount of hemorrhage, internal or external, occurring suddenly, or by exhaustion of the vital forces. When the disease is promptly and beneficially influenced by treatment, the symptoms gradually disappearing, the case is a favorable one; also when the attack is mild, and unaccompanied with the more severe symptoms.

The *pathological appearances* vary considerably; petechiæ or ecchymoses may be observed on the mucous membranes of various internal organs, as, the lungs, pleura, pericardium, abdomen, liver, spleen, kidneys, bladder, brain, etc. There may also be more or less effusion of blood into the serous cavities, or into the tissue of the parenchymatous organs. The tissues are more or less soft and friable, especially those of the liver and spleen. The blood may resemble that of health, or it may present a light red, translucent, tremulous, jelly-like appearance, not separating into serum and coagulum, and is generally very deficient in fibrin and coloring matter.

The *treatment* of purpura hemorrhagica consists, principally, in the administration of tonics and mineral acids. Manganese, combined with Iron, will frequently be found efficient when Iron alone fails—thus, Pills of Iron and Manganese may be administered, and the still further addition of Extract of Nux Vomica or Strychnia will frequently be found advantageous; or the Citrate of Iron and Quinia, with Strychnia, may be used. The Syrup of Iodide of Iron and Manganese will also prove efficient in many cases. Tincture of Chloride of Iron has been used with benefit; so has the Bisulphite of Soda, in doses of six or eight grains every three or four hours; this last named article has proved very efficacious in some apparently hopeless cases. Spirits of Turpentine has been administered with marked benefit, in doses of half a fluidrachm or a fluidrachm, three or four times daily. When there is a torpid liver, or splenic disease, Nitro-muriatic Acid, White Liquid Physic, or Podophyllin and Quinia may be prescribed; the Nitro-muriatic Acid should not only be taken internally, but should be rubbed over the region of the liver, externally, twice a day, in a diluted state. I have used a pill composed of Berberin and Oleo-resin of Ptelea with much apparent benefit. When there is much depression of the vital powers, Wine or Brandy may be used, or the Tincture of Prickly-ash Berries.

Flatulence, pains in the abdomen, congestion of the abdominal viscera, and a tendency to constipation, may be relieved by external applications, and injections of Castor Oil, Spirits of Turpentine, and Tincture of Prickly-ash Bark, in combination. Internal hemorrhages may be arrested or lessened by the internal employment of Spirits of Turpentine, Sulphate of Iron, Kino, or Perchloride of Iron; and if the hemorrhage occur from the rectum, a properly diluted solution of one of these agents may be injected three or four times daily. I have cured a few cases of this disease with the following pill: Take of Sulphate of Iron, Cimicifugin, each, forty grains, Podophyllin ten grains, Extract of Gentian a sufficient quantity to form the whole into a pill mass; mix together, divide into forty pills, and administer one pill every two or three hours through the day. In one or two instances, Kino was substituted for the Cimicifugin. The skin was bathed daily with tepid water made slightly pungent with Tincture of Capsicum.—The internal use of Chlorate of Potassa, though it will exert no influence whatever upon the disease itself, will harden the gums when soft, and prevent their bleeding. And a gargle of a Solution of Permanganate of Potassa five or ten grains to the fluidounce of Water, will frequently be found valuable in removing the purplish appearance of the gums and

fauces; and also being of service as a local application to the external ecchymosed patches.

The diet should be nutritious, but consisting of a spare amount of animal food; fresh vegetables, ripe fruits, and farinaceous articles, milk, and eggs are useful; a moderate amount of salt should be partaken of daily. The bowels should be kept regular, but not actively purged at any time during the presence of the disease. Sleep should be confined to nine hours out of the twenty-four; moderate exercise in the open air, every day, is advisable, when the strength of the patient and the condition of the weather will permit. Cheerful society, together with a total neglect of all household or other cares and duties is recommended. In the more debilitating form of the disease, the patient should not be allowed to assume the sitting or standing posture, nor to rise for the purpose of evacuating the rectum or the bladder, as profuse hemorrhage or fatal syncope might result therefrom.

SCORBUTUS.

Scorbutus or Scurvy is a disease strongly resembling purpura hemorrhagica in many of its symptoms, though entirely different from it. In past ages it was frequently met with in military camps, in besieged towns, and especially among sailors making long voyages, but in consequence of the great improvements in the diet and hygienic rules among sailors, soldiers, etc., it is very much less common at the present day.

The theories relative to the *causes* of scurvy have heretofore been varied and conflicting. At one time it was supposed to be due to the use of stale or salted provisions; again, a deprivation or deficiency of certain succulent and acescent vegetables containing ingredients required for the healthy constitution of the blood, was deemed a cause. According to Dr. Baly, a diet deficient in succulent vegetables, continued from three to six months, will fully develop the disease. Others have supposed that the want of vegetable albumen, or of animal casein in the food is the cause; while still another party considers the disease due to the want of potash in the diet; and yet another attributes its existence to a deficiency of phosphorus, sulphur, lime, and the alkalies, in the system, etc.

The potash theory originated with Dr. A. B. Garrod, and is sustained by Dr. Wm. A. Hammond and other eminent medical men; it is, probably, the correct view, or, at all events, the one nearest to it yet presented to the profession. But, however this may be, scurvy is undoubtedly due to a deteriorated condition of the blood, resulting

in a diminution of vital power and nerve force. This deterioration may be caused by living upon an exclusive vegetable or animal diet, or by living for several months upon decomposed, scanty, or innutritious food, in conjunction, more especially, with exposures tending to depress nervous energy, as, cold and moisture, indolence, want of exercise, excessive labor, fatigue, sadness, despondency, unhealthy water, impure or damp air, uncleanliness, and food deficient in acid and potash. The long-continued use of old salted meats, in conjunction with the above circumstances, is extremely apt to be followed by scurvy; indeed, the same may be said of any kind of food that possesses but little nutrient qualities, and is used in scant quantity. Whether a combination of two or more of these conditions will occasion an absence of potash in the system, has yet to be satisfactorily determined. But the treatment based upon the potash theory has proved very successful. Dr. Garrod considers the presence of potash as essential to the perfect nutrition of the muscular fiber.

The *symptoms* of scurvy develop themselves gradually; frequently, at the commencement, there will be a debility or a depression both of the mental and physical powers, the slightest exertion giving rise to fatigue and a difficult or hurried respiration. These symptoms are not always present, as it is by no means uncommon to observe cheerfulness, good appetite, considerable physical energy, and more or less activity, even for some weeks after the gums have been affected and the teeth loosened. The face, and indeed the surface generally, presents a pale or sallow and bloated appearance, and, as the disease progresses, becomes of a dusky hue; a dark ring surrounds the eyes; the appetite is deficient; the tongue is flabby and appears enlarged; the pulse is small, feeble, and generally slow, occasionally frequent, and, in the last stages, intermittent; and the skin is dry and harsh, or rough, or presenting streaks or patches resembling ecchymoses, and of various tints. Sooner or later the gums become swoln, soft, spongy, of a dark or purple color, and bleed from the slightest touch; the teeth become loose; the breath is offensive; pains of a rheumatic or neuralgic character are often experienced in various parts of the body, but more generally in the inferior extremities, chest, and back. As the disease progresses, these symptoms increase in severity, the patches on the surface enlarge, appear in greater number, and of a deeper ecchymosed appearance; the pains also augment, and are accompanied with swellings and stiffness, especially in the joints; hemorrhages occur from the nose, throat, bowels, vagina, and other mucous surfaces; hard and painful tumors appear on the limbs and jaws, which often

form fungous ulcerations; the bowels are usually constipated, but sometimes loose, with dark coagula of blood in the discharges; the urine is scanty, very dark colored, and often tinged with blood; there is a diminution of urea in the urine, a strong tendency to putridity and the development of an ammoniacal or a hydrosulphureted odor. A total absence of potash in the urine is stated to occur in all cases. Nyctalopia is frequently met with. Not unfrequently old sores or wounds, which have long been healed up, break out afresh, and eruptions upon the surface of the body frequently discharge blood, or become changed into malignant formations.

The disease is very variable, generally advancing gradually, but sometimes appearing very suddenly, and with great malignancy. The disease at sea, or on shipboard is frequently much more severe in its character than that met with on land, and this may be due to a superiority of hygienical measures in the latter instance. Death may occur from extreme prostration, from profuse hemorrhages, from diarrhea, or from gangrene of some internal organs.

The *diagnosis* is not difficult, when the peculiar symptoms, their gradual appearance, and the previous condition and hygienic deficiencies of the patient are taken into consideration. It may be discriminated from *purpura hemorrhagica*, the only disease with which it may be confounded, by the dusky, sallow hue of the skin, the greater sponginess of the gums, the indurated and painful swellings about the jaws and limbs, and the hard and unyielding livid blotches met with in scurvy, and which are absent in purpura. In purpura, the blotches are soft and impressible, and the joints are not so stiff and inflexible as in scurvy. In purpura, the blood contains a great diminution of fibrin, and is scarcely coagulable; in scurvy, the salts of this fluid, and its fibrin, are increased—the vital cohesion of the fibrin being more or less impaired, the blood corpuscles are greatly diminished, and the blood is coagulable—the albumen is increased, but probably altered in quality. Purpura is more common during the warm seasons of the year; scurvy, during the cold and moist seasons.

The *prognosis* of scurvy in its early stage is generally favorable; but in the more advanced periods, when hemorrhages are present, or dyspnœa, frequent respiration, dropsical effusions, albuminous urine, or enlargement of the spleen; or, if the disease be complicated with dysentery, pulmonary, pleuritic, or other affections, it is unfavorable, though cures have been effected even in apparently the last stage of the disease, when uncomplicated with any other malady. If an amendment occurs soon after the adoption

of suitable treatment, we may augur favorably. From a more correct understanding of the origin of scurvy, and its treatment, the disease rarely proves fatal at the present day.

The *pathological appearances* observed in scurvy, are, effusions of blood in the substance of the skin, in the subcutaneous and intermuscular cellular tissue, in the muscles, between the periosteum and bones of the lower extremities and of the jaws. The liver may present a pale, or nutmeg appearance; the bile, pale or yellowish; the spleen, dark colored, soft, and enlarged; the lungs œdematous; and, sometimes, the mesenteric glands and kidneys will have become enlarged or undergone some morbid alteration. Traces of hemorrhage will often be observed in the mucous coats of the intestines.

The *treatment* of scurvy is more of a hygienical character; therapeutical measures being, as a general rule, required only for the purpose of overcoming urgent symptoms. A proper change in the diet; pure, oxygenated atmosphere; and a removal or avoidance of the disposing causes, are the most important among the curable measures. In addition to a moderate use of good, healthy, not diseased nor decomposed animal food, the patient should freely use fresh, succulent and acid fruits, as, oranges, lemons, limes, unripe grapes, apples, strawberries, gooseberries, pine-apples, and similar articles. Radishes, and water-cresses, eaten raw, turnips, and the sour-krout of the Germans, are all valuable against the attacks of scurvy. The potatoe boiled, or in its raw state, grated, and eaten with vinegar, has also been found to possess most valuable antiscorbutic properties. Milk, onions, garlic, leeks, spinage, lettuce, parsley, dandelion, wild sorrel, garden cresses, rhubarb pie-plant, spruce-beer, fresh meats, etc., are all good antiscorbutics.

Now, all these articles, which are termed antiscorbutics, contain potash, and those who ascribed the cause of scurvy to a deficiency of potash in the food, as well as in the blood, having, in accordance with their theory, administered potash salts internally, found their use to be promptly followed by marked beneficial results, amendment commencing in all cases, as soon as potash appeared in the urine. In consequence of these results, the Bitartrate, Acetate, Chlorate, Carbonate, Phosphate, Nitrate, and Oxalate of Potassa have been given in cases of scurvy, and with excellent results. The Bitartrate is generally preferred, in doses of one drachm, three times a day, on account of its additional beneficial diuretic and laxative properties. Others, who attribute the beneficial effects of fruits, etc., to the acids in them, recommend, in the absence of such fruits, the use of Lime juice, Lemon juice, Citric

Acid, Tartaric Acid, etc., to which, when required, some Wine or Porter may be added.

Nitric Vinegar, so called, has been found beneficial; it is prepared by dissolving from two to four ounces of Nitrate of Potassa in a quart of Vinegar, and is administered in doses of half a fluid-ounce, considerably diluted with water, repeating the dose two, three, or four times a day.—Obstinate constipation may be overcome by Bitartrate of Potassa, taken either dissolved in Water, or in Tamarind water; or Castor Oil may be given in some Lemon juice, or in a weak solution of Citric Acid.—If diarrhea be present, an infusion of Blackberry Root, Geranium, or other astringent may be given; or, the Tincture of Kino, or of Catechu, with or without the addition of Paregoric, will frequently be of service. The Tincture of Chloride of Iron, or Solution of Perchloride of Iron, will also be found efficient in many cases, and may be used both by mouth and by injection. Similar measures may be used to check profuse hemorrhage.

Acidity of the stomach may be removed by the Compound Powder of Charcoal, or the Compound Powder of Rhubarb and Potassa.—Abdominal pains may be alleviated by opiates internally, and warm fomentations.—Sponginess of, and hemorrhage from, the gums, with a loosening of the teeth, may be removed by washing the gums freely with a solution of Chlorate of Potassa, or, with a mixture composed of equal parts of Tinctures of Myrrh, Rhatany, and Cinchona. Chewing raw potatoes, grated, either with or without the addition of Lime or Lemon juice, will be found an excellent remedy for scorbutic affections of the mouth and gums. Chlorate of Potassa used internally in conjunction with lime juice, is said to speedily restore the gums to a sound state.—Obstinate and foul ulcers may be washed with Solution of Bitartrate of Potassa, of Permanganate of Potassa, or of Chlorate of Potassa, or, with Tincture of Chloride of Iron. Or, they may be dressed with bruised Sorrel Leaves, or a Yeast Poultice,—a Cranberry Poultice will also be of benefit.—Sleeplessness will generally be removed as the patient improves in health, or it may be treated by Valerianate of Quinia, Lactucarin, Lupulin, Cypripedin, Scutellarin, Hyoscyamus, Opium, etc.

In all severe cases, and in the milder cases when anemia is present, the patient must be kept in the recumbent position, and should be cautioned against rising, or making any sudden movement or exertion, as these have been followed by immediate death from syncope, induced by putting upon the heart more work than it can

accomplish. As strength returns, moderate exercise will prove advantageous. The patient should have the surface of his body bathed daily, and also have a constant supply of air. He should be removed from a damp atmosphere to a dry one. His diet should be generous and nutritious, consisting of well-made soups, broths, eggs, milk, and mashed potatoes, at least, until the condition of the teeth and gums will admit of more solid food. For drink he may use wines, ale, porter, whey, buttermilk, tamarind water, cider, spruce-beer, lemonade, etc. The Tincture of Chloride of Iron may also be added to tonic infusions, in cases of anemia.

DROPSY.

Dropsy or Hydrops is a morbid accumulation of serum or watery fluid in the cellular areolæ, in the natural cavities, or in both, and which impedes or prevents the functions of the organs in its immediate vicinity. It is generally the result of disease in some of the important organs of the body, and is occasioned by defective absorption, excessive effusion, or both combined. The blood-vessels alone, so far as is known, are concerned in the exhalation and absorption of the watery fluid; the lymphatic absorbents having no share in the phenomena of dropsy. Dropsy may be *acute*, sthenic, or active; passive, asthenic, or *chronic*. It may also be *idiopathic*, due to some morbid condition of the blood, suppression or cessation of inordinate discharges; or, *symptomatic*, resulting from disease of internal organs, as, of the heart, liver, kidneys, spleen, peritoneum, etc. Either sex, and of all ages, are liable to dropsy, whenever the disposing causes exist. I have placed the consideration of dropsy, at this place, deeming it the most appropriate, as it appears to be a disease connected with the condition of the blood either as to quality, or, to circulation.

In relation to the *cause* of dropsy, Dr. Geo. Johnson, Professor of Practice in King's College, England, and from whom I have quoted freely in the present article, gives the following remarks:—"The explanation of dropsy is to be found in the condition of the blood-vessels and their contents. In general terms, the proximate cause of dropsy may be, 1st. A mechanical impediment to the circulation of the blood and a consequent preternatural fullness in some part, or in the whole of the vascular system; and in most, if not in all forms of dropsy, the flow of blood through the capillaries is impeded. The cause of the impediment differs in different cases. In one class of cases there is a distinct mechanical impediment to the return of blood by the veins; pressure on a venous trunk; or dis-

ease of the heart, lungs, or liver. 2d. An alteration of the physical condition of the blood, and a consequent loss of that mutual relation between the blood and the vessels upon the maintenance of which depends the freedom of the capillary circulation. The morbid conditions of the blood which chiefly favor the occurrence of dropsy, are, an excess of water, with a deficiency of the solid constituents of the blood, especially of the coloring matter and albumen, as, in anemia or chlorosis, or from an imperfect action of the skin and kidneys; or, the retention and accumulation of excrementitious materials in the blood,—most frequently urea and other urinary constituents, less commonly carbonic acid, as is the case in acute renal dropsy, dropsy following scarlatina, etc. The urinary constituents being retained in the blood occasion an impeded circulation through the capillaries, and a consequent effusion of serum through the walls of those vessels.—One of the most convincing proofs of impeded capillary circulation, consequent on contamination of the blood with urine, is to be found in the hypertrophy of the left ventricle of the heart, so commonly present in cases of chronic renal disease. An analogous obstruction results from an excess of carbonic acid in the blood as proved by the experiments of Dr. John Reid.

"There is probably another cause for dropsical effusion in these cases—viz., a direct irritant action tending to cause serous effusion, but short of that which would give rise to inflammatory exudation.

"An impeded return of the blood through the veins often causes dropsical swelling of the parts beyond the seat of obstruction. Thus, the pressure of enlarged glands, or of an aneurism on the femoral or popliteal vein, or the pressure of the gravid uterus on the iliac veins, will give rise to œdema of the lower extremities. Structural disease of the liver, especially an advanced stage of cirrhosis, may greatly impede the return of blood through the portal system of veins, and the result is an effusion of serum into the cavity of the peritoneum, constituting ascites. Dr. Watson relates the case of a man who had dropsy of the head and neck and upper extremities, while the rest of the body was free from dropsical swelling, and disproportionately small. The cause of the dropsy was found to be obliteration of the superior cava vena by the pressure of an aneurism of the aorta. The larger the vein which is obstructed, the greater will be the extent of the dropsy; and when the impediment to the circulation exists at one of the orifices of the heart, the dropsy may be general over the whole body.—Now the immediate cause of the dropsical effusion in these

cases is *over-distention of the veins and capillaries, and increased pressure on their walls.*

"Experiment has shown that the transmission of fluids through membranes is in direct proportion to the *pressure* employed. Experiments by Magendie and others have also shown that while depletion of the blood-vessels by venesection quickens absorption, artificial distention of the vessels by the injection of water checks absorption and favors exhalation or the escape of liquid through the walls of the vessels.—Again, absorption is checked by a retarded movement of the blood through the vessels. 'Fluid may be raised against gravity by directing a stream along a membranous canal which lies immersed in the stagnant fluid. The outer fluid enters the canal by endosmose, and is carried away with a speed proportioned to the velocity of the current.' An obstacle to the return of blood through the veins therefore checks absorption and favors dropsical effusion, by causing a retarded circulation, increased fullness of the veins and capillaries, and increased pressure on their walls.—It is thus, chiefly, that valvular disease of the heart, and some forms of pulmonary disease—such as emphysema with bronchitis—cause dropsy. I shall presently show you that congestion of the kidneys, and a consequent scanty secretion of urine, are among the results of the cardiac and pulmonary disease which concur in causing dropsical effusion."

Among the exciting causes of dropsy may be named, cold, dampness, injuries, obstructions to the circulating system, recession of cutaneous eruptions, want of proper nourishment, general debility, long-protracted fevers, frequent and excessive evacuations, as, hemorrhages, protracted diarrhea, constant use of drastic cathartics, etc., chlorosis, amenorrhea, intemperance, use of mercurials, use of pork as a diet, sudden suppression of diarrhea, dysentery, or of the excretions, etc. Some of these may give rise to the acute form of dropsy, and others to the chronic. However, the latter form is generally dependent on some pathological conditions, the principal ones of which I will now briefly refer to:

Cardiac dropsy is dependent upon some disease of the heart, which occasions a derangement in the circulation, or enfeebles it. Commonly, the heart affection has existed for a longer or shorter period previous to the dropsical symptoms. The dropsy is chronic and passive, is unattended by febrile excitement, and the blood may have undergone little or no physical change. The urine is scanty, in proportion to the degree in which the blood is impeded in its passage through the kidneys by the heart disease; indeed, a scanty secretion of urine is commonly the immediate precursor

and cause of that which is rightly called cardiac dropsy. The impediment to the circulation is in the heart, and it acts through the veins on the blood in the capillaries. In the advanced stages of heart disease, the obstructed state of the circulation often produces a congestion of the kidneys, resulting in albuminaria; but it must also be recollected that degeneration of the kidneys and consequent blood contamination frequently give rise to disease of the endocardium and valves. And it is by no means uncommon to have both the heart and kidneys implicated in many cases of general dropsy.

In cardiac dropsy the capillary obstruction is greatest in the most dependent parts, from which the blood has to ascend against gravity. And after the water has been effused into the areolar tissue, it tends to gravitate downward. For this reason, the swelling usually makes its first appearance in the feet and ankles, and gradually extends upward, being, however, greatly influenced by the position of the patient. Sometimes there will also be observed an œdema or puffiness in the face, eyelids, or superior extremities, on rising in the morning; while that in the feet and ankles is more particularly observed toward evening. This symptom may remain a considerable length of time before any symptoms of effusion in the chest, or in the abdomen, are manifested. Frequently, considerable swelling of the thighs as well as of the scrotum will be observed, and there will be more or less effusion into the cavities of the pleura, or into the lung tissue. More commonly, the effusion is met with in the thorax and abdomen, and sometimes the dropsy may be general or anasarca. When the effusion is in the thoracic cavity, the patient will require his head and shoulders to be raised considerably during sleep, and as the disease progresses he will not be able to assume the recumbent position at all. With this form of dropsy, there will also be the symptoms peculiar to the cardiac affection under which he may be laboring. (*See Cardiac Dropsy*, page 352.)

Renal dropsy is due to some disease of the kidneys, occasioning an impediment to the circulation through the capillaries. This impediment originates in the capillaries themselves, and is a result of the contamination of the blood with urinary matters. The effused fluid also contains urea, which is not present in the fluid effused in uncomplicated cardiac dropsy.—The circulation of impure blood, resulting from defective action of the skin and kidneys, is commonly attended with considerable febrile excitement, and is called acute, active, febrile, sthenic, or inflammatory dropsy. There is, therefore, an acute renal dropsy, in which the swelling

usually appears in the face, feet, and over the whole body, at the same time. The blood being contaminated, a universal capillary congestion or impediment takes place, and an active transudation through the walls of the capillaries.

Chronic renal dropsy often commences in the feet, and thence gradually extends upward, the same as in cardiac dropsy; the proximate cause of the dropsy being mainly the impoverished condition of the blood, which contains an excess of water, with a deficiency of solids, especially albumen and coloring matter. The presence of albumen in the urine, in conjunction with the other symptoms of diseased kidney, will enable us to determine renal from other dropsies; and patients with chronic renal disease are liable to become dropsical, in proportion to the abundance of albumen and the scantiness of water in the urine. Thus, we find dropsy to be almost invariably present in those cases of Bright's disease with the large wax-like and fat kidneys, which are associated with a scanty secretion of highly albuminous urine; while, on the other hand, in cases of chronic desquamative disease, a form of renal degeneration, attended with a copious secretion of urine and comparatively little albumen, there is usually no dropsy.

In most cases, anasarca or general dropsy is either *cardiac* or *renal* in its origin; but it may be due to some *pulmonary* affection, as emphysema of the lungs with bronchitis, which produces a serious impediment to the flow of blood through the lungs. In these cases an excess of carbonic acid in the blood is an additional source of impeded capillary circulation and of consequent dropsical effusion.

Hepatic dropsy is due to disease of the liver; as with the preceding forms, it may partake more or less of anasarca, but more commonly, unless associated with cardiac or renal disease, it gives rise to dropsy of the abdomen, with more or less anasarca of the lower extremities. In hepatic dropsy, there is a decided impediment to the circulation of the vena porta. This impediment may be occasioned by other lesions than those of the liver, as, dyspepsia, enlargement of the pancreas, or of the spleen, peritonitis, abdominal tumors, diseased glands, etc. These diseases may also cause a deterioration of the blood, accompanied, perhaps, by a debilitated state of the heart, which will give rise to more or less effusion, the same as is frequently observed in anemia, chlorosis, etc., where the dropsy is due to a watery blood, weakness of the heart, and consequent impeded circulation.

Dropsy is *distinguished* by several names, according to its location, thus; *œdema*, is a swelling formed by effusion into the cellular tis-

sue; there is no redness, no tension, and no pain; the swelling yields under pressure of the finger, retaining the pit or impression for some time. It is distinguished from *phlegmon* by the absence of inflammatory symptoms. Œdema may be due to a disease of the heart, kidneys, or lungs, but in such cases the swelling is liable to become more or less general. When the œdema is confined to a certain locality, and is limited in the quantity of effused fluid, it is more commonly the result of some local difficulty which interferes with the venous circulation. Thus, it may occur from enlarged glands pressing upon the principal vein of the arm or leg, from crural phlebitis, from defect or impairment of the nutrition of an extremity, from an anemic or chlorotic condition, from a sprain, etc. The œdema may be limited to one limb, or it may appear in both. The presence of any local difficulty, the existence of anemia, or, of cardiac, renal, or hepatic disease, will enable us to determine the cause and the character of the œdema.

When the œdema becomes more general, the dropsical effusion is called *anascara*, or *cellular dropsy*, which is a very common variety of dropsy. This may be limited to the inferior extremities, or it may spread over the whole body; the swelling is always regular and uniform, of a soft, doughy feel, leaving a pit or depression when pressed upon by the finger, and which slowly returns to its former fullness. Anasarca generally commences with a swelling of the feet and ankles, which is more evident in the evening, especially when the person has been standing or walking considerably; and, toward morning, when the recumbent position has been maintained for some hours, the swelling wholly or partially disappears for a time. The skin is paler than usual. As the effusion increases the swelling gradually ascends into the legs, thighs, and trunk of the body, and not unfrequently the face and eyelids appear full and bloated. Sometimes the fluid oozes through the pores of the cuticle, or raises the cuticle in small blisters, and sometimes the skin, not allowing the escape of the water, becomes compressed, hardened, and so much distended as to give the tumor a considerable degree of firmness. The effusion is much more considerable in those parts where the areolar tissue is lax. The bowels are generally more or less constipated, the skin dry, tense, and shining, the pulse natural, but usually small and weak, countenance sallow, but, in the more advanced stages, it sometimes presents a livid hue, thirst augmented, appetite deranged, and urine scanty, high-colored, giving a copious reddish deposit on standing, or, containing considerable albumen. As the disease advances, there will be a state of inactivity and sluggishness, with general debility.

When the watery accumulation has become pretty general, the vesicular and cellular structures of the lungs become affected, with difficult respiration, cough, and a watery expectoration. Anasarca may be associated with ascites or hydrothorax, when it is apt to be of a serious character, and more difficult of cure.

Ascites, or Dropsy of the Abdomen, (*See Chronic Peritonitis*), are the names applied to a collection of effused fluid in the peritoneal sac, or general cavity of the abdomen; sometimes it is found without the peritoneum, between it and the abdominal muscles, and occasionally it is contained in sacs formed upon and connected with some of the viscera, as the liver (*hydatids*), or ovaries (*ovarian dropsy*), forming what is termed "encysted dropsy." Ascites is met with next in frequency to anasarca. It is often preceded by an impaired appetite, sluggishness, dryness of the skin, cough, oppression at the chest, scanty urine, and constipation. Occasionally ascites may be preceded by anasarca of the lower extremities.

Dropsy of the abdomen presents at first a slight enlargement of the inferior part of the abdomen, together with a disagreeable feeling of fullness, and some tenderness when pressure is made; the enlargement gradually advances as the effused fluid accumulates, until the whole abdomen becomes uniformly swoln and tense. As the swelling progresses, the difficulty of breathing usually increases, being worse when the patient lies down; the face is apt to be pale and bloated; there is more or less thirst; the stomach and bowels, in most cases, perform their functions with tolerable regularity, but sometimes they become deranged, with nausea, flatulence, colic pains, and a sense of weight in the abdomen; the pulse is variable; the urine scanty, thick, high-colored, with reddish deposits on standing.

Ascites may be *detected* by the dull sound elicited on percussion; and by the practitioner placing one hand upon one side of the abdomen, while the patient is sitting or standing, and striking on the opposite side with the finger tips of the other hand, which will give rise to a distinct fluctuation, readily felt, and frequently obvious to the ear. The tympanitic resonance of the bowels will also be found to vary according to the position of the patient, as these organs usually float on the upper part of the effused fluid.

Dropsy of the abdomen may be detected from *tympanitis*, as, in the latter malady there is a clear tympanitic sound on percussion, and no fluctuation can be perceived. From *ovarian* or *encysted dropsy* by the indistinct and limited fluctuation; by observing that instead of the uniform swelling of the abdomen found in ascites, only one side, or some particular part of the abdomen is more protuberant than the rest; and by a change of position effecting no

change in the resonance of the bowels by percussion; adhesions from peritonitis will prevent the ascites from presenting its proper symptoms, and they may be so limited and indistinct as to be mistaken for ovarian dropsy, but the history of the case, from which we may learn the existence of a previous peritonitis, or some tubercular disease of the peritoneum and mesenteric glands, together with the constitutional symptoms present, will materially aid in the diagnosis. In ascites the general health suffers more than in ovarian dropsy, and there is also more liability to detect cardiac, renal, or hepatic disease. From *dropsy of the womb*, by observing that the tumor is confined to the region of this organ, and, as it increases, somewhat resembles the shape of the pregnant womb; it yields upon pressure; there is a less marked sense, or an entire absence of fluctuation, and the urine is but slightly diminished, if at all. From *distension of the bladder*, by evacuating this organ by means of a catheter. From *pregnancy*, by the absence of fluctuation, and the usual signs of pregnancy; in dropsy the countenance is pale and sickly, and œdema of the feet and ankles are present, which is not the case in the early months of pregnancy. Pregnancy and ascites may co-exist, which renders the diagnosis very difficult, especially in the earlier months, before ballottement, etc., can be obtained. (*See Hydrocephalus*, or *Dropsy of the Brain*, page 168.)

Hydrothorax, or Dropsy of the Chest, are the terms applied to an accumulation of serum within the cavity of the pleura; this form may exist alone, but generally prevails as part of a more universal dropsy. Its injurious consequences are due more to its mechanical compression than to any peculiar quality which it possesses, as the lungs are frequently reduced in size by its pressure, and even the heart may be displaced. At an early period of hydrothorax there will be an oppression and difficulty of breathing experienced, proportioned to the extent of the effusion, and these symptoms will be augmented on every sudden or uncustomary exercise, or when the body is in a horizontal posture; and when there is effusion in both pleural cavities, the breathing is still shorter and laborious. There is an inability to lie on the side of the chest where effusion does not exist, and as the disease progresses the patient is compelled to sleep more or less in a sitting posture. There are frequent shiverings; a short, dry cough; sense of uneasiness or heaviness at the lower extremity of the sternum; paleness of the complexion; feeble and irregular pulse; confused and disturbed sleep, with unpleasant dreams and sudden startings; palpitations of the heart; and occasional syncope. As the effusion increases, the face, lips, and hands present a livid or mottled aspect; anasarcous swellings of the feet

and legs occur; thirst increases; a sensation of numbness in one or both arms, extending from the cardiac region toward the insertion of the deltoid muscle is frequently complained of; the eyes present an anxious stare; and the urine is scanty, high-colored, giving reddish deposits on standing. Sometimes the patient can distinctly perceive a sensation of fluid in motion, on making certain sudden changes in the position of the body.

The continued accumulation of fluid is marked by intolerable difficulty of breathing; the patient being obliged to remain in the erect posture, with his mouth open, and his body leaning toward the side in which the effusion is greatest, while he incessantly manifests the greatest anxiety for fresh air. The face and extremities become swoln and cold; a cold, clammy sweat occurs upon the face and upper part of the body; drowsiness, coma, or delirium, occasioned by the difficult transmission of the blood through the lungs, and want of sleep, frequently attend the latter periods of hydrothorax, and from the same cause the expectoration is sometimes bloody. Death may take place suddenly; in some cases it is preceded for a few days by a spitting of blood; but more commonly the patient dies gradually from suffocation or apoplexy, the first being the result of the increased pressure of the accumulated fluid on the lungs; the second being the result of pressure of the dark, venous blood on the brain, not unfrequently accompanied with serous effusion on the surface of this organ, or in its ventricles. Occasionally, hydrothorax ends in general dropsy, and which may, indeed, accompany it from the beginning.

When hydrothorax is due to an inflammatory attack, the effusion is commonly on one side only; when it is the consequence of some lesion of the heart, kidney, or liver, the fluid is effused into both pleural cavities. Upon inspection, the affected side will frequently be found enlarged and round; the intercostal spaces become effaced at the lower parts of the chest, as they are extended by the gradual divergence of the ribs, and the intercostal muscles will be more inactive than those of the opposite side. An abnormal position of the heart may be readily discovered by observing the point at which the apex of the organ is seen to beat. An absence of the natural vibrations usually communicated by the voice to the walls of the chest (vocal fremitus), characterizes the presence of effusion in a pleural cavity, and which may be ascertained by placing the hand on the side of the thorax containing the fluid. Mensuration will detect a difference of size between the two sides of the chest, the affected one being increased in circumference. Percussion will elicit a dull or perfectly flat sound, to an extent proportionate to the

quantity of effusion present; by altering the position of the patient the character of the percussion sounds will vary, according to the altered level and depth of the fluid under examination. Auscultation will, at first, give a muffled or tubular inspiratory murmur, the weakness of which will vary according to the amount of fluid present; when the disease is well marked, there will be an entire absence of the normal murmur toward the base of the chest, (especially in its lower or back parts), where the fluid is naturally accumulated to a great extent. Sometimes a tubular sound may be heard, more distinct about the angle of the scapula. Friction sounds are not present in hydrothorax. If the fluid be not in too large quantity, ægophony may be heard; though this may exist in hepatization, when there is no pleural disease. When the hydrothorax is due to cardiac or other visceral lesions, dropsical effusions in other parts will co-exist.—The diseases with which hydrothorax may be confounded are, chronic pleurisy, pericardial effusion, abscess in the walls of the chest, enlarged spleen or liver, a tumor within the chest, pneumo-thorax, and emphysema; in cases of doubt, great care should be taken to arrive at a correct diagnosis, and especially in cases where the operation of paracentesis thoracis is about to be performed.

Chronic dropsy is almost always symptomatic, and rarely idiopathic, and to determine the disease upon which it is dependent may frequently be readily effected by the symptoms which manifest themselves. But often it becomes a difficult matter to do this, and the practitioner will then have to proceed carefully in his investigation, before he can satisfy himself that the effusion is due to anemia or watery blood, or to lesion of the heart, liver, kidneys, lungs, etc. And in such investigation a thorough knowledge of all the symptoms pertaining to these several lesions will prove a most valuable and important aid. (*See Chronic Hydrocephalus*, page 168, and *Hydropericardium*, page 348.)

The *prognosis* of dropsy depends upon the nature and extent of the disease of which the dropsy is a symptom. Some forms of dropsy are readily curable, as, the acute dropsies, and those due to certain changes in the blood, as, in chlorosis, anemia, etc., and those dependent upon renal disease, in its early stage. When the disease to which the dropsy is owing is incurable, or of long standing, the dropsy may sometimes be relieved, but never cured. Thus, a chronic dropsy, dependent upon long-standing renal, cardiac, lung, or hepatic disease, is seldom, if ever curable, or, at least, not until the organic disease is cured. The location of the effusion has also an influence upon the prognosis; when in the cavities of the body,

it is more unfavorable than when seated in the areolar tissue. Ascites is, as a general rule, less difficult of removal than hydrothorax. Young and otherwise good constitutions usually admit of cure more readily than the infirm, and those advanced in years. Local dropsies almost always disappear with the removal of their cause. Dropsy following the exanthema, hemorrhages or other profuse discharges, or, an improper or innutritious diet, is generally curable.—In hydrothorax, or effusion into the pleural sac, we may determine the increase or decrease of the liquid, by percussion, which gives a flatness of sound along the level line of the fluid, as well as below it. For this purpose a nitrate of silver mark may be made along the line indicating the level, at different periods of examination.

The *pathological appearances* met with in dropsy are various, according to its locality. The fluid itself will vary in color, being dark colored and turbid, sanguineous, limpid, yellowish, greenish, or brownish; it may be whey-like and turbid, as when there has been considerable vascular action in the seat of the effusion, or it may contain lymph, mucous, or albumen, or a mixture of these, frequently in the form of shreds, or flocculi, etc. Generally the fluid is of a faint-yellow color, more or less turbid, of specific gravity 1010 to 1025, of alkaline reaction, containing more or less albumen, chloride of of sodium, and, if the kidneys are diseased, urea; if fatty matter be present, cholesterin may usually be found in it.

The serous membranes may be thickened and opaque, either indurated or softened, often presenting indications of previous inflammatory action, as, coagulable lymph, old adhesions, etc.; the serous surfaces may be covered wholly or partially with a reticulated lymph, with granulations, or tuberculations. In the cellular tissue, the areolæ may be distended by the effused fluid, the cells enlarged or ruptured, the intermuscular tissue hardened, the fibers of the true skin separated so that the fluid may penetrate its denser parts, and sometimes the cellular tissue may be softened and plastic.—In addition to these, will be observed the appearances common to the renal, cardiac, or other disease, upon which the dropsy depends.

In the *treatment* of dropsy two indications are to be fulfilled, 1st, to remove the cause of the dropsy; and 2d, to remove the accumulated fluid from the system. The first object may be attained by the adoption of those measures necessary for the removal of the the disease or condition occasioning the dropsy, and which are given under their respective heads; and, as a general rule, when the disease is cured the dropsy disappears. When the dropsy is

from a poor and watery condition of the blood,—as, in chlorosis,—nutritious diet, fresh air, moderate exercise, and chalybeates, will improve the quality of the blood, and the dropsy becomes cured. But this is not always the case, as the effused fluid may remain, and require to be removed by the appropriate treatment for the dropsy. Again, the disease may be incurable, and then the removal of the accumulated fluid from time to time may afford temporary relief, and prolong the patient's life. And again, the active and continued measures adopted for the removal of the dropsy, will sometimes be followed by a cure both of the original disease and the dropsy.*

A very important class of agents to aid in removing the accumulated fluid in dropsies, are Hydragogue cathartics. There are several of these which have been recommended, but the one I generally prefer is the following: Take of powdered Jalap three

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* "In cases of *acute renal dropsy*, the urine is at first scanty and of morbid quality, being often high-colored from admixture with blood, always albuminous, and usually containing casts of the kidney tubes. The scanty secretion of urine is the cause of the dropsy, and the secretion of urine is scanty because the flow of blood through the kidney is obstructed and the structure of the gland changed, the tubes being filled with desquamated epithelium and with blood and fibrin which have escaped from the gorged Malpighian vessels. Now observe what happens during the progress of cure in a case of this kind. The patient we will suppose to be placed in circumstances favorable for recovery; he is confined to bed; has a scanty diet; the loins are dry cupped, or mustard and linseed poultices are applied there; and means taken to excite the secretory action of the skin and bowels, and thus to lessen the work of the kidneys. Soon the secretion of urine begins to increase, until, in the course of four or five days, perhaps, the quantity of urine, which at first had been less than half the natural amount, becomes three times as great as the standard quantity, no diuretic medicine of any kind having been given.

"The explanation of this spontaneous diuresis appears to be this: During the acute stage of the renal disease, the constituents of the urine, both solids and liquids, have accumulated in the blood, and have thence been effused into the areolar tissue and into the serous cavities. Now urea itself is a most powerful diuretic; and no sooner is the inflammatory congestion of the kidney removed, and the freedom of the renal circulation restored, than the urea exerts its natural diuretic action on the kidney. The copious diuresis thus induced speedily removes the accumulated urinary solids and liquids from the blood, the areolar tissue and the serous cavities into which they had been effused, and so the dropsy is cured.

"This abundant flow of urine occurs without aid from diuretics or drugs of any kind. I have seen it occur while bread pills alone were given as a placebo. Stimulating diuretics, such as squills, or cantharides, or turpentine, are injurious by increasing congestion of the kidney. The best diuretic in such cases are means which tend to lessen the congestion of the kidneys; counter-irritation over the loins, especially by dry cupping; hot-air baths and diaphoretics, purgatives, and a scanty diet." (*G. Johnson.*)

drachms, Bitartrate of Potassa six drachms, powdered Elaterium from one grain and a half to six grains; mix thoroughly together, and divide into twelve powders. One of these powders is to be administered every six hours. The Elaterium frequently occasions nausea or vomiting, which may generally be overcome by the addition of three or four grains of Capsicum to each dose. When copious watery discharges are produced, the use of the powders may be discontinued; or, if required, may be still continued every six hours but without the Elaterium. Other hydragogue preparations may be employed, as, a mixture of Podophyllin one-fourth or one-half of a grain, Bitartrate of Potassa twenty grains; mix for a dose, which is likewise to be repeated every six hours. The powdered root of the Large Flowering Spurge (*Euphorbia Corollata*) is a very valuable hydragogue in dropsy; it may be given in doses of fifteen or twenty grains, repeating it every day or two; it induces copious watery evacuations, and sometimes gives rise to emesis, which may be checked by the administration, with each dose, of a grain or two of Extract of Hyoscyamus. On account of the greater solubility of the tartrate of potassa, or, the tartrate of potassa and soda, it is preferred by many, in the above preparations, being substituted for the bitartrate. Another hydragogue, sometimes used by practitioners, is composed of Elaterium one grain, Compound Extract of Colocynth two scruples, Extract of Hyoscyamus twelve grains; mix, and divide into twelve pills, of which one may be taken every twelve or twenty-four hours. The strength of the patient must be taken into consideration in the administration of these powerful cathartics; and the hydragogues should be repeated only once, twice, or thrice a week, according to his strength and ability to bear catharsis. If great debility and prostration follow the use of the hydragogues, the strength of the patient must be properly sustained by stimulants and nourishment. Croton Oil, in doses of a minim, repeated sufficiently often to act freely upon the bowels, may also be used with advantage; it does not produce the debility which follows the use of elaterium, but, while it lessens the quantity of effused fluid, it also appears to augment the action of the absorbents. It may be given on sugar, in emulsion, in pill form with crumb of bread, or, in combination with Soap and Compound Extract of Colocynth. The fresh bark of the root of Sambucus Nigra, scraped, and the juice obtained from the scrapings by pressure, is also an excellent purgative in dropsy, in doses of from a teaspoonful to a tablespoonful; it occasions no inconvenience. Probably, the root bark of S. Canadensis will answer equally as well.

A very excellent cathartic may be administered in cases where the tongue is smooth and red, with irritable stomach and bowels, tenderness on pressing over the epigastric region, and where the ordinary hydragogues are not retained upon the stomach, as follows: Take of Indian Hemp (*Apocynum Cannabinum*) two ounces, Blue Flag Root, Queen of the Meadow Root, each, one ounce; make three pints of infusion; or, three pints of tincture with equal parts of Holland Gin and Water, of either of which a tablespoonful may be given every two hours, until the bowels are acted upon freely. Or, the Alcoholic Extracts of these articles may be used, in pill form.

To promote absorption of the effused serum, increase the secreting action of the kidneys, and improve the condition of the blood. I believe there is no preparation so generally efficacious as the Compound Infusion of Parsley, which should be used during the intervals between the cathartics. For the same purpose, Iodide of Potassium has been highly extolled, and will undoubtedly prove useful in scrofulous and tuberculous habits, and in dropsy accompanying albuminaria, and yellow liver—where the liver or kidneys are enlarged, and owe their peculiar appearance to interstitial deposition of fatty and morbid fibrinous matter.

For a constant drink, it will be better for the patient to use some diuretic infusion or decoction, as, equal parts of Dwarf Elder and Juniper Berries; or, equal parts of Spearmint, Parsley Root, Elder Bark, and Indian Hemp Root; or equal parts of Queen of the Meadow Root, Dwarf Elder, and Indian Hemp. The infusion or decoction of either of these compounds may be drank pretty freely whenever diuresis, or quenching thirst, is desired. Meadow Sweet Herb (*Spiræa Ulmaria*) in decoction, is useful in some cases of dropsy, proving actively diuretic, and causing an absorption of the effusion without producing debility, or lowering the circulation; so is an infusion of Ampelopsis Quinquefolia. Other diuretics may be employed, as, Asclepias Syriaca, Verbascum Thapsus, Pyrola Umbellata, Juniperus Virginiana, etc. When the urine is albuminous, the free use of an infusion of Canada Snakeroot, will frequently be found of service.

When the effused fluid has been carried off, the Compound Infusion of Parsley should be used daily for several weeks, in order to prevent farther effusion; resorting to the preceding measures, whenever symptoms of a returning effusion are manifested. And, the treatment for any organic disease which may exist, must be persistently adhered to; omitting it only occasionally, when active

measures are being adopted, as, the administration of hydragogues, etc.

In anasarca of the extremities, as the fluid is absorbed and carried off, the limbs should be bandaged their whole length as tightly as the patient can bear comfortably, renewing it once or twice daily, particularly in the morning when the swelling has somewhat diminished from diffusion of the fluid, owing to the recumbent position. In ascites, as the water is carried off, a broad bandage must be worn around the abdomen, sufficiently tight not to be uncomfortable, and gradually increasing its pressure as the enlargement decreases. This mechanical support is a very important measure, as it enables the tissues to regain their natural tone and vigor, after the extreme and enfeebling distension to which they have been so long subjected. If the bowels be kneaded or shampooed by hand, two or three times a day, after the fluid has commenced to disappear, much benefit will be derived from it, and, particularly, if, after each shampooing, we apply over the abdomen with considerable friction, a liniment composed of equal parts of Oils of Juniper, Sassafras, Cajeput, and Spearmint.

The surface of the body and limbs should be bathed daily with a weak alkaline solution, using considerable friction in drying. And, in anasarca of the legs, friction with a coarse towel or flesh-brush should be made use of on every renewal of the bandage, also, applying, where stimulation is required, a mixture of two parts of Olive Oil, and one part of Tincture of Capsicum. In hydrothorax, the Hot Air Bath will be very useful, when the strength of the patient will permit; employing it once or twice a week.

Stork's-bill Geranium (*Erodium Cicutarium*), a plant introduced into this country, and growing along the Oneida lake-shore, New York, and in other sandy locations, is an excellent diuretic and tonic, and has proved very efficacious in renal and hepatic dropsies, even when hydragogues and other agents had failed. Two ounces of the dried plant are placed in three pints of boiling water, and simmered down to two pints; the dose of the strained decoction is three or four fluidounces, repeated four times a day. (*Dr. W. A. Smith.*)

"In some cases of chronic renal dropsy, diuretics may be given without risk, but too often without much benefit in the way of removing or lessening the dropsy. Diuretics are more frequently successful in cases of cardiac dropsy, when the kidneys are free from disease.—In the treatment of cardiac dropsy, while we endeavor to remove the fluid by diuretics and by purgatives, which

excite copious watery discharges from the bowels, it is desirable to do what we can to sustain the power of the heart by nutritious food, stimulants, and tonics, little or nothing can be done to repair a damaged valve, but much may be done to strengthen the muscular walls of the heart, and thus enable it to overcome the impediment to the flow of blood, and the consequent tendency to dropsy which a diseased valve occasions. When other means fail to remove the dropsical accumulations, we may often afford great temporary relief, and prolong life, sometimes, for a considerable period, by mechanical means—by tapping the abdomen, for instance, in a case of ascites; by acupuncture or incisions through the skin of the legs for the removal of anasarca," and by paracentesis thoracis in hydrothorax. (*G. Johnson.*)

Tonics will indeed be found very valuable in chronic dropsy, and will sometimes effect cures even where diuretics prove useless, as, for instance, in anemic conditions, where there is excessive debility and no organic disease, in which cases the Tincture of Chloride of Iron, with or without Quinia, will be beneficial. In cases of enlarged spleen, the following mixture will often prove advantageous: Take of Syrup of Hypophosphite of Iron four fluidounces, Hypophosphite of Quinia one drachm; mix. The dose is a fluidrachm to be repeated three or four times a day. In some cases of chronic renal dropsy, I have derived considerable benefit from the stimulating diuretic effect of Oil of Turpentine, given in doses of ten drops, and repeated three or four times a day, gradually increasing the dose, according to the effect produced and the progressive condition of the patient; but its action must be watched, as in some cases it will aggravate the disease, from the renal irritation it is apt to occasion.

In ascites from chronic peritonitis, occurring in strumous habits, Syrup of Iodide of Iron with Cod Liver Oil, has effected cures; the syrup should be omitted when diarrhea is present, and opiates and astringents be given. (*See Chronic Peritonitis.*) In cases of passive albuminous anasarca, especially those following the exanthematous diseases, Tannin, in doses of thirty to sixty grains per day will often give rise to abundant diuresis; so will urea, in doses of one-third of a grain, given in sugar, and repeated three times a day—the diuresis in the latter case will not be manifest until after six or eight grains have been taken. An infusion of Elder Bark in Sherry Wine, taken in wineglassful doses three or four times a day, has been found valuable. I have had great success in the treatment of dropsy following scarlatina, by the following course; Take of Nitrate of Potassa one scruple, Bitartrate of Potassa two

scruples, Infusion of Parsley Root twenty-four fluidounces; mix. For a child from five to eight years of age, the dose is half a fluidounce every hour, so that the whole twenty-four fluidounces shall be taken up in the course of forty-eight hours. This must be repeated daily until the dropsical swelling has disappeared, and a free diuresis been produced, which will vary from three to seven days, when its use must be omitted, and an infusion of Parsley Root, or some other diuretic be freely administered, together with some Tincture of Chloride of Iron. Should there be, at the same time, a thick white coat on the tongue, or other symptoms of gastric acidity, an alkaline solution should also be given, as, a Solution of Bicarbonate of Potassa. And to sustain the strength of the patient, wine or other stimulant may be administered as required; and, when all swelling has disappeared, some tonic Wine Bitters should be used for a few weeks thereafter.

The diet, exercise, etc., must be suited to the peculiar circumstances of the patient, to his strength, to the condition of the blood, and to the character of any existing organic lesion. For the operations required to discharge the accumulated fluid, and thus afford temporary relief, the reader is referred to works on Surgery, in which they are described.

ANEMIA.*

Also termed Oligæmia, Spanæmia, Hydroæmia, Poverty of the

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*CANCER is an affection not included within the scope of this work, belonging, as it does, to the department of surgery; yet, as some of my readers may desire to know what kinds of treatment have been pursued for its cure, I will give a list of the principal ones that have fallen under my observation. As may be seen, some of them appear to be active enough to remove almost anything in the form of normal or abnormal tissue, but I wish it to be distinctly understood that I neither recommend them nor vouch for their efficiency.

1. Take a piece of soft leather somewhat larger than the size of the cancer, and in this cut an orifice the exact size and shape of the ulcerated part, as near as possible. Upon the remaining rim of leather, spread some White Turpentine to render it adhesive, and then apply it around the ulceration in such a manner as to have the inner opening exactly fit the margin of the ulcer. Fill up this internal opening upon the surface of the ulcer with fine Brass Filings, and cover this with another piece of leather, upon the marginal circumference of which some White Turpentine has been spread, in order that it may adhere. Every day or two remove this cover, cleanse the ulcer with Castile Soap-suds, dry it, and apply more Brass Filings, cover as before, and so proceed. Whenever the first rim of leather becomes loosened from the skin, apply more White Turpentine to the margin. This "rots out" the cancer with but little or no pain, leaving a simple ulcer to heal. It is supposed to act galvanically from the copper

Blood, etc. This disease is a condition directly opposite to that of plethora, which consists, not as the word "anemia" indicates, in an absolute decrease of the quantity of blood in the system, but in a deficiency in the normal number of its red globules. The normal

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and zinc in the brass; but as some arsenic is usually present in brass, I am disposed to look upon this as the active agent. I know of two cases in which this has effected apparently permanent cures.

2. Take of Solution of Persulphate of Iron, Aqua Ammonia, each, four fluid-ounces, Water a sufficient quantity, say half a pint; mix, and allow the mixture to stand until there is no longer a precipitate; filter through strong muslin, express to remove as much water as possible, and, before the resulting Hydrated Sesquioxide of Iron has dried, add to it enough fresh Lard to form an ointment. When required for use, to four ounces of this ointment add from ten to twenty grains of finely powdered Arsenic, according to the size of the cancer, or the pain, etc., it produces, and rub thoroughly together. A portion of this ointment is to be applied daily, until the whole malignant growth is reduced to a slough, and until a needle can be passed into it in various parts, as far as the healthy tissue, without causing pain or tenderness. Then the slough may be removed by applications of Slippery Elm Poultices. Heal the simple ulcer left by frequently dressing it with Solution of Tannic Acid, and Elm Poultice containing Tannic Acid, which heals the part without granulation and without leaving a cicatrix; being careful at each dressing to remove any "roots" that may be observed on the surface of the ulcer. If any malignancy is observed at any part, the ointment must be re-applied over it, and treated as before. Should an erysipelatous redness occur around the cancer, or should much pain be produced while using the ointment, the quantity of arsenic must be reduced. If the cancer is not open, the cuticle may be removed by Cantharidal Collodion, before applying the ointment.—This is stated to have effected numerous cures of cancer without pain, and "taking it out by the roots," and I know of several in which apparently thorough cures were effected; but in large, extensive, or long-standing cancerous ulcerations, it generally fails. A cure by this method requires from two to six months, as the process is a gradual one. Some persons who have built up a considerable reputation for curing cancers, employ, in conjunction with this treatment, a Solution of Potassio-tartrate of Iron, or Fowler's Solution internally.

3. Take of finely-powdered hard wood Soot two ounces, Belladonna Ointment two ounces; mix thoroughly together, and then add of finely-powdered Arsenite of Copper from sixteen grains to an ounce. The quantity of Copper salt to be added will depend upon the sensibility of the patient, as no pain must be caused by the application; the quantity must also be regulated by the extent of surface of the cancerous ulcer. A portion of this ointment spread upon cotton batting is to be applied to the ulcer daily.

4. Triturate thoroughly together a drachm, each, of Sulphate of Iron, Sulphate of Copper, Nitrate of Potassa, and from five to ten or twelve grains of Arsenic. Mix the compound with enough White Turpentine to form a plaster, of which a small quantity spread upon lint or linen rag is to be applied upon the cancer, repeating it every day or two, and continuing its use until the disease has been removed by it. After which heal the simple ulcer left by the ordinary means, or by applications of the following ointment, viz.: Take of Rosin eight ounces,

medium of these globules in the blood is 127 out of every 1000. These may be lessened to 113, and even still lower, and not be incompatible with health; but when they reach 80 and below, then we have the disease under consideration, and its seriousness will be

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Beeswax four ounces, Lard six ounces; melt these together, strain, and add of finely-powdered Subacetate of Copper half an ounce.

5. File down a silver twenty-five cent piece, dissolve it in Nitric Acid two fluid-ounces, and then add enough powdered Sulphur to form a plaster. Apply this to the cancer, repeating the application every two hours. Three or four applications are said to be sufficient to destroy the cancer, which may then be removed by "poulticing."

6. Mix together Red Oxide of Iron one ounce, Arsenic one scruple. When to be used, mix a small portion with the yelk of an egg, and spread it thinly on oil silk or bladder. If the cancer has not ulcerated, the skin must be removed before applying the above, by means of Cantharidal Collodion. The application should be renewed every day until a slough is formed, which may be removed by poultices. If too much pain is caused, remove the plaster for a time, and apply anodyne cataplasms.

7. Make a strong ley of the ashes of Red Oak Bark, and evaporate this to the consistence of a thin extract. Cover the cancer with this, and allow it to remain on an hour; then remove, and apply a plaster of common Tar, which may remain on for a couple of days. Then, after removing the dressings, should any portion of the cancer remain, re-apply the caustic alkaline plaster, and pursue the same course as before, repeating it until the cancer is cured. The simple ulcer left may be healed in the ordinary way. This is very painful.

8. Take of Red Oxide of Iron, Animal Charcoal, each, one ounce, Digitalis, Sulphur, each, half an ounce, Balsam of Canada a sufficient quantity to form a thin plaster. Spread a small quantity of this upon a linen cloth, apply it over the whole surface of the ulcer, and cover with a common tar plaster. Repeat these applications daily, until the cancer is destroyed; no pain follows its use.

9. Take of recent Marygold Flowers and Leaves, recent Red Clover Flowers and Leaves, Bloodroot, Digitalis, each, in coarse powder, half an ounce, Carbolic Acid four ounces, Glycerin eight ounces; mix the articles together, and allow them to stand fourteen days. Apply some of this, on lint, to the cancer every day. Said to be also useful in lupus and other cutaneous diseases.

10. Take of Extract of Arrow Wood (*Viburnum Dentatum*), Extract of Marygold Flowers and Leaves, Extract of Red Clover, and Extract of Wild Indigo Leaves and Bark of Root, each, equal parts; mix, and form a plaster, which apply on linen to the ulcer, cleansing it daily. Internally, use the following: Take of Salt of Tartar one ounce, Cream of Tartar four ounces, Water two quarts; mix. The dose of the solution is a wineglassful three times a day.

11. Take of Sulphate of Zinc, Sulphate of Copper, each, one ounce; Sulphate of Morphia, one drachm; mix thoroughly together. To use it, mix a sufficient quantity with white of egg, and apply. It is quite painful.

12. To an Aqueous Extract of recent Sassafras Bark, add a few drops of Nitric Acid, until a froth or foam is formed; spread this on a piece of lint, and apply twice a day. Previous to each application, wash the ulcer with a mixture of equal parts of brandy and honey. This will not act on the healthy tissue but only on the cancer; and when this is destroyed, heal the ulcer with,—Sweet Oil

in proportion to the amount of diminution of the globules of the blood. Anemia is, therefore, due to a clear, watery, viscid state of the blood, in which it forms, if at all, a small, soft, diffluent clot; or, in other words, the blood contains an excess of fluid, and a diminution of red corpuscles and iron. Poverty of blood is the most appropriate term for it. Chlorosis is a well-marked form of anemia in females, associated with amenorrhea.

The exciting *causes* of anemia are various; it is frequently produced by copious losses of blood; imperfect nourishment; continued profuse discharges; unhealthy diet; glandular diseases; impure air; excessive fatigue; want of rest; malarious atmosphere; privation of sunlight; and whatever exhausts or depresses the vital and nervous powers. The existence of an anemic condition may permit disease to occur, which would not have done so under opposite

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one pint; Beeswax, one ounce; melt together, and when nearly cold, add Nitric Acid, half an ounce. Apply this once or twice a day, at the same time using the above wash between the dressings.

Chromic Acid,—Oxalate of Copper or of Tin, dissolved in a solution of Oxalic Acid,—Sulphate of Zinc,—Chloride of Zinc,—Inspissated juice of Sheep Sorrel,—Solution of Binoxalate of Potassa, etc., have all been recommended.

Fell's cancer plaster is prepared as follows; Take of Chloride of Zinc three ounces, finely-powdered Bloodroot, one ounce, Bayberry Wax half an ounce, Extract of Conium, Watery Extract of Opium, each, three drachms. Mix together and form into an ointment. Remove the skin by Cantharidal Collodion, and apply this to the raw tumor; when it forms an eschar, cut lines or furrows in this, about half an inch apart, being careful not to injure the healthy tissue, and then continue the application of the plaster. He uses this alternately every twelve hours, with the following: Take of Glycerin two drachms, Spermaceti Ointment four ounces, Iodide of Lead two scruples—mix, and form an ointment. Apply this over the ulcer every alternate twelve hours. In conjunction with these, he gives the following pills internally: Take of pulverized Bloodroot two scruples, Iodide of Arsenic four grains, Extract of Cicuta four scruples; mix, divide into eighty pills, of which one pill is a dose, to be repeated three times a day.

Another agent said to be useful in cancer is the following: Take of Manganic Acid, Arsenious Acid, each, half an ounce; Charcoal two drachms; Extract of Belladonna six drachms; mix together, and form a plaster. Carbolic Acid has recently been found to destroy cancer cells under the microscope; when applied to the parts affected it is said to relieve pain very much, destroy the fetor, and to bring about healthy action. It may be used in combination with Citric, or Acetic Acids. It has been applied to cancer and other malignant formations in the following combinations:—1. Take of Carbolic Acid forty-five minims, Alcohol half a fluidounce, Water one pint; mix. 2. Take of Carbolic Acid one part, Pyroligneous Acid of 8°, four parts, Water fifteen parts; mix. It may also be variously combined with Acetic Acid, Glacial Acetic Acid, Solution of Citric Acid, Sulphate of Zinc, Sulphate of Iron, etc. Perchloride of Iron, used locally and internally, has been found very effectual in some cases of malignant growths.

circumstances; while, in other cases, its presence is a symptom or indication of various lesions. It is almost always present in an advanced stage of malignant diseases, and is frequently found associated with several chronic maladies.

The principal *symptoms* of anemia are, a waxy paleness of the surface, and pallor of those mucous membranes adjacent to the skin, as the lips, tongue, inside of the mouth, conjunctiva, etc.; the pulse is feeble, small, slow, irregular or intermittent, but easily accelerated upon mental or physical excitement; languor; debility; bowels irregular, flatulent, and often acidity of stomach; appetite deficient; a sense of sinking, of suffocation, or of syncope, with more or less palpitation on exertion, and, in some cases, upon assuming the erect posture; respiration short, hurried, oppressed, and sometimes gasping; vertigo; tinnitus aurium; nausea, or vomiting; and œdema of the lower extremities, especially about the ankles. Not unfrequently a very obstinate headache will be present. The greater part of all these symptoms will be present in well-marked cases of anemia. The urine in anemia is clear and pale, contains less urea, uric acid, and fixed salts than the normal urine, is of low specific gravity 1010 to 1018, and, as a general rule, deposits no sediment, unless associated with some functional or organic lesion.—Auscultation will detect a peculiar murmur or blowing sound in the jugular vein, which is often co-existent with distinct carotid impulse, which may be interrupted by pressing upon the vein above the location of the stethoscope, and which is increased by any cause that accelerates the flow of blood through the jugular vein. This sound is termed *bruit de soufflet*, *bruit de diable*, or *venous hum*. Auscultation over the heart will detect a murmur at its base, and occurring with the systole.

Anemia may not only be a symptom of, but often gives rise to, hysteria, epilepsy, syncope, palpitations, nervous tremors, diarrhea, gastralgia, colic pains, worms, hemorrhages, as well as atrophy and softening of several of the internal viscera. It may terminate life by symptoms of exhaustion; by a convulsion; by symptoms of effusion on the brain, or in the pleural or pericardial cavities; and, in very unfavorable cases, the patient may have a fatal attack of syncope on suddenly assuming the erect posture.

Dr. Wilks has recorded several cases of a new disease, which he has termed *anemia lymphatica*. The essential features of the disease are, the most extreme pallor of anemia, enlargement, with often pain of one or more of the various groups of lymphatic glands, either internal or external to the body, as, the cervical, mediastinal, bronchial, lumbar, and inguinal, etc., and a peculiar

morbid condition, with occasional enlargement of the spleen; the last depending upon the deposition of an opaque, white, lardaceous material, in isolated masses, or diffused throughout the substance of the organs, and resembling bacon-rind. The disease has been mistaken for scrofula from the glandular enlargements present; may occur at any age, and after two or more years, or as soon as the thoracic and abdominal glands become involved, prostration gradually takes place, followed by death. The disease, thus far, has invariably proved fatal. There is a deficiency of red globules in the blood, and the "anemic bruit" is present; œdema or anarsaca may also exist. (*See Leucocythemia.*)

The *prognosis* of anemia, as a general rule is favorable, except when it is complicated with other diseases, and then much will depend upon the nature of the accompanying lesion, and whether the anemia is its cause or effect. Frequently, when anemia exists as an effect, an attention to the condition of the blood, improving it, will permit a cure of the original disease by treatment which had previously proved of no avail. A long-standing anemia may give rise to lesions which are incurable, even though the original malady, the state of the blood, may be greatly improved. If to the pale urine of an anemic or chlorotic patient, we add one-fourth its bulk of strong nitric acid, and then boil it, and it assumes a red or deep mahogany hue, it is an indication that the blood corpuscles are being too rapidly consumed, that the life's blood is oozing away by the kidneys—as shown by the excess of urohæmatin (red blood-coloring matter) in the urine. In these cases, although fed well, the patient loses flesh, because the blood-coloring matter is fast passing away.

In some of these obscure cases, if we boil four ounces of the urine with one ounce of nitric acid, so as to set all the coloring matter free, and then, when cold, put the urine into a six ounce vial along with an ounce of ether, cork it, thoroughly shake it, and let it stand for twenty-four hours,—the ether, having taken up the urohæmatin, will be found solidified into a red, tremulous currant jelly-like mass, which may sometimes be cut with a knife. In the worst form the urine is neutral or even alkaline. Sometimes the nitric acid will merely change the color of the urine to yellow, while sulphuric, or hydrochloric acid will develop the red color. Excess of urohæmatin is an unfavorable symptom, though, when properly treated and taken in time, most cases can be cured. (*G. Harley.*)

The *pathological appearance* of those who die from anemia, are, more or less paleness of the tissues of the various organs, espe-

cially the heart and blood-vessels; in long standing cases, the heart may be atrophied, with softening of its substance. Serous infiltrations may also be observed in some of the cavities, and in the cellular tissue.

The *treatment* for uncomplicated anemia, consists in the administration of some preparation of Iron, with nourishing diet, well-regulated exercise, and attention to the bowels, kidneys, and skin. And it must be recollected that the red corpuscles require a greater length of time for their restoration, than any of the other constituents of the blood. But iron alone will not always prove successful, or, it may produce benefit to a certain point at which the disease subsequently remains stationary. In such instances, other additional agents will be required. Very frequently, the addition of Manganese to the Iron will promptly act, effecting a regeneration of the blood, and a permanent cure. Pills of Carbonate of Iron and Manganese; Pills of Iodide of Iron and Manganese; or, Syrup of Iodide of Iron and Manganese, will prove very efficacious. And, if there should be, at the same time, a great deficiency of nervous power, Alcoholic Extract of Nux Vomica, or Strychnia, should be administered in conjunction with the Iron, or Iron and Manganese preparations, or, the Citrate of Iron and Quinia with Strychnia may be preferred.—Tannic Acid, administered internally, will frequently be found to improve the blood in anemia, hence, the efficacy of alterative syrups, etc., in which the barks, roots, etc., contain tannic acid.

If diarrhea be present, Sulphate of Iron, Tincture of Chloride of Iron, Perchloride of Iron, etc., may be given. If much nervous irritability and wakefulness, Valerianate of Iron, or, the iron may be combined with a sedative, and, in many cases, where there is an excessive nervous impressibility, Hydrocyanic Acid, or the Oil of Bitter Almonds will be found of great utility; however, I prefer the latter as being less liable to decomposition than the acid.—If struma be present, Iodide of Iron, Bromide of Iron, Elixir of Iron and Cinchona, and similar preparations may be used. In many instances, especially where there is nervous debility with diminution of mental activity, Hypophosphite of Iron, with or without the addition of Hypophosphite of Soda, or of Potassa, will be found very valuable; or, Procter's Compound Syrup of Hypophosphites, may be used. The Pyrophosphate of Iron and Soda has also been highly recommended as a valuable preparation, not liable to be precipitated, or transformed into an oxide when taken into the stomach; it is given in solution, is easy to administer, rapidly absorbed, and does not produce fatigue to the digestive organs.

These same agents may also be employed in cases of excess of urohæmatin in the urine.—Chlorosis will not only require ferruginous preparations, but also uterine tonics to overcome abnormal conditions of the uterus, as, Alcoholic Extracts of Black Cohosh, Blue Cohosh, Aletris, Senecio, etc.; aided frequently by Iodine, Bromide of Potassium, or other alteratives, together with counter-irritation, and all the necessary measures required to combat various abnormal symptoms that may present themselves.

When the anemia is complicated with functional or organic lesions, these must be combated with the proper treatment for them, in conjunction with the means used to overcome the anemic condition of the patient.

LEUCOCYTHEMIA.

This is a morbid condition of the blood, consisting in a marked increase of the white globules, which imparts a reddish-gray tint to the blood, the same as is observed in the blood of the splenic vein, which, in health, always contains a great excess of colorless corpuscles; it was first discovered by Professor J. H. Bennett, of Edinburgh, Scotland, who subsequently gave to it its present name, meaning, "white cell blood." Men appear to be more liable to this affection than women, though no age or sex is wholly exempt from it.

The *causes* of leucocythemia are still a matter of speculation. It exists in combination with disease of the spleen, liver, and lymphatic glands. The spleen, in this affection, appears to be more commonly diseased than the other organs, being enlarged to such a degree that its weight may be found to vary from one to eight or nine pounds. It is also met with in affections of the thyroid gland; though it must be recollected that hypertrophy, malignant or non-malignant disease of these several blood-glands, may exist, without the presence of leucocythemia. This morbid condition of the blood can not, therefore, be characteristic of any special affection, but constitutes a symptom of various lesions. Anemia differs from leucocythemia in consisting of a diminution of the red corpuscles, while the latter consists in a great increase of the white corpuscles of the blood.

The *symptoms* are paleness or dinginess of the surface, and of the conjunctiva, a cachectic appearance, with more or less enlargement of the spleen, liver, lymphatic glands, especially those of the axilla, the neck, the abdomen, etc., and of the thyroid gland. Bronchocele is sometimes accompanied with leucocythemia. The

enlargement of the spleen, and liver, will give rise to a tumor which in some cases may extend from the ribs to the groin, and from the spinal column to the umbilicus. The tumor is hard, dull on percussion, and painful on pressure over one or several parts of it. In connection with these, there will be several of the following symptoms: diarrhea, dysentery, hurried and difficult breathing, giddiness on assuming the erect posture, ringing in the ears, lassitude, more or less debility, sometimes emaciation, slight transitory pains in the abdomen, or in the hypertrophied glands, the anemic bruit or bellows murmur may be heard over the heart and large vessels, epistaxis, or hemorrhage from the gums or from internal organs, and sometimes œdema or ascites. The appetite may remain good, the bowels continue regular or become costive, the tongue clean or furred, dry and brown, pulse small and weak, from seventy-five to one hundred, and the urine healthy, or, especially when ascites is present, scanty, turbid, and loaded with urates, or phosphates.

But in order to satisfactorily determine the character of the affection, we must not rely upon these symptoms only, but must institute a microscopic examination of the blood itself, a drop of which may be obtained by pricking the finger with a needle; it should be placed immediately upon a glass slide, covered with thin glass, and be examined under a power of at least three hundred diameters. The colored and colorless corpuscles will be seen rolling confusedly together, but the latter will be greatly in excess; instead of being in normal amount, about one to fifty of the colored, they will be found varying from one to ten to one to two. The colored globules usually collect together in rolls, while the colorless ones fill up the intervening spaces. If a drop of acetic acid be added to the drop of blood, it will render the cell wall of the colorless corpuscles very transparent, bringing into view the nucleus, consisting of a single round or oval body in some, and, in others, consisting of two, three, or even four nuclei, each having a central depression or shadowed spot, and, in some instances, the nuclei will be crescentic or horseshoe form.

The *prognosis* in well-marked cases of leucocythemia associated with distinct glandular enlargements, is decidedly unfavorable; and, though in the less-marked cases, considerable improvement may take place under treatment, it is still doubtful whether any permanent results have been obtained. The patient may die suddenly, even when we are congratulating ourselves upon his apparent improvement, or he may die in a state of delirium, or from hectic fever and gradual exhaustion, In some cases, treatment has so far

improved the condition of the patient as to prolong his life for several years.

The *pathological appearances* observed in leucocythemia, are, grayish or cream-colored clots in the heart and large veins, exhibiting great numbers of white corpuscles, and usually more or less crystals (hematoid) of rhomboidal form, yellowish, and soluble in acetic acid. Distension of some of the large veins; simple hypertrophy of the spleen or liver; or enlargement of the lymphatic glands in the groin, axilla, bronchii, mesentery, etc. Sometimes the liver will be found cirrhosed, or cancerous; and when the lymphatic glands are enlarged, they are soft, present a granular-whitish appearance when cut into, and yield a copious turbid fluid on pressure, which is crowded with corpuscles. Occasionally these glands will be indurated, containing calcareous, tubercular, or cancerous deposits. In a few cases, Peyer's glands, and the thyroid gland have been found hypertrophied. These are the chief appearances, although other abnormal conditions may be met with according to the particular lesion or lesions with which the leucocythemia may be associated.

The *treatment* of this affection consists in the administration of preparations containing Iron, Manganese, and Nux Vomica, in conjunction with Bromide of Ammonium, Iodide of Ammonium, Hypophosphite of Ammonium, or, Nitrate of Ammonium. Indeed, the constitutional treatment named under Anemia, appears to be likewise proper in leucocythemia. For the hypertrophied condition of the organs, Nitro-hydrochloric Acid, White Liquid Physic, Podophyllin, and a nutritious but moderate diet, are the means to pursue; aided by currents of electro-magnetism through the hypertrophied organs, and hypodermic injections of a dilute solution of Chloride of Gold and Soda in their immediate neighborhood. A pill composed of Oleo-resin of Blue Flag, Oleo-resin of Prickly-ash Bark, Baptisin, each, one grain, and Peroxide of Iron, a sufficient quantity to form a proper consistence for a pill, may be given for a dose, and be repeated three or four times a day, or so as to fall short of purgation; and this, in conjunction with Procter's Compound Syrup of Hypophosphites, will frequently be found a very valuable treatment. The preparation referred to under the treatment of Chronic Peritonitis, composed of Blue Flag, Black Cohosh, Soluble Pyrophosphate of Iron, Glycerin, Water, etc., may frequently be of immense benefit; in two cases, I used it with most excellent results.

Exercise in the open air, but not to fatigue, and frequent bathings and frictions of the skin, are also necessary; and, in cases of diar-

rhea, or hemorrhages, astringents will be required, especially those from among the ferruginous preparations; or, Tannic Acid, Gallic Acid, etc. The principal indications being to remove or palliate any urgent symptoms, or complications, and to support the vital powers.

CACHEXIA AFRICANA.

Negro Cachexy is a disease of the nutritive functions, presenting chlorotic symptoms, but which differs from Chlorosis, as males and even children become attacked with it. It is peculiar to the southern and West Indian blacks.

It appears to be *caused* by grief, despondency, harsh treatment, improper or unhealthy food, severe labor, bad nursing of children, indolence and inaction, etc.

The *symptoms* are a depression of spirits, in which the patient indulges, and for the indulgence of which he seeks solitude, he appears drowsy, is inactive, greatly enfeebled, and has neither the inclination nor the ability to labor. The least exertion produces hurried or difficult breathing; the appetite becomes lost; there is a constant gastric pain; gastric acidity, with a desire to eat absorbents or alkalies, as, earth, chalk, etc.; palpitation; pallid countenance; tongue coated white, and its body pale, with dark, ink-spots upon its surface; the conjunction white and shining; the skin cold and of an olive hue; œdema of the face, lids, and extremities; white or clay-colored stools; scanty urine; and a small pulse, more accelerated toward the close of the day. If there is an effusion of serum in the abdomen or in the chest, breathing can be performed only in the erect position. With the advance of the disease the lymphatic glands become indurated and inflamed; the liver enlarged and hard; the red globules of the blood are diminished; and sudden death occurs, by asphyxia.

In the *treatment*, a generous and nutritious animal diet must be pursued; and the body should be frequently bathed with a mixture composed of Salt one drachm, Tincture of Capsicum half a fluidounce, Vinegar, and Water, each, two fluidounces. Daily moderate exercise is necessary; frictions over the surface; warm clothing; and regularity of bowels. Cheerfulness should be encouraged. Pork, damp, cold, or night air, and fatiguing exercise, must all be avoided.

To restore the blood to a normal condition, chalybeates should be given, as, Iodide, Carbonate, or Pyrophospate of Iron, Reduced Iron, etc. When the urinary organs become torpid, stimulating

diuretics will be required, as, the Compound Infusion of Parsley, Compound Infusion of Trailing Arbutus, etc.

Negroes frequently present very strange and peculiar symptoms, which they attribute to poisoning or witchcraft, and many of which cannot be accounted for. I have treated many such cases successfully, by the administration of one or two teaspoonfuls of a mixture of powdered Rock Salt two parts, Capsicum one part; the dose should be given every two or three hours, and be accompanied with external means to cause a profuse perspiration. This course should be repeated every day or two, until a cure is effected.

CHRONIC DISEASES OF THE RESPIRATORY SYSTEM.

THE diseases of this system, include those of the nares, larynx, trachea, and lungs, and which are very common to this country, both in the acute and chronic forms. The many methods that have been recently devised for correctly diagnosing these diseases, and for enabling the practitioner to more directly inspect and make applications upon the tissues of the affected parts, have rendered them much more amenable to treatment than has been the case in past years. These methods are, examinations by means of the rhinoscope, the laryngoscope, percussion, auscultation, etc.; and, for the following remarks upon the laryngoscope, I am chiefly indebted to its discoverer, Czermak; to Dr. Gibb, who has devoted much attention to the use of the instrument, and has also published a valuable work on Diseases of the Throat and Windpipe; to Dr. G. Johnson, etc.

The LARYNGOSCOPE consists of a small mirror of steel, speculum metal, or glass, attached to a flexible metallic stem, which is fixed into a handle of wood, ivory, or ebony. The mirror, of which each practitioner should possess several, is of various forms and sizes, being circular, quadrangular with the angles rounded off, oval, or elliptical, and from three or four lines to an inch and a half in diameter. In consequence of the rapidity with which steel mirrors tarnish, glass and metallic mirrors plated with gold or silver, are preferred; though, if attention be paid to the proper cleaning of the steel ones, immediately after use, they may be preserved for a long time. The laryngeal mirror is inclined upon the stem at an obtuse angle, which, however, may be altered to any angle whenever this is desired. The angle at which the mirror is placed upon the stem, should be such that when inserted beneath the palate, it reflects the light thrown upon it into the larynx, and at the same time reflects back an image of the larynx to the eye of the observer. A

circular or quadrangular mirror, an inch in diameter, is the most convenient for general use.—Whenever the laryngeal mirror is to be used, it should be warmed over a spirit lamp, before introducing it into the mouth, in order to prevent the dimming of its surface by the patient's breath; exposing, not the back, but the surface only of the mirror to the flame, and estimating its temperature by by applying the back of it to the cheek or temple, in preference to the hand. The mirror should not be heated too much, as it will burn the patient's mouth, and, if it be a glass one, will have the silvering spoiled; the temperature, however, should be as high as can be conveniently borne by the person to be examined.

To use the mirror requires an illumination of the throat, and this is effected by reflecting the light from the sun, or from a lamp into the throat by means of a concave mirror or reflector, three or four inches in diameter, and possessing a focal distance of ten to fifteen inches, and which is fixed either in front of the right eye of the examiner, between the two eyes, or upon the forehead; the latter position is generally preferred. When artificial light is employed, another reflector should be placed behind the lamp. The reflecting mirror to fix upon the forehead, and the laryngeal mirrors can be had at any surgical instrument maker.

The person to be examined should be seated on a chair, to the right of a table, with the lamp near his left elbow, and a little behind him. His mouth should be on a level with the nose or eyes of the examiner, and the flame of the lamp should be on a level with, or even a little higher than the operator's eyes. The light should be brilliant and steady. The operator, sitting directly in front of the person to be examined, arranges the reflector on his forehead, or in front of his eye, etc., as he prefers, and, desiring the patient to open his mouth as wide as possible, and to incline his head forward and slightly upward, directs the rays of light from the reflecting mirror through the mouth to the back of the pharynx. This illumination having been regulated, the warmed laryngoscope is now passed rapidly over the tongue, but without touching either it, the teeth, lips, or back part of the pharynx, though it is gently applied against the middle of the soft palate and uvula, in order to elevate them. The light from the reflecting mirror striking upon the laryngoscope, the patient quietly breathing as usual, and the laryngoscope being placed at the proper angle, the parts will be seen in the following order,—it being borne in mind that the objects as seen in the laryngeal mirror, are reversed from before backward;—the back or postero-inferior portion of the base of the tongue with its large follicles; the fossæ at its base, or valleculæ,

also called the glosso-epiglottic sinuses, being situated on each side of the frænum or glosso-epiglottic ligament, and becoming shallower as they proceed laterally,—these sinuses are very apt to be diseased; the epiglottis,—its apex and largyneal surface; the posterior part of the cricoid cartilage, with its mucous membrane; the pharynx; the arytenoid cartilages with their apices; the cartilages of Santorini; the aryteno-epiglottic folds, or ligaments, with the cartilages of Wrisberg in the negro; vestibule of the glottis; superior thyro-arytenoid ligaments, or false vocal cords; ventricles of Morgagni; and the true vocal cords, or glottis.

The operator should practice the introduction of the laryngoscope with either hand, resting the little finger of the hand employed upon the cheek of the patient. If sunlight be used, the patient should sit with his back to the sun, and the rays should not be concentrated to a focus, lest a heat sufficiently great to burn the larynx be produced. The measures recommended will, of course, have to be modified by the image we obtain, and by the circumstances; thus, the laryngoscope may have to be advanced or withdrawn a little, or bent at a more or less obtuse angle, or a change may be required in the position of the lamp, or in the position and attitude of the patient, etc. For applying remedies, or performing delicate operations, the mirror must be introduced with the left hand, so that the right may be employed as circumstances require; and the patient must be instructed to manipulate his own tongue while the operation is being performed.

If the laryngeal mirror comes in contact with the tongue especially, or with the back part of the pharynx, which are the most sensitive parts within the mouth, cough, retching, dyspnœa, and other unpleasant symptoms may be produced, so that it is absolutely necessary to avoid contact with these parts in order to secure a satisfactory examination. But some persons can not keep the tongue advanced and flattened or depressed, but will throw it upward toward the roof of the mouth, just as the mirror is being introduced, and thus present a serious obstacle to the examination. This is generally due to a nervousness on the part of the patient, and is sure to be made worse by any petulance in, or cross remarks of, the operator. This may be overcome in several ways; by depressing the tongue with a spatula; by having the patient himself lay hold of his tongue with a napkin or handkerchief held between his thumb and forefinger, and gently but firmly hold it outward and downward, at the same time opening his mouth as wide as possible, and strongly calling his will into action that he may not thrust the tongue upward nor close the mouth. In some instances it will be

necessary to educate the parts, as it were, in order to allay nervousness and irritability; this can be effected by having the patient practice before a looking-glass, opening the mouth wide and keeping it so, while he flattens and depresses the tongue, pulls it forward, and frequently places it in contact with foreign bodies; the physician should also attempt the introduction of the laryngoscope every day or two. Several trials of this kind will eventually overcome the difficulty.

In all cases where it is required to examine the throat and fauces, using the tongue spatula, no satisfactory examination can be made, unless we can persuade the patient to open his mouth and breathe quietly through the mouth, and *not through the nose*, while the spatula rests on the tongue, and to effect which the patient's nose may be closed. He should not hold his breath, nor breathe more slowly or rapidly than usual, but should be requested to breathe quietly and as usual. If inspiration be effected through the nose, the tongue is raised and closes the mouth so that the pharynx can not be seen; if it be effected through the mouth, the back part of the tongue falls or remains down, and the uvula is somewhat elevated, so as to present a clearer view of the back part of the throat. A broad spatula should always be employed, carrying it as near to the root of the tongue as possible, without exciting much irritation; and the lips should be widely expanded, so as to permit the light to freely enter the throat.

An unusual sensibility of the fauces from inflammatory congestion, may be overcome by directing the patient to hold a lump of ice in his mouth for ten or fifteen minutes before the examination, and as the ice melts to swallow the cold water. Or, twenty drops of Chloroform placed on a handkerchief and inhaled, will quiet the most irritable throat without producing discomfort or drowsiness. Prof. Semeleder applies a solution of Morphia in Chloroform to the fauces, and to the internal wall of the larynx, by means of a curved brush, in order to lessen the sensibility of these parts, and permit the use of the mirror, as well as the introduction of instruments within the larynx. In some cases an astringent and soothing gargle, used for a day or two, or anodyne vapors directed upon the fauces will be found sufficient.—Generally, the tongue will come more under control after two or three sittings. And it will be found that the repeated introduction of the laryngoscope at intervals of a day or two, will have the effect of lessening the sensibility of the throat, so that after a short time the most sensitive throat becomes tolerant to the instrument.—An examination of the larynx may become difficult or impossible, from enlargement of the ton-

sils, elongated epiglottis, or where it is so pendent as to prevent the light from being thrown beneath it, and also where there is a great contraction of the arch of the epiglottis. More failures in examining the larynx occur among children than among adults.

Autolaryngoscopy, or where one can examine his own throat, requires the aid of different reflecting mirrors, etc.; Czermak's autolaryngoscope is well adapted for this purpose. But it is not my design to enter into an explanation of this; those of my readers who have some curiosity to examine their own vocal apparatus are referred to the several works on this subject already issued.

Laryngoscopy, as well as rhinoscopy, requires a good anatomical knowledge of the parts about the nose, throat, and larynx. And the student can become quite proficient in laryngoscopic examinations if he will educate himself to the operation, by examining the throats and vocal cords of all his male and female friends, old and young, as far as possible; studying their shape, position, color, and movements in health.

The parts observed by the laryngoscope present the following peculiarities in health: the *epiglottis* is an oval, or sub-triangular shaped cartilage, of a pale salmon, buff, or crust-of-bread color, convex below, and somewhat concave above, situated at the base of the tongue, usually nearly erect, projecting about half an inch high, immediately above the entrance into the windpipe, forming an angle of from 60° to 80° with the upper part of the laryngeal aperture; in some throats it can be seen by the unaided eye, by depressing the tongue. Its mucous membrane is more or less injected, though sometimes pale, with some clearly defined red vessels ramifying over its surface. The *glosso-epiglottic fold*, or ligament, is a vertical fold or frenum between the tongue and the epiglottis, in the median line of the body, composed of elastic tissue, and readily seen with the largyneal mirror. The epiglottis is also attached to the hyoid bone by means of a thin ligament, the *hyo-epiglottic*. It is also connected, at its apex or inferior extremity, through a long, slender, elastic cord, to the receding angle or pomum of the thyroid cartilage, immediately beneath the median notch, and above the attachment of the vocal cords; this cord is termed the *thyro-epiglottic ligament*. On every side, anteriorly, laterally, and posteriorly, the epiglottis is connected with the tongue, pharynx, hyoid bone, and arytenoid cartilages by means of folds of mucous membrane, which are named individually according to their particular attachments. The most important of all these are the *aryteno-epiglottic folds*, within which are muscular fibers, which help to draw down the epiglottis with or without the cognizance of the will.

When the *glosso-epiglottic* fold, from cold, cynanche, follicular disease, etc., becomes lax, losing its power of contraction to draw up the epiglottis, the surrounding mucous membrane being deficient in firmness and elasticity, and discharging a quantity of fluid from its follicles, the epiglottis will be more or less pendent, sometimes to such a degree as to render a laryngeal inspection impossible; it is important, therefore, always to observe its degree of erection or pendency. Again, the *aryteno-epiglottic folds*, with their muscular fibers, may often act so spasmodically as to keep the epiglottis permanently backward. The elasticity of the epiglottis may also be permanently destroyed in many cases, occasioning a greater or less degree of pendency, and giving rise to a thick, guttural voice; again, it may be, at the same time, in a congested condition, occasioning dyspnœa, a sensation as if some foreign body were lying at the back of the tongue, constant efforts to clear the glottis, and to swallow, and a fear of suffocation.

When we desire to render the field of vision in the interior of the larynx and of the trachea broader, we must separate the epiglottis from the posterior wall of the pharynx; this may be accomplished by requesting the patient to utter the sounds *ah* or *eh*, so as to give a convenient position to the base of the tongue. The complete emision of the vowel *e*, elevates the base of the tongue to the point of entirely covering the laryngoscope; but it does not do so when we only desire to pronounce the vowel, *without* actually pronouncing it,—the mere attempt sometimes suffices to bring about the wished-for result.

In health, the interior of the larynx above the glottis is of a pale rose color. The *glottis* is a fissure, running in an antero-posterior direction and which is formed by the true vocal cords; it is of triangular shape, but may be oblong, lanceolate, elliptic, lozenge or barrel-shaped. It may be extremely movable, or but slightly so. If the patient pronounces the syllable *ah* or *eh*, in a prolonged or short, or high falsetto note, the glottis will be seen to close, and the vocal cords vibrate with the impulse of the expired air. If the above syllable be successively repeated a few times, the glottis will be seen to open for inspiration, and close during the utterance of sound. The latter is the test of integrity, and permits an appreciation of the amount of approximation which the vocal cords undergo.

As soon as one desires to utter a sound, the two arytenoid cartilages raise themselves in the fold of mucous membrane which covers them, and approach one another the whole length of their internal surfaces with surprising mobility and complete freedom,

drawing the vocal cords together, rendering them more or less convergent, more prominent, and closing the glottis with great energy. By attention and practice the investigator may master the movements of the arytenoid cartilages, accelerating, retarding, or arresting them, as he may desire.

In quiet breathing, the glottis remains widely open. When the glottis is contracted or closed during pronunciation, the arytenoid cartilages perform very rapid and independent movements. During the emission of sounds from the chest, or of a shrill voice, the epiglottis assumes a different position, and is more or less distant from the arytenoid cartilages. Contraction of the aryteno-epiglottic muscular fibers draws the epiglottis backward, and applies its base or cushion, and then its posterior and inferior surface, upon the closed vocal cords. At this instant the base of the tongue covers all up, and nothing further is seen.

The *vocal cords*, or inferior thyro-arytenoid ligaments, are distinguished by their whitish-yellow, or white color tinged with a shade of gray, from the neighboring parts of a reddish color; their pearly white margins, which vibrate with surprising rapidity with the impulse of the expired air, have a brilliant, somewhat metallic, appearance. Corresponding to their attachments will be observed four yellow spots, indicating the vocal processes, two being anteriorly, and two posteriorly; the latter are larger than the anterior, and are of much value in judging of the movements of the vocal processes, and the tension of the vocal cords.

The *subglottis* is of a pale fawn color which shades off in the trachea into a drab; the thyroid and cricoid cartilages, where not otherwise covered, are white with a tinge of red; the rings of the trachea appear of an almost white color through the transparent membrane, with reddish inter-membranous portions; the parts more deeply situated appear dark. In some persons, the arytenoid cartilages are of a yellowish pink, and those of Wrisberg, (almost always present in negroes), when present, have a yellowish tinge like a small abscess.

RHINOSCOPY is an examination of the posterior recesses of the nostrils, and of the pharyngo-nasal recess, and is much more difficult than laryngoscopy. The laryngeal mirror is used in this, in the same manner as in laryngoscopy, with the exception that its reflecting surface is turned upward. The uvula and soft palate are generally drawn forward, out of the way, by a small hook, which may be attached, on a movable joint, upon the stem of the

laryngoscope. Sometimes the examination can be made without the use of the hook, by applying a small mirror on either side of the uvula behind or below the velum, and which is much the best method when it can be effected, as the hook is apt to excite a contraction of the palate, causing it to completely obstruct the view by drawing upward and backward; this drawing is also effected by a deep inspiration, and may be avoided during the examination by directing the patient to breathe quietly.

The parts that are brought into view by a rhinoscopic examination are, the posterior openings of the nasal fossæ, the three turbinated bones, the septum narium, the roof of the pharynx, and the orifices of the Eustachian tubes. Of course, in order to obtain a view of all the parts named, the mirror will require to be inclined or directed in the proper position.—A rhinoscopic examination should always be made with delicacy and gentleness.

The appearances of the healthy parts seen by a rhinoscopic investigation are as follows: the septum narium is a prominent object, generally of a vivid pink color; the turbinated bones have a pale pink and drab color; but when congested, the blood-vessels are distinctly seen, and have a bluish tinge. The oval trumpet orifices of the Eustachian tubes are usually of a pale yellow color.

In all cases, after an examination of the larynx or nose, the laryngeal mirror should be immediately wiped with a soft sponge moistened with warm water, and then dried and thoroughly rubbed with a soft piece of chamois, in order to prevent it from becoming tarnished. And steel mirrors should always be carefully inspected from time to time, occasionally rubbing them with whiting, soft rotten stone, or the soft, silky feeling part of the ashes of cannel coal, which will not scratch the softest metal. When stained or tarnished they are not fit for use until they are reburnished.

The instruments required in laryngoscopy and rhinoscopy for applying remedies, are, variously curved brushes for the larynx and nose; laryngeal electro-pole, fumigation tube, insufflation tube, porte-caustic, sponge-carrier, and brush; Weiss' fluid pulverizer; Dr. Elsberg's nebulizer, an excellent and cheap instrument for forming spray to be inhaled into the air passages; other spray instruments; Matthieu's irrigator; curved forceps; scarificators for œdema of the larynx; laryngeal syringes; glass bottle with accompanying sliding rod to apply fluids to the nasal cavities by hydrostatic pressure; curved bougies; bistouries; long curved

scissors; Gibb's laryngeal ecraseur; tongue depressors; small sponges; linen napkins, etc.

The remedies employed are, acetic acid; tannic acid; benzoic acid; concentrated nitric acid; chromic acid; tincture of belladonna; tincture of aconite; tincture of sheep laurel; tincture of gelseminum; tincture of oil of stillingia; tincture of geranium; tincture of Indian hemp; tincture of rhatany; tincture of capsicum; solution of atropia; solution of morphia; solution of strychnia; solution of quinia; solution of perchloride of iron; balsam of Canada; glycerin; glycerin one ounce, tannin two drachms, as a useful topical astringent; glycerin one ounce, muriate of morphia, fifteen to sixty grains, as a soothing application in irritable larynx; glycerin and alum; glycerin and perchloride of iron; glycerin and strychnia; glycerin and a solution of nitrate of silver; very dilute carbolic acid; chloroform; alum; sulphate of zinc; chloride of gold and soda; concentrated decoction of golden seal; spirits of turpentine; chloride of zinc; chlorate of potassa; permanganate of potassa; tincture of myrrh; nitrate of silver; iodine; hydrochlorate of ammonia; aluminated sulphate of copper; aralia spinosa; swamp milkweed; camphor; black cohosh; citric acid; horseradish; oil of erigoron; oil of erechthites; oil of lobelia; geraniin; alum root; balsam peru; cod liver oil; sanguinarina; common salt; mullein; tincture of St. John's wort, etc. These are used in the solid, liquid, or gaseous form, single, or in various combinations, and, by inhalation, or by direct application with some one of the instruments referred to above, especially with the brush.

. . . . . "I yet feel it a duty to remark upon the possibility that the larynx may get too much of local treatment. The laryngoscope has brought this organ so completely within our reach that we are all exposed to the temptations of being too meddlesome. We may be too apt to forget that a structural disease, strictly limited to the larynx, may yet be constitutional in its origin, and require a plan of treatment based upon the recognition of that fact. If we can avoid the error to which I have here alluded, the introduction of the laryngoscope will be an unmixed good both to ourselves and to our patients, and it will soon be acknowledged to be one of the most valuable additions that have ever been made to our means of diagnosis and treatment." (*Geo. Johnson.*)

In the investigation of diseases of the thoracic organs, as, the lungs, bronchii, pleura, etc., other methods are had recourse to as

aids in forming a diagnosis; though some physicians rely *almost wholly* upon the evidences which these methods develop, to the exclusion of other signs,—this is entirely wrong, the measures about to be referred to, are indeed valuable, but they should not have an exclusive importance attached to them, nor be relied upon too implicitly,—they should always be received in conjunction with all the other symptoms present, before concluding upon our diagnosis. In no other way will we be enabled to arrive at correct and satisfactory conclusions. No one physical sign has any value in determining particular disease; it may inform us of a morbid alteration existing in a tissue or tissues, but it does not make known the disease producing or accompanying this alteration. Besides, there is no pathological state which is invariably accompanied by any series of physical signs. A safe diagnosis can only be based upon the conjunction of evidence from many sources. The methods referred to are, inspection, palpation, mensuration, succussion, percussion, and auscultation. These modes of examination may be employed in the investigation of the diseases of various other parts of the body, but it is more especially in diseases of the thoracic organs that their utility stands pre-eminent; and, in order to render them available in the diagnosis of disease, the physician must be well versed in them, he must know the particular value of each of them, and must have had an experience in them at the bedside,—for it is here only that they can be learned, and not from books or diagrams.

For the purpose of localizing the physical signs as accurately as possible, it has been the custom to form a topography of the chest by artificially mapping it out into regions; and the boundaries adopted have been different with different observers. The simplest arrangement, and that which is more frequently followed is the one dividing the surface of the thorax into anterior, posterior, and lateral regions. These regions are again subdivided; the anterior, into—the *clavicular*, one on each side; the *subclavian*, one on each side; the *mammary*, one on each side; the *infra-mammary*, one on each side; the *upper sternal;* and the *lower sternal.* The subdivisions of the posterior region are on each side, the *acromial;* the *scapular;* the *inter-scapular;* and the *dorsal.* Of the lateral region, on each side, are the *axillary;* the *lateral;* and the *lower lateral.*

Many other arrangements may be found, each differing, as already stated, from the rest; and any one of these may be adopted by those who desire it, but they had better all be rejected. The simple fact that there are so many arrangements destroys the use of any one—because the only object in making them must be to

facilitate the accurate description of the site of the disease. But as there are numerous plans of topography, the divisions of which differ in their limits, no accuracy of description can be obtained by their use unless we first state, in each case, the author of the arrangement followed; and then it will be necessary to give the definitions, otherwise it will be intelligible only to those who are acquainted with the same author; and at last, some further method of division must be adopted, to indicate how much, and what portion, of any region is affected.

It is of the greatest importance that the terms of science shall be clearly intelligible to as large a number of persons as possible; and hence, whenever it is practicable, they should be based upon universal facts. In the present instance, we have a basis of this kind in the *obvious anatomical points*, such as the clavicle, its two ends and middle; the scapula with its angles and spine; the sternum with its divisions; the ribs with their numbers, their angles, their cartilages, etc.; the axillæ; the nipples; the intercostal spaces with their numbers; and the spaces above and below the bones mentioned. These anatomical points, which are familiar to all, may be taken as the landmarks or fixed points from, and to which, measurements may be made with any degree of accuracy.

In examinations of the chest, the patient should be placed in such a *position* that its walls may be rendered firm and tense, while, at the same time, the patient remains comfortable, and the physician can go through with the examination without any inconvenience. In an examination of the anterior parietes, the patient should sit, as erect as possible, upon a chair or stool, opposite to a good light, allowing the arms to hang loosely by the sides, the head being thrown somewhat back, and the upper part of the body covered with a thin piece of muslin, or else entirely uncovered. When the lateral regions of the chest are to be examined, the patient should be directed to place the hand of the side under examination upon the back part of his head, which raises the arm out of the physician's way, also, to incline the upper part of the body over a little to the opposite side.

In examining the back, he should fold his arms across his breast, lean well forward, and hold down his head.—In some instances the patient may stand, if able to do so, during inspection, palpation, mensuration, and percussion.—If his strength or condition will not permit him to sit in a chair, he may be examined while sitting up, or even while lying, in bed, but this will render it more inconvenient to the practitioner, who will have to observe a little more care in conducting the examination. The room must, during the

investigation be kept quiet; and friction against any part of the stethoscope, either from the patient's or practitioner's dress, or otherwise, must be carefully guarded against during auscultation.

It is not proposed here to enter into a full explanation of the several methods of investigating thoracic maladies, which would occupy entirely too much space, but to briefly refer to several points connected with them, as simple guides to the practitioner. There are so many excellent monographs upon these methods of diagnosing, which should have a place in every medical library, that it would be superfluous to enter into minute details.

INSPECTION requires the chest to be exposed so that its form, size, and movements may be observed. It should be practiced anteriorly, laterally, and posteriorly, and these several conditions of one side of the chest must be closely compared with those of the opposite side. The practitioner will stand at a short distance from the patient, and first take a front view of each region, and then a view in profile. Among females it is better not to expose the upper part of the body all at once, but only those parts in front, at the sides, and back, as we wish to inspect them. Healthy chests are generally of regular form, having both sides symmetrical, and their respiratory movements equal. Deformity of the chest, it must be borne in mind, may arise from other causes than disease of the lungs or pleura, and care should be taken to discriminate between such malformations and those originating from disease.

If there be a *depression or contraction of one portion of the chest*, it may be due to disease of the lung beneath, causing diminished power of expansion, and obliging the chest-wall to sink down upon it, as in tuberculous excavations; or, it may originate from compression of the lung from some cause external to itself—most probably in the pleura—the depressing cause having disappeared, and the chest-wall being allowed to apply itself to the diminished lung, as, after empyema. The depression will appear the greater from the sound lung becoming larger, owing to its having to perform double work.

If there be an *enlargement of one portion of the chest*, it may be due to increased function of the inclosed lung, compensatory to loss of function at some other part; to diseased increase in the size of the inclosed lung, as, in emphysema; or, to an accumulation of some abnormal matter in the chest, as in the case of intra-thoracic tumor, empyema, hydrothorax, or pneumothorax. When this

matter is in the pleural sac, its specific gravity will influence its position.

The *size* of the chest, and any variations in size between the two sides, can not be accurately judged of by the eye; it is more satisfactorily determined by mensuration. Generally, right-handed persons have the right side of the chest somewhat larger than the left, and vice versa.

The *movements* of the walls of the thorax during respiration may, in disease, be augmented or diminished in frequency. In health, the *thoracic* movements predominate in the female, the *abdominal* in the male. If, therefore, the respiratory movements in a male should have the character of those normal to a woman, they would in him indicate disease, and be called "thoracic respiration." If, on the other hand, the breathing movements of a woman should have the character of those normal to a man, they would in her indicate disease, and be called "abdominal respiration." In both sexes the movement of *forced inspiration* predominates in the thoracic portion, and while the chest-wall is elevated, the abdomen actually recedes. This may be particularly observed when the respiration is rendered forced and laboring by disease.

In health, the average number of regular respirations, or expansions among adults, is from 15 to 20 per minute; and, during each respiration, the heart beats about four times. As a general rule, when a pulmonary disease is attended by increased respiratory movements, there is not a corresponding excess in the heart-strokes.

"When disease exists in the chest, if the *thoracic breathing movements are in excess*, the disease is one either interfering with the action of the diaphragm, as in peritonitis, tympanitis, abdominal tumors, or ascites; or in which the difficulty of getting air into the lungs, is so great, that all the muscles of the chest-wall are exerted, to attempt—by elevating it and taking off the pressure from the lungs—to induce the further expansion of these organs and the consequent ingress of air, as, in some cases of bronchitis, (capillary), spasmodic asthma, laryngitis, and the like.

If the abdominal breathing movements are in excess, the disease is one requiring the diaphragm, to compensate, by excess of action, for deficient action in the muscles of the chest,—for loss of the healthy resiliency of the lungs,—or for both; as in pleurodynia, some cerebral diseases, etc.

If the breathing movements are one-sided, it may be due to deficiency on one side, or to excess on the other, or to both,—the excess compensating for deficiency; and these affections may be in the chest-

wall, as, in intercostal neuralgia, in the pleura (*pleurodynia*), or in the lung.

If the movement of expansion is deficient but elevation remains, the loss of power is in the lung, but it may be due to disease of its own structure, as, in phthisis, or, to pressure from without, as, in consolidation from the pressure of interpleural fluid.

If the expiratory movement is undue in length, the disease is one offering an impediment to the escape of tidal air from the lungs which may be due to actual obstruction in the tubes, or to loss of power on the part of the lung to contract upon the air and expel it. Thus, it occurs in bronchitis, in tubercle, and to its greatest extent in emphysema.

If the respiratory movements are excessive in rapidity, it may be due to any disease preventing the full expansion of the lungs at each inspiration, whence an attempt is made to compensate the loss of quantity by increased rate; or to imperfectly aërated blood, or to any disease increasing the rapidity of the circulation, whence an attempt is made to supply air to the blood at a rate proportionate to the demand.

If both thoracic and abdominal breathing movements are deficient, it is due to a combination of diseases interfering with the action of the diaphragm and the external muscles of the chest, or to paralysis, or, most probably, to general exhaustion, in which case the deficient action will be broken at intervals by a sighing inspiration, as sufficient power accumulates for the effort."

PALPATION is an application of the hand to the exterior surface of the chest, to detect,—any painful or tender spots on touching certain parts; the frequency of breathing; the absence or presence of certain vibratory motions of the thoracic walls, or the degree to which these vibrations are influenced by disease, or to which their transmission is increased or diminished by interposing media; the comparative temperature of different parts of the surface; the presence of fluid indicated by fluctuation, etc. Palpation may be effected in two ways:—1. When the symptoms of the disease are limited to a small extent, by pressure with the tips of the fingers, as in the ordinary exercise of the sense of touch; and, 2, by placing the palms of the hands upon both sides of the chest, gently and evenly and with such a moderate degree of pressure as to enable them to participate in—but not to deaden—the vibrations, or to appreciate the excess or defect of movement in the two sides, and thus to compare the results.

Standing behind the patient, the physician will place his thumbs, one on the top of each scapula, resting his fingers, firm and flat, on the collar-bones and upper ribs; then directing the patient to sigh deeply, the examiner, looking along his fingers is enabled to compare the motion of the two *upper lobes* of the lungs with one another. If a bright light shines on the finger nails, a difference in expansion of one-twentieth of an inch, can be detected, when present.—If the ends of the thumbs are then placed on the lowest dorsal vertebra, and the hands be extended so as to span the waist as far as possible, requesting the patient to again sigh, the extent of motion of the *lower lobes* can be felt.

Palpation—below the clavicles in the female, and below the epigastrium in the male—is the best mode of learning the number and force of the respirations.

The vibrations experienced by the hand in palpation, are the following:

Vocal vibration or *fremitus*, or the vibrations of the lung, produced by the voice, and transmitted through the chest-wall. When the palm of the hand is lightly applied upon the chest of a healthy person, a slight thrilling sensation (*vocal fremitus*) will be communicated to the fingers. This is more marked in adults than in children, in males than in females, in short-chested than long-chested persons, and in the spare and thin than in the fat and stout; it is also most distinct over the larynx and trachea, also appreciable over the upper parts of the chest, but becoming gradually extinct as we advance downward. It may likewise be produced in the act of coughing, and its intensity is considerably modified by the voice, being more appreciable in cases where the voice is low, deep, and powerful, than where it is sharp and feeble. It may also be detected by the ear, and is more strongly marked when the person is lying down. The natural vocal fremitus or thrill is generally better appreciated on the right side than the left, and it may be increased or diminished by disease. It is abnormally *increased* where lung substance consolidated by interstitial deposits comes closely in contact with the chest-wall. When the lung has its density thus increased, its conducting power is increased, and, unless the increase be very great, the fremitus is more or less augmented, as, in congestion of the lung, the early stages of pneumonia, in tubercular infiltration, and in œdema of the lung. It is abnormally *diminished* or *annulled* when the lung becomes solid, or when fluid collects in the pleural sac, as, in the stage of pneumonic hepatization, and in pleuritic effusion. Thus, in both lung consolidation, and pleuritic effusion, there is dullness on percus-

sion, and resistance to the percuting finger, but vocal fremitus is only increased in the former.

Sometimes, a vibration is produced by the bronchial valves or rhonchi, which is termed the *rhonchal fremitus;* and, at an advanced stage of pleurisy, when the effused fluid is absorbed, and the roughened surfaces of the pleura are brought into contact, a distinct cracking sensation or rubbing movement (pulmonary *friction fremitus*) is conveyed to the hands, and is very distinct at the same time, on auscultating. When the lungs or pleuræ contain fluid, a sense of *fluctuation* may be detected in the intercostal spaces, with a diminished or annulled vibratile tremor. (*See Heart's Impulse*, page 339; *Fremissement Cataire*, page 344; and, *Cardiac Friction Fremitus* (*Exocardial Friction Murmurs*) page 342.)

By MENSURATION any deviation of the chest from the state of health may be detected; and this must always form a part in minute examinations, as, thereby, can be ascertained more exactly the comparative bulk and volume of the two sides of the chest, as well as the amount of expansion and retraction of the chest-walls during inspiration and expiration. But for clinical purposes, inspection affords sufficiently exact information, as a general rule. The simplest method of measuring the circumference of parts, or the distance between any two fixed points, is by means of a graduated tape, taking care to apply the tape at the end of an ordinary expiration, while the patient holds his breath. The fixed points usually selected in measuring, are, the spinous processes of the vertebræ posteriorly, and a line drawn through the center of the sternum and umbilicus, anteriorly; and, in measuring from these to other points, the tape should be carried evenly between the points, and on an exact level. As a general rule, the right side of the chest measures about half an inch more than the left; in left-handed persons, it will be the left side that is largest, or both sides may be equal.

Enlargement of one side of the chest may be occasioned by pleurisy with effusion, pneumothorax, hydrothorax, hypertrophy of the lung, emphysema, and cancerous tumors of the lung or pleura. Contraction of a side may be due to, pleurisy at the period of absorption with retraction, pleuro-pneumonia, tubercular deposit in the second stage, chronic consolidation of the lung, and infiltrated cancer of the lung.

The diameter of the trunk, in various directions, is best ascertained by means of a pair of callipers.—Various instruments have

been invented for practising mensuration, as Quain's stethometer, Sibson's chest-measurer, Alison's stetho-goniometer, and Hutchinson's spirometer. For analytical investigations these instruments may be useful and necessary, but for clinical purposes, inspection and palpation will generally be sufficient; in some cases, however, we may more accurately determine the amount of expansive movement by Quain's instrument. The spirometer only measures the volume of air expired by the lungs, or the vital capacity of these organs, and the information it furnishes as to the existence of disease is of a negative character.—Mensuration may be made more especially useful, by measuring the chest from time to time during the treatment of disease of the thoracic organs, in order to determine the changes for better or worse in the size, etc., of the chest-walls, as they gradually progress.

SUCCUSSION is rarely necessary. It is performed by gently but abruptly pushing the chest of the patient backward and forward, while the observer's ear is applied to the chest; or, the patient may make the movements himself. The sound developed by this, resembles that of water in a partly-filled decanter held close to the ear, and shaken; the precise tone, however, will vary with the density of the fluid, and the proportion of fluid and air present. This sound, termed *splashing*, is elicited in cases of pneumo-hydrothorax, involving, in most cases, a fistulous communication between the lung and pleura, but not necessarily. It may sometimes be heard in phthisis, where there is a large tuberculous cavity partly filled with fluid. This thoracic splashing is sometimes accompanied with a ringing sound, or with metallic tinkling.

PERCUSSION is one of the most important means of physical diagnosis in diseases of the chest. It consists in striking the chest in such a manner as to elicit sound, and is of two kinds—*immediate*, or *direct*, when nothing intervenes between the percussing agent and the part percussed; and *mediate*, when some solid substance—as the finger or a disk of ivory—is placed upon the chest, so as to receive the blows made when percussing. This intervening medium is termed a *pleximeter*. Mediate percussion is the one usually pursued at the present day. One, two, three, or four fingers of the left hand, pressed firmly against the chest, serving as the pleximeter, while the ends of the fingers of the right hand, brought together in a line, form the *percussor*. Or, an ivory disk, held between the

thumb and index finger of the left hand, by two movable handles attached to the disk, forms the pleximeter; while a small steel hammer attached to a stiff spring handle, and having a piece of caoutchouc inserted in its percussing surface, forms the percussor. Both of these plans are used, the first, with the fingers, is usually preferred in private practice in examining chest diseases.

In practicing percussion it is best to strike first on one side of the chest, and then on the corresponding spot of the other side, in order to compare the character of the sounds; as it is not the sound elicited which determines the presence or amount of disease, but the relative degree of the dullness or resonance observed on each side. The strokes given should be made at right angles to the part percussed, and should be made quickly, smartly, and uniformly; and if the fingers be used as the percussor the movement of striking should be made from the wrist alone, in the same manner as the keys of a piano are struck by a well-trained pianist, the fore-arm and arm being held motionless. The pleximeter should always be held firmly against the chest, and the firmer it is held, and the more forcibly the blow struck, the more readily do we develop the sound of deep-seated organs; but, on no account, should the blow be too forcible, there is a limit to it. The examiner must not go on hammering long at a time, but should compare, by two or three quick strokes, each place with the corresponding place on the other side.

The parts should be percussed in the following order: 1, on right clavicle; 2, on left clavicle; 3, under right clavicle; 4, under left clavicle; 5, above right scapula; 6, above left scapula; 7, close under right scapula; 8, close under left scapula; 9, under right mamma, (an inch below); 10, under left mamma; 11, right lateral region; 12, left lateral region; 13, upper middle and lower sternal regions. In order to become a good diagnostician, the medical man should percuss and auscultate the chests of healthy persons, whenever he has the opportunity, for the first thing to start with in these examinations, is, a perfect acquaintance with the healthy sounds developed by these methods. By such investigations he will ascertain that, even in health, pulmonary resonance will vary in different persons in quality, pitch, duration, and degree of intensity, according to the size of the lungs, the elasticity of the chest-walls, the quantity of muscular and adipose tissues, etc. He will also ascertain that corresponding portions of the chest, as a general rule, yield, on each side, identical sounds. Indeed it will be found highly advantageous to practice percussion upon bodies of all kinds, until the ear is perfectly familiar with the differences of each, and can identify them with the eyes shut.

The sounds elicited by percussion of the chest are as follows,—and if we are acquainted with the normal sounds of the several parts percussed, we become enabled to judge whether the following sounds are indicative of a normal or abnormal condition of the parts from which they are obtained, more especially when taken in connection with all the other symptoms present:

1. *Clear*, also termed *pulmonary*, or *vesicular resonance*, and which is due to the presence of air. The lungs yield their normal, full, clear sound, slightly more and more distinctly from above downward, owing to their increasing capacity; the sound being muffled, however, by the pectoral muscles, the mammæ, and the scapulæ. On the right side, from the sixth rib, a dead sound is produced from the presence of the liver; the same is elicited on the left, from the junction of the fourth costal cartilage with the left border of the sternum, to the point where the heart's impulse is felt, owing to the position of the heart; while below on this side, to the left, at the sixth rib, the sound will be tympanitic, owing to the empty stomach being subjacent. At the ninth or tenth rib, well-marked dullness, and a feeling of resistance to the finger, are observed, and which are due to the presence of the spleen. The clear or hollow sound is always produced when the chest is struck over a portion of healthy lung; but a distinct difference in the sound may be observed when elicited immediately after a full inspiration, and a full expiration. This difference is never detected when the tissue becomes indurated from any cause.—The subsequent remaining percussion sounds, are morbid, and indicate abnormal conditions; they are—

2. *Increase of clearness*, or *exaggerated vesicular resonance* of low pitch, long duration, and diminution of its vesicular quality, is due to an abnormal increase in the quantity of air in the lung-cells, and is observed in vesicular emphysema. When the vesicular quality of the resonance is substituted by one of a tympanitic character, the increase of clearness being of a higher pitch and short, this may then be due to pneumothorax, etc.—Increase of clearness and a duration of sound, with diminished elasticity, is observed where there is a surplus of air in the subjacent part, with considerable induration of tissue between the surface and the part containing that surplus,—a combination of conditions sometimes met with in phthisis, when a superficial cavity in the lung has a thin, indurated, and adherent external wall.

3. *Diminution of clearness*, or *diminished vesicular resonance*, also termed *dullness*, may vary from a slight degree to perfect dullness, in proportion to the increased density,—with shortening in the duration of the sound, and is due to solidification of the lung, or

to compression. The degree of diminution of the normal vesicular resonance is due to the amount of air in the lung-vesicles, or to the displacement of air by an augmentation of the solid matters contained in the chest. Diminution of vesicular resonance is met with in most pulmonary diseases. Slight pleuritic effusion, congestion and partial condensation of the lungs, and during the paroxysm of spasmodic asthma, are the chief causes of a partially dull sound on percussion. In hydrothorax, the dullness of resonance will be observed above the level of the fluid. In pleurisy with great effusion, in hydrothorax, in pulmonary apoplexy, in complete condensation of the lung from pneumonia, in phthisis, in cancer of the lung or pleura, in hypertrophy with cardiac dilatation, in pericarditis with effusion, and over aneurismal tumors, there will be a greater or less diminution of normal resonance, in proportion to the amount of air in the air-cells, and the quantity of air displaced by an increase in the solid parts.

A tympanitic resonance with increase of clearness is sometimes present above the level of the fluid, in many instances of pleuritic effusion; this may also be observed in the healthy lobe of the lung, the lower lobe of the same side being solidified, as in pneumonia; there may also be a tympanitic sound from deposits at the apex of the chest; and also in the lower lobes, the sound being transmitted from the stomach and intestines. These form exceptions to the general rule given in the preceding paragraph.

A complete *absence of resonance* is termed a *flat* sound, like that produced when the thigh is percussed. This flatness may be due to the presence of effused fluid in the pleural sac, and is obtained only below the level of the fluid; to complete solidification of the lung in pneumonia (the lower lobe); and to tumors.

By marking the point of the upper margin of the flatness, and then, after causing the patient to change from the vertical to the horizontal posture, by again percussing, if there be fluid in the pleural sac, the flatness will be found to have also changed its position, in consequence of the fluid having moved with the patient's change of position. In the first instance, the level of the fluid will be nearly at right angles with the median line of the body; in the second, it will be nearly parallel with this line. With flatness there will almost always exist an increased resistance, the ribs being less flexible than usual under external pressure.

4. *Tympanitic resonance*, or drum-like sound, requires that the cavity from which it is elicited by percussion shall be full of air, but shall not communicate freely with external air; it is best produced by percussion over the empty stomach, or over a portion of

intestine filled with air, but is never obtained on percussing the healthy chest. With the exception of flatness or absence of sound, all abnormal resonances which are not vesicular, are termed "tympanitic." A purely tympanitic sound has no vesicular resonance whatever; though it may vary in clearness, loudness, and other qualities,—thus we may have "tympanitic clearness," "tympanitic dullness," etc. The tympanitic sound may generally be distinguished from the clear or pulmonary resonance, by its higher pitch, its more ringing character, and its being non-vesicular. When it occurs, we may infer that a cavity filled with air exists beneath the spot percussed; and, consequently, in thoracic affections we obtain the clearest tympanitic sound in pneumothorax. But the tympanitic sound may be quite dull or of less intensity when the thoracic walls are rendered extremely tense, from the great distension occasioned by the large accumulation of air in the chest. It may also be produced less perfectly in two conditions of the lung, independently of pneumothorax, viz.:—1. In the emphysematous portions of lung which often surround lung-tissue solidified from hepatization, tubercles, etc.—in emphysema, the sound usually retains a portion of vesicular resonance. 2. When the lung is gradually recovering from the compression of fluid previously effused into the pleural sac.—Tympanitic resonance, and its several modifications, subsequently referred to, are present in a comparatively small number of cases in which cavities exist in the lungs; to elicit them, the cavity must be large, seated near the exterior of the lung, and have rather firm parietes to prevent collapsion. They are more frequently observed in tuberculous excavations.

5. *Amphoric resonance* is a modification of the tympanitic tone—it requires that the cavity percussed shall communicate freely with external air. The sound has a metallic, tinkling character, and is similar to that produced by striking an empty, or partially empty wine cask, or, by snapping the finger upon the tense cheek with the mouth somewhat open, in order to produce a sound resembling that of pouring fluid from a bottle. Amphoric resonance is indicative of a large cavity, in which the air can vibrate, and is more generally heard in cases of large tuberculous cavities, more or less empty, and having firm and elastic walls. It is occasionally heard in pneumothorax. When a small amount of fluid is contained in the cavity, metallic tinkling (gutta cadens) will frequently be heard, owing to drops of the fluid falling from the upper part of the cavity into the liquid below.

6. *Tubular resonance* is another variety of the tympanitic sound;

it is elicited from an elastic tube filled with air, and is natural only when produced over the larynx or trachea. In dilatation of the bronchi, in chronic consolidation of the lung, and in some cases of pleuritic effusion, it may be heard over the bronchi. Occasionally, it may be heard in pneumonia, in small tubercular cavities, and in cancer around the bronchial tubes.

7. The *Bruit de pot fêle*, or cracked metal sound, may be very closely imitated by taking a vulcanized rubber ball with a small aperture in one side, and while it is placed upon a table, lay one finger upon it as a pleximeter, and then percuss the ball, the air from which puffs out at the hole; if a small glass or metal tube is pushed into the hole so as to project a little into the cavity of the ball, the sound of air in escaping acquires a more metallic quality. It may also be produced when the closed hands are struck upon the knee to imitate the sound of coin in the hands. To elicit this sound, the patient must open his mouth while his chest is percussed, so that no impediment may exist to the sudden exit of air through the respiratory tubes; the percussing blow must give the impulse slowly and heavily, and allow the fingers to press forcibly on the part for some moments after it has been given. It is indicative of a cavity, having thin, elastic walls, communicating freely with a bronchial tube. If the walls of the cavity are simply hard and leathery, however elastic, no metallic timbre is given to the sound, but rather a hissing noise; if they are more dense and vibratile, the air, impinging on the borders of the aperture by which the cavity communicates with a bronchus, may produce a sound more of a cracked-pot character. The sound is caused by the sudden, forcible ejection of air along the bronchial tubes communicating with the cavity; but it has been elicited at the top of the chest among healthy children.

AUSCULTATION is an investigation of internal diseases by the sense of hearing, or by listening to the sounds produced beneath the part auscultated; mankind are deeply indebted to the genius and energy of Laennec for this invaluable diagnostic method. There are two modes of auscultation; the one termed *immediate*, where the ear is placed in contact with the surface of the part to be auscultated; the other, *mediate*, by means of the stethoscope, or some other conductor of sound, placed between the surface of the patient's body and the ear of the auscultator. For most purposes, immediate auscultation will be found the best; mediate auscultation is preferred with fastidious, as well as uncleanly persons, where the surface is une-

qual, where it is desirable to limit the sounds in order to more correctly analyze them, and where the ear can not be well placed against the parts, as, in the axilla, around the clavicle, etc. Sometimes, both methods will be required during an examination. A common hollow cedar-wood stethoscope, with the trumpet-shaped end not too much, expanded, is the best. One equally as good, but somewhat more troublesome to use, is, a stethoscope with a flexible tube, which admits of application to various parts without requiring much change of position, or uncomfortable position, of either patient or physician. The double flexible stethoscope of Dr. Cammann, has the disadvantage of intensifying, and in a measure confusing sounds, as well as changing or modifying their quality and pitch; but when the physician has once educated his ear to its peculiarities, he will find it an excellent and very valuable instrument, having an advantage over the others in several respects, as, by rendering obscure morbid sounds more distinctly heard, by more thoroughly eliciting the differences of intensity, the rhythm, etc.

As a general rule, auscultation is best performed with the patient in a sitting posture, having him assume the same positions, when the several regions are auscultated, as named for percussion in these regions. Occasionally, the enfeebled condition of a patient may require him to be examined in bed, while in the recumbent position; this may answer very well for the anterior regions, but will be found quite troublesome for the lateral and posterior, to auscultate which, it will be desirable to raise the patient to a sitting posture, and have him properly supported, whenever his condition will permit this. The following rules should be attended to:

1. The patient, as well as the physician, should be placed in an easy position, one admitting of ready auscultation, without stooping, straining, or holding the head too low, and without giving rise to fatigue or constraint. If the patient be seated low, or be lying down, the physician will find it best and more convenient to rest on one or both knees. A flexible stethoscope is best suited to these examinations in the recumbent position.

2. Immediate auscultation may be practised with a thin towel or piece of muslin over the chest; but in mediate auscultation, the chest should be naked, though, with the female, only such parts should be exposed at a time as are undergoing examination. The room should be kept comfortably warm.

3. The stethoscope should be placed closely against the surface, without an undue degree of pressure; it may be held between the thumb and index finger, or, if it be a double stethoscope, the patient may hold it. And great care should be observed not to rub the

instrument with the fingers, nor to allow anything, as, clothing, etc., to come in contact with it externally, as the least movement or contact will interfere with the examination by giving rise to extraneous sounds. The room should be kept perfectly quiet, as outside noises draw off attention and confuse the sounds. Whenever it can be done, the stethoscope should be held in its place solely by pressure with the ear; but when required to be held otherwise, the fingers should be placed upon it only directly above its trumpet extremity.

4. Any agitation on the part of the patient increases the action of the heart, and disturbs breathing; consequently, in such cases, the examination should be postponed until the patient becomes more calm, and free from excitement.

5. Corresponding points on each side of the chest should be examined in connection, one after the other, in order to correctly form a comparison between them; examining the same points several times, if there is any doubt. And the auscultation should be made during breathing, during forced respiration, while coughing, while whispering, and while the patient is counting from one to five, repeating each number with the same degree of strength and intonation. Auscultation should also be made in order to discern the sounds produced by percussion.

But no physician can successfully auscultate, who is not well versed in the normal sounds of the voice and of respiration,—in the healthy laryngeal, tracheal, bronchial, lung, and heart sounds. He should auscultate the old and young, strong and feeble, thin and stout, males and females, of his acquaintance, as frequently as possible; and so educate the ear as to be perfectly certain that a respiratory murmur is healthy; that is, that it comes from a vesicular lung-substance in its healthiest state, and is conducted to the chest-wall through structures in their healthiest state. The center of the clavicle in front, or rather a little below the center, is the point at which the examination is to be commenced, then on the corresponding point at the other side, and so proceed alternately from one side to the other, at corresponding points, with each region of the chest, until its whole surface has been explored. In all cases where auscultation is practised, the intensity of any sound, its character or quality, its position, its pitch, its duration, and its rhythm, should all be taken into consideration, as modifications of these properties possess diagnostic importance.

1. The normal sound caused by the ingress and egress of air to and from the lungs, during inspiration and expiration is termed the *Pulmonary*, *Respiratory*, or *Vesicular murmur*. It is of a gentle, soft,

silken, breezy character, is more distinct during inspiration, though almost continuous like one prolonged sound, and is heard all over the chest in health, except at those points where it is superseded by a bronchial or laryngeal respiration. However, it is not exactly identical in every part of the lungs, and is better marked at the point below the center of the clavicle. It is louder during childhood, on which account the term *puerile*, has been applied to an increased respiratory murmur; it is also louder in females than in males. Its quality and pitch will be found to vary in different persons, though not to an extent that will destroy its diagnostic value. The vesicular quality of this sound is more distinctly marked during inspiration, that of the expiration being somewhat of a blowing or tubular quality.—Healthy vesicular murmur cannot be imitated by anything, but must always come from healthy lung; but it must not be forgotten that, as it obscures the sounds which pass beneath it in the healthy bronchi, so may the sounds of disease be going on beneath it, and yet be inaudible; and also that, in its turn, vesicular murmur may exist, but not be heard. The principal changes to be observed in normal respiration, that are indicative of disease, are the following:

a. Prolonged expiratory murmur may be observed; it is indicative of an impediment to the escape of breathing air, and may be due to increased density of the lung-substance, by which its resiliency is impaired, as, in tubercle; to a distended condition of the air-cells, preventing the normal collapse of the lung during expiration, as, in emphysema; or, to a diminished calibre and elasticity of the tubes through which the air has to escape, as, in bronchitis. When present, it may be observed by listening to the patient's chest when he is asleep, or is not attending to the examination, at which times he will generally draw a sharp, short breath, and then expire as long as he can. When the impediment to the exit of air from the vesicular structure of the lungs is very great, a necessity for muscular effort will arise, and then the expiratory movements will be *prolonged and labored*, as, in chronic bronchitis.

b. Exaggerated, puerile, or *supplementary respiration*, are the terms applied to an increased or unnaturally loud respiratory murmur. This increased sound is indicative, either of temporary excitement, or of the presence of disease in some part of the lungs. Thus, when one lung is rendered powerless, from the compression of fluid effused in an inflamed pleura, or, when a portion only of a lung becomes solidified, as, in pneumonic hepatization, the intensity of the respiratory murmur will be increased in the healthy lung, or in the unaffected parts of the diseased lung, owing to the

necessarily increased functional activity of the same, the compensating powers of the healthy lung-texture being brought into play.

c. Weak, feeble, or *deficient respiration,* are terms applied to a diminished or suppressed respiratory murmur; it is present when air is prevented from freely entering the lungs, and is commonly more marked during inspiration than during expiration. Great caution is needed in concluding that the respiratory murmur is abnormally deficient, unless the change is well marked, as it may be masked by pleuritic effusion. When it occurs on the right side it is a more valuable sign than when on the left. The difficulties to the free entrance of air into the lungs, which occasion weak vesicular murmur, are, general debility, paralysis, pain from pleurisy or pleurodynia; foreign bodies in the trachea or bronchi; diseases of the larynx, or trachea; bronchitis; thickening or compression of the bronchial mucous-lining membrane; partial infiltration of the lung with tubercle; compression of the lung-tissue by pleuritic effusion, or morbid growths; and old age.—*Suppression* or *absence* of the respiratory murmur may be due to complete obstruction of a bronchus; pleurisy with abundant effusion, and flatness on percussion at the lower part of the lung; pulmonary apoplexy; during a severe paroxysm of asthma; and, occasionally, in infiltration of the lung with tubercle or other morbid matters, and associated with flatness at the upper part of the lung.

d. Jerking, interrupted, wavy, saccadée, respiration, are terms applied to the respiratory murmur when it does not occur in one soft, continuous strain, but is divided into one or more parts; it is associated with inspiration, which is affected, as it were, by several disconnected efforts. This modification may occur from so many different causes, and may likewise be absent though either of those causes exist, that it is not one to which much diagnostic value can be safely attached. If, however, the interrupted inspiration is confined to the apex of one lung, and it is clear that pleuritic adhesion does not exist there, the sound acquires some value as a sign of increased density of that portion of lung, from tubercular deposits.

e. Rough, harsh, or *rude respiration,* are terms applied to a murmur, which lacks the peculiar softness of the vesicular murmur, and consists of a combination of the vesicular and bronchial sounds, and hence more correctly termed by some writers, *broncho-vesicular respiration.* The inspiration is harsh, tubular, and of high pitch, while the expiration, if present, is apt to be prolonged, of

higher pitch than inspiration, and of a blowing character. This is another of those delicate changes in the quality of the respiratory sound which may or may not be valuable as a sign of early disease, according to co-existing circumstances. And the signs at an early period of disease are so few, so subtle, and so unsatisfactory, yet the information sought from them—the detection of altered structure, almost before it is altered, while disease pauses on the threshold—so eminently important, that it behooves us especially to weigh the meaning of any language in which it is told, however faint the tones. Rough respiration may be said to grow out of prolonged expiratory murmur, and to grow into bronchial breathing. It is heard in incipient tuberculization, dry bronchitis, vesicular emphysema, chronic pulmonary consolidation, dilatation of the bronchi, and incipient cancerous infiltration of the lung, in cases where the lungs are slightly compressed by plastic or tuberculous matter in the pleura, in the resolution stage of pneumonia, at different periods of pleurisy, and in pulmonary apoplexy. By itself, rough respiration, indicates only that the vesicular structure is, from some cause or other, impeded in its equable, resilient expansion and contraction; other signs or circumstances must be co-existent to give specific value to this change of sound as diagnostic of any particular form of disease. A normal increased loudness of the breathing sounds are often observed on the right side when compared with those on the left, and must not be mistaken for a rough respiration. Rough respiration is considered a valuable sign in the early period of tubercular consumption; yet, as Skoda observes, solitary tubercles, however abundant, do not necessarily interfere with the vesicular respiration.

2. *Bronchial respiration* appears to be a mixed sound, being tubular, blowing, harsher than the vesicular sound, but often associated with it, and of somewhat higher pitch. It may be heard over the large bronchial tubes, that is, at the upper part of the sternum, between the scapulæ on a level with their spines, or with the second and third dorsal vertebræ, and less clearly under the clavicles and in the axillæ. Bronchial respiration exists throughout the whole bronchial tree, and needs only a change in the conducting medium to bring it audibly to the surface; it always indicates disease when heard elsewhere than at the two points where they exist in the healthy chest, as, condensation of the lung from infusion into its air-cells and parenchyma, which occurs in the second stage of pneumonia, in pulmonary œdema, pulmonary apoplexy, malignant or tubercular deposits, intra-thoracic tumors, etc. The sound is loud in proportion to the extent and degree of condensation, and

the proximity of the condensed portion to the larger bronchi, and is entirely free from any vesicular murmur.

a. Cavernous respiration is considered to be a modification of the bronchial; it is a blowing or tubular sound of low pitch, non-vesicular, of a circumscribed extent or proportioned to the size of the cavity occasioning it, and is not present if the cavity is occupied with fluid—on which account it is often intermittent in its character, being present when the cavity is empty or partially so, and absent when it is entirely filled with liquid. Inspiration takes place slowly, with a pitch lower than the healthy sounds; expiration, when present, is of still lower pitch. Cavernous respiration when heard in situations where vesicular respiration alone exists in health, is indicative of a cavity with firm, smooth, but yielding walls, not too soft to reflect sound, not collapsing during breathing, and which communicates with the bronchial tubes. Other cavernous signs may be associated with it, as, gurgling, metallic tinkling, and pectoriloquy, which will be referred to presently.

If auscultation be properly performed, there is no part of the chest-wall, after passing the first sternal bone, from which cavernous sounds can be detected in a state of health; yet, in listening above the clavicles, we must be careful not to carelessly direct the stethoscope toward the trachea, instead of in a line with the perpendicular axis of the chest, as tracheal sounds may be heard, and be mistaken for cavernous.—Although the sounds of bronchial tubes may become audible at the surface of the chest, through increased conducting power of the structures interposed; these tubes are not large enough in health to give sounds like those from the trachea, except perhaps at their bifurcation.—Cavernous sounds are produced under conditions which almost insure their reaching the thoracic parietes, viz.: 1. A cavity so large that the vibrations of a considerable volume of air may be transmitted to its walls; 2. These walls must present a large surface from which vibrations may be conducted to the ear; 3. The walls must be of a certain density, which implies, almost of necessity, increased density of the surrounding structures—that is, increased power of conducting sound; 4. A cavity so large and so defined, that it will, almost necessarily, communicate freely with some of the bronchial passages upon which it has intruded, thus acquiring free ingress and egress of air during respiration, speaking or coughing.

Hence when the sounds, which in health are audible only on auscultating the trachea, are heard at any part of the chest except over the trachea and its bifurcation, it positively indicates the existence, not only of a cavity, but of one larger than is consistent with

health. Nevertheless, cavities, the result of disease and large enough to be of serious consequence, may exist without producing any cavernous sounds. Therefore, although these sounds are positive evidence of the existence of a cavity, their absence is not positive evidence that no cavity exists; they thus lose much of their value; for it is just in those cases in which they are not audible, that it is most important to detect the existence of disease—cases in which the general symptoms are not very marked, and which are not too far advanced to afford a reasonable prospect of recovery.

b. Amphoric respiration is another modification of the bronchial; it is a blowing sound, somewhat like that produced by blowing into an empty decanter, with the mouth at a little distance from the neck. It may be of low pitch and humming, or ringing and metallic, and has an echo from the parietes of the cavity. It is diagnostic of a large excavation, and is more apt to be heard in pneumo-hydrothorax with a fistulous communication between the cavity and bronchi. It may be absent or present, the same as with cavernous respiration, and the remarks made under this head, relative to its diagnostic value, may be applied to the present sound. *Metallic tinkling*, and *gutta cadens*, which may be also associated with amphoric respiration, the voice, or cough, will be referred to hereafter.

3. *Laryngeal* and *tracheal respiration* or *murmurs*, are heard over the larynx and trachea, the sounds are more intense, drier, and hollower, than the bronchial; the sound during expiration is more prolonged, and of higher pitch than that during inspiration, and the expiratory and inspiratory sounds instead of being continuous, are separated by a short interval. These sounds are termed "tubular," because they resemble the noise made by a current of air forced through a tube of large size. They may be exaggerated or feeble. In health there is no cavity in the lung large enough to yield them, after the first bone of the sternum has been passed; therefore, whenever heard elsewhere than over the larynx or trachea they always indicate disease, having the same indications as the cavernous respiration and its modifications.

ABNORMAL OR ADVENTITIOUS SOUNDS are termed *rales*, *rattles*, or *rhonchi*. They differ from the preceding in never being heard during health, and in not being modifications of the normal respiratory sounds. They are occasioned by air passing through the air-tubes when these are contracted, or when they contain liquid;

the first are termed *dry* or *vibrating rales*, the second, *moist*, *mucous*, or *bubbling*.

The dry sounds are divided into *sibilant* and *rhonchus*. Take a piece of vulcanized rubber tubing, three feet long and two lines in the bore; with this a number of useful lessons may be learned. Rest about half the tube on the table or against the wall and lightly apply a stethoscope upon it; listen, while with one end of the tube in the mouth, you inspire and expire through it alternately. The sounds heard will be something like loud bronchial breathing. Make pressure upon one portion of the tube so as to diminish its calibre at that part, and, if it is perfectly dry, *sibilant* sounds will be produced when the tube is most compressed, and sonorous snoring *rhonchus* when the calibre is only slightly diminished. By varying the extent and degree of compression, changes in the character and pitch of the breathing sounds may be produced, as numerous as those heard in the chest. It is most interesting to observe the effect of moisture in the tube, and how minute a quantity affects its sounds. If sixty drops of water are put into the three-foot tube, and the auscultation and breathing repeated as before, *large crepitation*, most abundant and loud, will appear to fill the tube for a considerable part of its length. If pressure is now made, as for the production of rhonchus and sibilus, the size of the crepitation will diminish as the calibre of the tube is decreased. If we empty the tube and blow through it to expel all the moisture possible, and again auscultate, crepitation will be heard, not of the same character as before, but more crackling, yet still distinctly bubbling; and if the tube is compressed the sounds become smaller, and assume nearly the character which they had before the water was emptied out. At parts where the tube appears dryer, loud rhonchus is heard, less musical and more harsh than from the dry, compressed tube. So slight an amount of moisture is sufficient to give the crepitation and rhonchus, that it is most difficult, having once moistened the tube, to get it again so dry as not to produce these sounds; so that we can not help wondering how it is that the human air-tubes are ever free from rhonchi and crepitations when lubricated by even their normal amount of secretion.

1. *Sibilus*, or *sibilant rale*, is a high-pitched, hissing, wheezing, or whistling sound, produced in the small bronchial tubes and vesicles, and is indicative of acute catarrh or bronchitis; it augurs some danger.

2. *Rhonchus*, *snoring*, or *sonorous rale*, has a low or grave pitch, resembles a droning hum, like the cooing of a pigeon or the bass note of a violin, is produced in the larger bronchial branches, is of

less dangerous import than sibilus, and indicates catarrh or bronchitis seated in these large tubes. It may exist alone, or be associated with sibilus. Each of these sounds may vary as to intensity, tone, location, appearance and disappearance, occurring with expiration, or inspiration, or both, etc.

These are the most common of all the morbid sounds detected by auscultation; are frequently heard without any other sign of disease, and generally occur at some period of its course, in company with every disease of the lungs. They may be heard in many varieties by listening to a sleeping child with a "cold in the head." As the nasal passages alter in the amount of obstruction they present to the tidal air, by their tumid walls or by their secretions, at one moment rhonchus is heard, at the next sibilus, and again, perhaps, normal respiration; or either sound may be persistent until the child sneezes and clears the passages, or opens its mouth, and ceases to use the nose for respiration.

As already remarked, rhonchus and sibilus are produced by any causes, temporary or persistent, by which the larger air-tubes are diminished in calibre over a limited extent—so that air passing through a tube of a certain diameter is suddenly met by some obstruction, that obstruction not being sufficient to entirely block up the passage; if the obstacle is of such a character that it will vibrate freely as the air rushes past, the snoring, cooing, or more sonorous noises, classed as rhonchus, are produced; if the obstacle is such as to considerably diminish the calibre of the tube for some distance, the more hissing and less sonorous varieties of sound, called sibilus are produced. Hence sibilus, although it may have its origin in the larger tubes, is most frequent when the smaller, more terminal, bronchial passages are affected—when their lining membrane is tumid, and their calibre thereby diminished; while rhonchus is more frequently produced in the larger tubes when they are partially obstructed by swelling of the lining membrane, by pressure from without, or by portions of adhesive secretion hanging to their walls and vibrating as the tidal air passes by. Rhonchus is, therefore, under ordinary circumstances a less persistent sound than sibilus, being more easily removed by forced respiration, or by cough.

3. *Crepitant rale*, or *rhonchus*, also termed *fine crepitation*, is a dry sound, although usually classed among the moist. It is a peculiar and delicate sound, one of the most valuable revealed by auscultation, and may be imitated by rubbing between the thumb and finger a lock of one's own hair, close to the ears; or, according to Dr. E. A. Carr, of Canandaigua, New York, by moistening the thumb and finger with a drop or two of paste, or mucilage of gum arabic,

and then holding them to the ear while alternately separating them and pinching them together. There is no bubbling sound associated with it, as it is of a crackling character, is almost always limited to the inspiratory act, and once established, it is persistent, not being removable by coughing or by expectoration, but remains until replaced, either by some other morbid sound, or by the happy return of normal respiratory murmur. It must be most scrupulously distinguished from the small crepitation of capillary bronchitis, with which it is too apt to be confounded, and which is bubbling, accompanies both expiration and inspiration, and may be removed for a time by cough and expectoration. Fine crepitation is heard in its true character only in the first stage of pneumonia. In the lobar form of pneumonia it generally exists during the whole course of the disease. It is generally limited to one side (unless both lungs are affected with pneumonia), and may be best heard below the scapula; while small crepitation is heard on both sides. Both fine and small crepitation may be heard when pneumonia is complicated with capillary bronchitis. Fine crepitation is also an indication of phthisis, when detected at the superior anterior part of the chest, and limited to a narrow area.

4. *Mucous rales*, or moist bubbling sounds, are heard when any kind of fluid, as, pus, blood, etc., exists in the bronchi; they vary in character according to the calibre of the tubes in which they are seated, may be irregularly present, may shift their location from one part to another, and are termed, according to their degree of tone, coarse and fine, the first being heard in the larger bronchi, the latter in the finer ramifications. They result from the passage of air through a liquid, and are directly occasioned by the formation and bursting, in quick succession, of numerous little air-bubbles.

The *coarse* or *large bubbling sounds*, also termed *large crepitation*, occur in the larger air-tubes, in which the air-bubbles are large, and indicate the presence of fluid in these tubes, as, in pulmonary catarrh, bronchitis with secretion of mucous, hemoptysis, abscess, œdema, the last stage of tuberculous disease, etc.

5. The *sub-crepitant rale*, also termed *small crepitation*, is another moist rale, which is produced in the smaller ramifications of the bronchi, and differs from the preceding rale in being much finer. It is a sign of much value in diagnosis.

When we hear a number of very small bursting bubbles or "crepitations," accompany an expiratory act, it tells us that air is issuing from the fine passages or cells of the lungs in a number of minute streams, and that these encounter some fluid before they

have united into a blast of larger size; and as the air must be introduced through the same tubes before it can be expelled, the crepitation of inspiration needs no further explanation; hence, "small crepitation," speaks unmistakably of fluid in the remote ramifications of respiratory tubes. If, on the other hand, the crepitations are of larger size, they tell that they must have larger spaces to contain them, and that the stream of air which produced them had a certain calibre. This is the interpretation of crepitation of various sizes, rising from the exceedingly delicate bubbling, almost like effervescence, of capillary bronchitis, to large, noisy crepitation, and thence even to "gurgling." Once understanding the acoustic conditions of crepitation, it will be evident that it is not necessary for the air or fluid to be confined in the respiratory tubes:—that a portion of lung-substance, broken down in structure and converted into a soft semi-fluid mass, if freely communicating with previous respiratory tubes, may have the air from these passages forced through it, and thus yield crepitation similar to that from fluid in the tubes themselves. Thus, crepitation may be yielded by masses of tuberculous deposit lying in the course of the air passages, and reduced with the involved lung-substance to a fluid condition; again, crepitation may be due to inflammatory exudation into the air-passages themselves. Crepitation then, both large and small, indicates the presence of fluid, and the passage of air through it, but for its special pathological meaning in any given case, we must look to the signs and circumstances which bear it company,—as, those of pulmonary apoplexy, œdema, etc.

6. *Gurgling*, also termed *cavernous rale*, and *humid crackle*, may be produced in the largest bronchial tubes, but it then retains more of the characters of large crepitation, and has not those peculiar characteristics which gurgling acquires in cavities of larger size—and which convey to the mind a definite impression of a considerable volume of air passing through a mass of fluid, and of that fluid becoming greatly agitated, or leaping up into an atmosphere in which the sounds it produces are reflected from the surrounding walls. As a sign of the existence of a large cavity containing both air and fluid, this description of gurgling takes rank, with metallic tinkling and amphoric sound, as a sign of a large cavity containing air. When audible, all these phenomena are of the greatest importance. But a cavity may exist, and gurgling be absent. If the gurgling be distinctly heard at the summit of either lung, it is in all probability indicative of a cavity from

tuberculous softening. This sound should be carefully discriminated from the coarse mucous rales.

7. *Friction* or *attrition sound*, is generally difficult of detection by the ear alone, but if the hand be placed upon the affected part, a sensation of rubbing is generally perceived, which is then communicated to the ear by auscultation; it attends both movements of respiration, but is loudest and most prolonged during inspiration. It occurs in pleurisy, when, the polish of the healthy serous membranes being lost by the exudation of lymph, the rubbing of the costal upon the pulmonary pleura is distinguished. It of course ceases when the exudation of serum is sufficient in quantity to separate the costal from the pulmonary pleura, but returns as the fluid poured out becomes absorbed, continuing until the lymph itself is also absorbed, or, until the opposed surfaces of the pleura become adherent. The individual characters of pleural friction sounds may vary—with the degree to which the opposing surfaces are roughened, with the consistence of the exudation, and with the extent to which the respiratory movements are restricted by pain. Thus, in the first stage of dry, tumid, vascularity, if any sound is produced, its character is usually rather soft and grazing; in the second stage, ridges of adhesive, sero-plastic exudation may give a grating or sawing sound; and in chronic pleurisy, when the interpleural matter has become variously altered in consistence, and more or less adhesion has occurred between different portions, the friction sound may acquire creaking, rumbling, and other modifications.

In examining cases of chronic pleurisy, or of the acute disease in persons who have suffered from a previous attack, it is necessary to remember that adhesions may have been effected between the pulmonary and costal pleuræ, which, by restricting movement, may interfere with the production of friction sounds; and when the pleural cavity is becoming distended with liquid effusion, the lung, in other parts pushed back from the chest-wall, may, at the points of adhesion, be held in contact with the ribs, and thus complicate the diagnosis.——Friction sound may also occur when deposits of tubercles or carcinoma are so localized as to cause roughening of the pleura, or even when interlobular emphysema gives rise to the same conditions.

AUSCULTATION OF THE VOICE is almost always had recourse to by physicians while examining the condition of the lungs; and, as with the other auscultatory signs, these are of but small value in the diagnosis, except when taken in connection with

the various other symptoms present. The *vocal fremitus* or vibrations which occur during speaking, in a healthy chest, have already been referred to under Palpation; these vibrations may be heard as well as felt; and are more distinct among deep-toned adults. The vocal sounds undergo several changes during disease, which have been termed as follows:

1. *Bronchophony* or *increased vocal resonance*, is the normal vocal sound heard more or less distinctly over portions of the lung where it is not heard in health. The sound is dull, distant, feebly vibratory, resembling a distant, confused, humming noise. It is indicative of condensation of the lung in the vicinity of large bronchial tubes, the result of pressure or deposits, and is more generally present in pneumonia, and in phthisis with tubercular deposits, though it is of more value in the former than in the latter disease, owing to its being more constantly present. It may also be present in several other diseases that give rise to increased density of the pulmonary tissue. Bronchial respiration and bronchophony are frequently heard together; but since the sound of the voice is much louder than the sound of respiration, bronchophony may often be heard before the lung has become sufficiently solid to render bronchial respiration audible.

2. *Diminished* or *suppressed vocal resonance*, over the parts where the resonance should exist in health, is present in many cases of emphysema, and solidification of lung-tissue, in cases of obstruction of one of the large bronchi, in pleurisy, in pneumothorax, hydrothorax, etc. It is an inferior sign.

3. *Pectoriloquy*, a modification of bronchophony, is where the voice passes into the ear, as if it came from and through the stethoscope; it is natural over the trachea, but when heard elsewhere is indicative of disease. It is generally caused by solidification of lung-tissue around a dry cavity having free communication with the trachea through the larger bronchi, and has been termed *cavernous* and *amphoric voice*. It may also arise from a very solid state of lung alone, or from consolidation of the lung around a dilated bronchus. However, it is often impossible to distinguish a dilated bronchus containing fluid from a tuberculous cavity. When a metallic sound (*amphoric*) is also present, we may almost always safely diagnose a cavity. Nothing can be determined from pectoriloquy, except it be taken in conjunction with all the other signs.

4. *Ægophony*, is another modification of bronchophony, it consists of a peculiar tremulous resonance of the voice, resembling the

bleating of a goat, or the voice of Punch, following, or accompanying the words of the patient. It is usually heard at the inferior and posterior portion of the chest, near the larger bronchi. It is changing, being very faint or quite strong, with more or less tremulousness, is not always constant, may be of variable duration, and may be heard at any portion of the chest. It is indicative of a small amount of fluid in the pleural cavity, and may be met with in pleurisy and hydrothorax. It has also been heard in simple consolidation of the lung, when no fluid could be detected in the pleural sac; but, in most cases, it appears to be due to pleuritic effusion; when the effusion is large, it disappears.

AUSCULTATION OF COUGH is frequently practised, and is subject to the same rules as are applied to that of the voice. The principal sounds are termed, 1, *Bronchial* or *tubular cough*, which is heard over the chest, the sound being similar to that heard over the trachea in health, upon coughing. It indicates the same conditions as bronchial respiration, and bronchophony.

2. *Cavernous cough* is of more limited extent than bronchial, is more or less intense, blowing, prolonged, and imparts a heaving shock to the auscultator's head, as if raising it from the chest or stethoscope. Its indications are the same as those of cavernous respiration.

METALLIC TINKLING is a peculiar sound, which is frequently met with in auscultation, whether of the respiration, voice, or cough, and is of great value in the diagnosis of disease when present. On applying the stethoscope over some portion of the chest-wall and making the patient speak, abnormal vocal resonance of cavernous character is heard, and almost at the same time a tinkling or ringing sound, as of a half-muffled bell. The same occurs if the patient coughs, and, sometimes, also during respiration. If a glass bell is suspended in air, and then a small blast of wind be suddenly directed against its margin, we may hear, first, the rush of air, and then following it at a distant interval, a faint ring of the bell; the same effect is produced if the gust is directed against the interior wall of the bell. This corresponds in essential characters with the sound called metallic tinkling. In the human chest, this sound is due to the presence of a cavity of considerable size, with dense vibratile walls, containing air; and a blast of air impinging upon some portion of its walls, usually either upon the edge of an opening into the cavity, or upon the inner surface of its parietes, occasions the sound. It is heard in pneumothorax, and tuberculous excavation; more generally in the former, when there is a

fistulous communication between the lung and the pleural cavity, and of which disease it is considered almost pathognomonic.

If the walls of such a cavity are *damped* in their vibrations, or are too thick, or not sufficiently dense, or if a blast of air into the cavity is not forcible enough, metallic tinkling may not be excited in its walls, and reflection alone, or combined with imperfect metallic resonance, may take place, and produce a sound of the peculiar character known as *amphoric echo.* (*See Amphoric Respiration*, page 530.)

A drop of fluid falling from a height on to the surface of a fluid, in a space bounded by reflecting or vibratile walls, containing air, produces a peculiar and characteristic sound to which the name *gutta cadens* may be appropriately applied. If we suspend lightly a thin glass or metal flask, so that it can ring when struck; and, while listening attentively, with the ear close to, but not touching the wall, pour some water slowly, drop by drop into it from the neck, a dropping is heard accompanied by a slight ringing sound, but quite distinct from the sound in the experiment named for metallic tinkling. This dropping corresponds in essential characters with the *gutta cadens* sound. As the water collects in the flask the dropping becomes more dead, is raised in pitch, and the ring of the flask is lost.—This sound is produced by the falling of drops of exudation from the walls of the pleural sac in pneumothorax, into the fluid of empyema or of hydrothorax, or of drops of pus from the roof a large tuberculous cavity into the liquid secretion on its floor.

The acoustic conditions present, may be intermediate between those necessary to the true metallic tinkling and those essential to amphoric echo—producing sounds of intermediate character; while the conditions necessary to gutta cadens include those of both the other sounds; and hence, not improbably, has arisen that confusion between gutta cadens, metallic tinkling, and amphoric echo, and the theories of their production, so commonly met with among teachers of auscultation.

Isolated signs are of no value in the detection of disease; it is only when all the signs are associated together that we are enabled to arrive at any correct and satisfactory diagnosis. And in the several diseases to which the thoracic organs are liable, there are usually a multiplicity of signs which depend upon the same physical conditions and tend to corroborate each other. Thus, certain symptoms associated in a group, indicate most clearly the existence of consolidations, liquefactions, or excavations, etc., as will be

observed in the groups of physical signs given in the Note below,* which I extract from H. Dobell's "Demonstrations of Diseases in

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CONSOLIDATIONS.*

1. ISOLATED (MILIARY) INTERSTITIAL TUBERCULOUS GRANULATIONS. *Deposited outside the air-cells.*

Inspection, Palpation, Mensuration, give no constant results but the infraclavicular regions are *usually* flattened.—*Percussion* normal; or slightly impaired if some tubercles are very superficial; or increased resonance from superficial emphysema.—*Auscultation* unsatisfactory. Respiratory sounds may be harsh; expiratory murmur usually prolonged; inspiratory murmur may be jerking; or vesicular murmur may be absent or nearly so; or co-existent bronchitis may produce rhonchus, sibilus, or crepitation of varying size.—*Vocal resonance* gives no constant results.—*Cough* may be present, or not.—*Sputa* none, or colorless, frothy, watery, or mucilaginous looking. Hemoptysis may be present or not in varying quantities.

2. CONGLOMERATED INTERSTITIAL TUBERCULOUS GRANULATIONS, *the same as No.* 1, *deposited in groups; involved vessels, bronchial terminations, and air-cells obliterated by pressure. In parts—traversed by large previous bronchi.*

Expansion diminished, chest-wall may be flattened. Vocal fremitus plus.—*Percussion* dull; resistance increased.—*Auscultation*, see No. 1, minus—respiratory murmur, if the deposit is abundant; plus—bronchial breathing and voice, where traversed by large previous bronchi; and conducted heart sounds.—*Cough* almost essential, rarely paroxysmal.—*Sputa*, see No. 1, plus—sometimes a grumous deposit from the thinner sputum, resembling that from barley-water; glairy mucous with streaks of yellowish or buff opaque matter, becoming less and less aerated.

3. INFILTRATED TUBERCLE. *Deposited inside the air-cells and passages. In some places collected into groups, in others scattered.*

See No. 2, strongly marked; plus—*Sputa*, more or less mixed with tuberculous matter.

4. APOPLEXY OF THE LUNG, AFTER COAGULATION. *Effusion of blood, with laceration, into the interstitial areolar tissue; without laceration, into the air-cells and passages.*

No Signs from small masses, unless quite superficial. From large masses or groups of small masses, resistance plus.—*Percussion* impaired or dull.—*Auscultation*, respiratory murmur diminished or absent;—in the neighboring parts harsh. Where the coagula are traversed by permeable bronchi, bronchial breathing and cough, vocal fremitus plus.—*Cough* varies in character with the primary disease.—*Sputa* hemoptic, generally darkish in color, rarely a large quantity of blood, but tinged mucous striæ of blood, pure blood. See Nos. 17, 18.

5. HEALED CAVITIES. *Fibro-cellular cicatrices and chalky concretions.*

Chest-wall depressed.—*Percussion* dull.—*Auscultation*, vesicular murmur absent. If previous bronchi are involved, bronchial breathing and voice.—*Cough*, variable.—*Sputa*, more or less, as Nos. 1, 2, 3, plus—occasional particles, of different sizes, of cretaceous matter.

the Chest," etc., to which valuable work I am indebted for much of the matter in the preceding subject of auscultation. By a

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6. FIRST STAGE OF PNEUMONIA. ("ENGORGEMENT.")

Costal movement restricted, if pleuritic pain. Vocal fremitus normal.—*Percussion* impaired in proportion to the amount of engorgement. *Auscultation*, respiratory murmur weak, or suppressed in the affected parts, exaggerated in the neighborhood and in the opposite lung. Vocal resonance somewhat increased when exudation has commenced. *Fine crepitation* on deep inspiration, especially after cough, persistent after expectoration. It may be masked by the rhonchus, sibilus, or large crepitation of bronchitis, but with care may generally be caught at the end of a deep sighing inspiration.—*Cough* moderate, rarely paroxysmal.—*Sputa* sanguinolent or rusty, viscid, semi-transparent, adhesive, slightly aerated. The tint may vary,—occasionally liquorice, or prune-juice color, or watery, brown, or blackish,—in rare cases only white and viscid,—more rarely absent. N. B. ACUTE ŒDEMA OF THE LUNG presents the physical signs of No. 6, except that the crepitation is less *fine*. Sputa *not* sanguinolent, but watery or muco-purulent.

7. SECOND STAGE OF PNEUMONIA. ("RED HEPATIZATION"), *traversed by pervious bronchi.*

Signs of No. 2, marked; minus—flattening of the chest-wall; plus—blowing or tubular quality of respiration. In the circumference of the affected part, signs of No. 6 may often be heard.—*Cough* and *Sputa*, see No. 6. The sputa may gradually become simply muco-purulent.

8. SECOND STAGE OF PNEUMONIA, *passing into the third.*

Signs of No. 7, passing into those of No. 15.

9. MEDULLARY CANCER.—10. HARD CANCER.—11. MELANOID CANCER.

Signs of Nos. 2, 4, and of No. 12, according to the extent and situation of the disease; plus—notable *flattening* of the chest-wall in infiltrated cancer; *protrusion* in actual thoracic tumor. The disease is usually limited to one lung. Dullness on percussion sometimes extending over the mesial line.—*Cough* invariable, very rarely dry.—*Sputa* catarrhal, purulent, often intimately mixed with blood, giving a red or black currant-jelly appearance, cancerous matter rarely mixed; free hemoptysis frequent; fetor of the breath occasional.

12. INDURATED LUNG, THE EFFECT OF PNEUMONIA, *traversed by permeable bronchi.*

Signs of No. 7. Dullness and resistance especially marked.—*Cough* and *Sputa* not characteristic.

LIQUEFACTIONS.

13. SECOND STAGE OF BRONCHITIS, *exudation into the bronchi of fluid, at first viscid and frothy, afterward more opaque and muco-purulent.*

Rhonchal fremitus occasionally felt. *Percussion* usually normal, but resonance may be slightly increased or slightly impaired.—*Auscultation*, vesicular murmur

careful study of these groups, an immense amount of valuable information of a practical character will be obtained, and which, if

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impaired. Inspiration and expiration accompanied by crepitation of various sizes, also rhonchus and sibilus. (*In capillary bronchitis the crepitation is so small that care is needed not to mistake it for true "fine crepitation."*)—*Cough* loose, may be loud and hoarse, occasionally paroxysmal.—*Sputa* white, frothy, adhesive, becoming ropy, faint yellow, or greenish, or gray, usually running together; sometimes in pellets and opaque.

14. CHRONIC BRONCHITIS. *Thickened, vascular, bronchial mucous lining, exudation of muco-serous and muco-purulent fluid.*

Expiratory movements prolonged and labored, antero-posterior expansion plus superiorly. *Percussion* often slightly impaired over the lower lobes, unless emphysema co-exists.—*Auscultation*, every variety of cooing, whistling, snoring, rhonchus—mingled with large crepitation and occasional clicking and ticking sounds. Vocal resonance may be increased.—*Cough* frequently suffocating and paroxysmal, varies in severity.—*Sputa* usually copious, of nauseous odor, in large masses little or not at all aerated; yellowish, greenish, ash-colored, or grayish green—occasionally streaked with blood; sometimes scanty and adhesive, and sometimes (bronchorrhea) copious watery, glairy fluid follows each paroxysm of cough.

15. THIRD STAGE OF PNEUMONIA. *Purulent infiltration replacing the plastic lymph of the Second Stage, No. 7.*

For Signs see No. 7 (Second Stage of Pneumonia), plus—crepitation of different sizes when the suppurating tissue communicates with bronchial tubes.

16. SECOND STAGE OF TUBERCULOUS DISEASE. *Reduction of the tuberculous matter and involved lung-tissues to the consistence of pus.*

For Signs see Nos. 1, 2, plus—increased depression of the chest-wall, and crepitation of various sizes, at first very small. *Cough* essential, troublesome, often provoking vomiting. *Sputa*, see No. 3, plus—purulent, non-aerated pellets, and often abundant muco-purulent matter mixed with bronchial mucus.

17. APOPLECTIC COAGULA IN THE LUNG, SOFTENING.

For Signs see No. 18, plus—bronchial breathing and voice from the yet unsoftened portions, if they involve permeable bronchi.—*Cough* not characteristic.—*Sputa* sooty or bistre-colored blood, mixed with mucus, or muco-purulent matter.

18. APOPLEXY OF THE LUNG BEFORE COAGULATION, *with and without laceration of tissue. Effusion of blood into the air-cells and passages, also into the interstitial areolar tissue.*

a. Small Exudations, may present no signs, or crepitation only. *b. Large Exudations*, vocal fremitus increased if permeable bronchi are involved.—*Percussion* impaired or dull, according to the amount and superficialness of the effusion.—*Auscultation*, crepitation of all sizes.—*Cough* varies with the primary disease.—*Sputa*, tinged mucus, or finely aerated florid blood mixed with mucus. Sometimes profuse discharge of florid blood, more or less aerated.

aided by ability to percuss, auscultate, etc., correctly, and by a proper understanding of the phenomena thereby produced or

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EVACUATIONS.

19. A LARGE EMPTY TUBERCULOUS CAVITY, *with smooth reflecting walls, and free bronchial communication. The surrounding lung consolidated with tubercle.*

Chest-wall depressed; expansion diminished. Vocal fremitus marked.—*Percussion* dull.—*Auscultation*, respiration, voice, and cough, cavernous. If the walls of the cavity are very dense and thin, the *lung immediately encompassing* them not consolidated, there may be *metallic tinkling*, or *amphoric echo*, on sudden, forcible inspiration, cough, or voice.—*Cough* varies, generally hollow.—*Sputa*, none from the cavity, but from surrounding lung may be of various characters.

20. A CAVITY SIMILAR TO No. 19, BUT CONTAINING SECRETION.

For Signs see No. 19, plus—gurgling and large crepitation, the vibration of which may sometimes be felt on the chest-wall.—*Cough* troublesome, only relieved by expectoration.—*Sputa*, pellets with sharp irregular outlines, or larger masses with flocculent edges, of yellowish color; or broad, flat, non-aerated lumps, smooth, greenish, remaining distinct; or ash-colored pure pus not remaining distinct, sometimes discharged suddenly and profusely. Any of these may be mixed with blood.

21. A VERY SUPERFICIAL TUBERCULOUS CAVITY FULL OF AIR, *free bronchial communication, the thin stratum of super-imposed lung consolidated.*

The chest-wall occasionally bulges over the cavity. Vocal fremitus marked.—*Percussion* clear and tympanitic, may be metallic, and if the bronchial communication is large and free it may be amphoric. *Bruit de pot fele* may sometimes be produced if the cavernous wall is elastic.—*Auscultation*, if no secretion, No. 19, marked: if secretion, No. 20, marked.

22. SMALL TUBERCULOUS CAVITIES, *bronchial communication very imperfect, super-imposed stratum of lung normal, surrounding bronchi inflamed, containing secretion.*

Chest expansion may be normal. Vocal fremitus normal.—*Gentle Percussion*, normal.—*Strong Percussion* may yield more or less fullness.—*Auscultation*, bronchial respiration absent, or imperfect, or occasional large crepitation, rhonchus, and sibilus from surrounding bronchi.—*Cough* dependent principally on the bronchitis.—*Sputa* differ with the amount of bronchial communication with the cavity, etc.

23. A VERY LARGE TUBERCULOUS CAVITY, *with a thick stratum of densely consolidated lung super-imposed, free bronchial communication.*

Percussion weakly tympanitic, if forcible, quite dull if gentle.—*Auscultation*, respiration, voice, and cough, cavernous. If the cavity contain secretion, gurgling.

24. EMPHYSEMA. *Enlarged air-cells, with attenuated anemic walls; in some places the contiguous cells have coalesced.*

Chest-wall elastic, more or less *rounded*, especially in front and superiorly. Vo-

detected, will enable any physician to correctly diagnose the greater part of lung affections.

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cal fremitus variable.—*Percussion* morbidly clear, sometimes tympanitic, unaltered by respiration.—*Auscultation*, expiratory sound peculiarly long and labored; but it may be weak, inaudible, or masked by rhonchus and sibilus. Inspiratory sound weak and short, or it may be inaudible or masked.—In extensive emphysema, the heart sounds are displaced and the area of pulmonary resonance extends beyond its normal limits.—Dyspnœa constant, subject to paroxysmal aggravations.—*Cough* not constant, but usual, paroxysmal, and suffocative.—*Sputa* frothy, liquid, mucous; often accompanied with the sputa of bronchitis. Nos. 13, 14.

25. BRONCHIECTASIS. *Bronchi dilated, cylindrical, flask-shaped, sacculated, etc., containing secretion. Surrounding lung condensed by pressure, in the immediate neighborhood of the tubes.*

For Signs see those of Tuberculous cavities of different sizes and positions. Moist sounds abound, and rhonchus and sibilus are generally associated.—*Cough* essential, generally very troublesome and paroxysmal.—*Sputa* No. 20, copious and opaque, odor usually nauseous; also No. 14. There is seldom much blood.

26. A GANGRENOUS CAVITY.

Percussion dull.—*Auscultation*, gurgling and large crepitation, the vibrations of which may sometimes be felt on the chest-wall.—*Cough* variable.—*Sputa horribly fetid*, dirty greenish, brownish, or ash gray, very liquid, mixed with portions of disintegrated lung-tissue.

27. PNEUMONIC ABSCESS. *The purulent contents more or less excavated—remains of hepatization in the surrounding lung.*

For Signs see Nos. 20, 23, according to the position and size of the cavity, minus—metallic sounds. If evacuation of the contents is prevented by absence of bronchial communication, see Signs of No. 7.—*Cough* varies.—*Sputa* purulent, or muco-purulent, sometimes contain degenerated lung-tissue; may be fetid.

PLEURISY, ETC.

28. NORMAL LUNG, *with increased function.*

Costal movements increased in expansion and elevation.—*Percussion*, undue resonance during inspiration.—*Auscultation*, respiratory murmur increased in the intensity and duration of both sounds, the expiratory slightly in excess; an increase unattended with modification of any kind, either in respect of quality, softness, or liquidness, (The increased proportion of the expiratory sound is very slight.) Vocal resonance *slightly* increased in intensity.

29. FIRST STAGE OF ACUTE BRONCHITIS. *The bronchial mucous membrane vascular, dry, tumid,—diminishing the calibre of the tubes unequally.*

Percussion normal.—*Auscultation*, respiratory murmur impaired in fullness, clearness, and softness, becoming harsh,—especially the respiratory sound, which is

DISEASES OF THE NASAL ORGANS.

OZŒNA.

OZŒNA or Rhinorrhea is a greater or less discharge from one or both nostrils, of a puriform or sanious character, and of an exceed-

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prolonged. Rhonchus and sibilus constant or occasional.—*Cough* essential, frequent, dry,—may be hoarse, loud, ringing, paroxysmal.—*Sputa*, none, or white, adhesive, *finely* frothed mucus in small quantity.

30. FIRST STAGE OF PLEURITIS. *Pleura vascular, rough, and dry. Subpleural cellular tissue injected and tumid.*

Costal movements restricted by pain.—*Percussion* scarcely or not at all impaired.—*Auscultation*, respiratory murmur weak, superficial, jerking. *No friction sound yet* (except in some cases unattended with pain.)—*Cough* usual, but not essential; dry, short, small, suppressed.—*Sputa* none, or a little viscid mucus.

31. SECOND STAGE OF PLEURITIS. *Slight sero-plastic exudation on the pleural surfaces.*

Vocal fremitus usually normal. If impaired it is in proportion to the amount of exudation. The vibration of pleural friction *may* be perceptible to palpation. *Percussion* impaired in proportion to the amount of exudation. *Auscultation, pleural friction sound* accompanies expiration, inspiration, or both. Respiratory murmur weak, jerking, distant, or inaudible.—*Cough* and *Sputa* see No. 30.

32. THIRD STAGE OF PLEURITIS. *Considerable sero-plastic exudation, separating the costal from the pulmonary pleura, compressing the lung, depressing the diaphragm, and displacing organs.*

Intercostal depressions obliterated, costal movements lost. Vocal fremitus lost.—*Percussion* perfectly dull, with increased resistance.—*Auscultation, no friction sound.* Respiratory sounds lost. Vocal resonance may be bronchophonic or lost. A peculiar tremulous bronchial voice, sometimes heard from the line of commencing dullness to a line at which all voice sounds are lost. Ægophony occasionally—especially in a line with the inferior angle of the scapula. (Heart sounds may be conducted.) Increased circumference of the affected side, most marked round the false ribs.—*Cough* and *Sputa*, see No. 30.—N. B. HYDROTHORAX. *An effusion into the pleural sac of serum, free from the products of inflammation.*—For Signs see above, No. 32. It is usually double.

33. PNEUMOTHORAX. *An abnormal collection of atmospheric air or gas in the cavity of the pleura, compressing the lung and displacing organs.*

Increased convexity of the affected side. Intercostal depressions obliterated. Elastic resistance increased. Vocal fremitus impaired or lost.—*Percussion* purely tympanitic—often extending beyond the middle line. If the left side is affected, *heart* dullness is obscured or lost.—*Auscultation*, respiratory sounds weakened by distance, or lost, according to the volume of the air or gas; but between the

ingly offensive odor; it is a symptom only of disease in some part of the nasal cavity. I have met with several cases, however, of a most fetid, repulsive character, in which there was no appreciable discharge.

Ozœna is *caused* by, or is rather symptomatic of, chronic inflammation of or ulceration of the lining mucous membrane in the deep recesses of the nose, and generally accompanied with a discharge; or, it may be due to periostitis, ending in suppuration, caries, and necrosis, in a strumous person, or, from syphilitic disease of the parts. Cancerous affections in the vicinity of the parts may also give rise to it. The disease may also proceed from decomposition of retained mucosities in the nasal cavity without any ulceration; from a deformity, whether congenital or acquired, but which prevents the free discharge of the mucosities of the nose; and, in some cases, from a morbid condition of the economy at large, inducing modification in the condition of the nasal secretion,—just as we meet with intolerable stinking secretion from the feet in persons perfectly clean,—a peculiar odor from the axilla, occurring in others besides the red-haired, in whom it is normal,—and an insupportable condition of the breath in certain menstruating women,—and in which cases, no signs of inflammation or ulceration can be detected by the most careful examination. The offensive odor which characterizes ozœna, does not necessarily come from the inflamed or ulcerated parts, but generally from a retention of mucus, or mucopurulent matters, and their consequent putrefaction.

"The most common origin of ozœna is neglected catarrhal

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scapulæ an obscure bronchial murmur may usually be found. Frequently in perforative cases, amphoric or metallic character of cough, voice, and respiration—heard especially in the neighborhood of the perforation of the lung, whether this is patent or not.—*Cough* and *Sputa* of the concurrent disease of the lung.

34. THE WHOLE LUNG COMPRESSED.

At the upper part several EMPHYSEMATOUS CELLS, *ruptured on the lung surface*, allow the escape of air into the pleural cavity. At the middle part, TUBERCULOUS CAVITIES, ruptured on the lung surface, and communicating with bronchi, allow the escape of air into the pleural cavity, and permit purulent matter to drop into the fluid empyema beneath. At the lowest part the LUNG IS SIMPLY COMPRESSED.

35. EMPYEMA WITH PNEUMOTHORAX. *Air and fluid at once in the cavity of the pleura.*

For Signs see Nos. 32, 33,—plus—succussion-sound when the chest is shaken; and perhaps *gutta cadens* from drops of exudation falling on the surface of the empyemic fluid,—heard usually after coughing or change of posture.

inflammation, in patients of scrofulous habit; and when once established, the bones may participate in the diseased condition. There is a peculiar appearance of the nose, a thickening, and quasi-*romanizing* of the nasal bones, so that the upper part of the organ looks broad and prominent, while the lower part has a sort of pinched or twisted appearance, which characterizes the early victims of ozœna. Moreover, there is that terrible aspect of scrofula, which Cullen describes, the swelled columna and alæ nasi, and the swinish pouting of the upper lip, which are realized to the full only in case of scrofulous ozœna." (*R. Druitt.*)

The *symptoms*, in addition to the fetid smell, which is frequently so repulsive as to keep the best of friends at a distance from the patient, vary somewhat, according to the character and location of the disease. When limited to the nostrils or parts in their immediate vicinity, uneasy sensations are experienced, an increased stuffing up of the nose, a fetid yellowish discharge, and at times a greater or less quantity of crusts, clot, or fleshy matter is passed, frequently a dull aching is complained of, and occasionally acute pain, especially just previous to the accumulation of the matters named above, and in some instances there will be more or less epistaxis. If the frontal sinus is affected, in addition to some of the preceding symptoms, there will be a constant and more or less severe headache across the affected sinus. In either instance there may be a nauseous taste in the mouth, and frequently, the sense of smell is lost, or impaired. As already remarked, instances will sometimes be met with in which the only symptom that can be observed, is, the fetor. The disease usually progresses slowly, without producing acute pain, unless it be of cancerous origin.—The *rhinoscope* should always be used, which will enable us to discover, in very many instances, the seat, extent, and nature of the local difficulty. Tumefaction, and deep-red, velvety appearance of the turbinated bones may be seen, sometimes extending to the ethmoidal and superior turbinated bones,—the result, sometimes, of general periostitis; or, there may exist ulcers of the nasal fossæ, of the turbinated bones, granulations on the floor of the nostril, etc.

The *prognosis* of ozœna, as far as relates to the offensive odor is, as a general rule, favorable; but as regards the disease upon which this depends, the prognosis must be governed by its character, as to a scrofulous, syphilitic, or cancerous, etc., origin, and by the nature and extent of the local inflammation or ulceration.

The *treatment* of ozœna is constitutional and local. The constitutional measures will depend upon the conditions present; if the

patient be anemic, preparations of Iron, Manganese, etc., as named under Anemia, will be indicated; if there be a general weakness of the system, without anemia, vegetable tonics may be used, as Elixir of Cinchona and Iron; Decoction of Cinchona a fluidounce and a half, Dilute Nitric Acid ten minims; mix; the whole to be taken in a day, in three doses of half a fluidounce each,—the same to be repeated every day; Compound Wine of Comfrey, etc. And if there be a scrofulous, syphilitic, or scorbutic taint present, the appropriate remedies for such malady should be prescribed.—The diet should be nutritious; moderate exercise be taken daily in the open air; and the digestive organs should be kept in as healthy a condition as possible,—any derangement of which is apt to increase the difficulty. A proper attention should likewise be paid to the skin and kidneys.

. The local measures consist in cleansing the nasal cavities from accumulations of putrid and other effete substances; and in applying weak medicinal solutions to the affected parts, by injections or otherwise. In many instances, frequent injections of tepid water, by removing extraneous matters, will effectually remove all offensive smell; other instances will require some disinfecting fluid, as, a very dilute Solution of Carbolic Acid; of Labarraque's Solution; of Pyroligneous Acid; of Chloride of Zinc; of Chlorate of Potassa, ninety grains to one pint of Water and one fluidrachm and a half of Hydrochloric Acid, to which, in some cases, a very small amount of Tincture of Myrrh may be added; of Iodine two grains to Glycerin one fluidounce; of decoction of Rhatany Root six fluidounces in which Chloride of Lime half a drachm has been well rubbed—let it stand an hour, strain, and inject half an ounce at a time, repeating it three or four times a day; or of Permanganate of Potassa, two to ten grains to a pint of Water, etc. Some of these agents, in addition to their disinfecting influence, will also exert a very beneficial therapeutical action upon the affected parts. Dr. T. G. Comstock, of St. Louis, Missouri, who has had considerable experience in the treatment of ozœna, informs me that he has been very successful with a Decoction of Logwood, used internally, and also as an injection into the nasal cavity; he considers it almost a specific for this affection.—These injections are usually effected by means of a large syringe made expressly for this purpose; but, they frequently fail in reaching the deeper-seated cavities, and hence are of but little account when these parts are affected.

Recently, a discovery has been made by Prof. Weber, of Halle, for a knowledge of which I am indebted to Dr. J. L. W. Thudicum, of London,—and which enables one to reach the deepest recesses

of the nasal cavity by fluid injections. I will give a description of it as nearly as possible in Dr. Thudicum's language.—When one side of the nasal cavity is entirely filled through one nostril with fluid by hydrostatic pressure, while the patient is breathing *through the mouth*, the soft palate completely closes the choanæ, and does not permit any fluid to pass into the pharynx; while the fluid easily passes into the other cavity, mostly round and over the posterior edge of the septum narium, in some persons also through the frontal sinuses, and escapes from the other open nostril, after having touched every part of the first half of the cavity of the nose, and a great part, certainly the lower and median canal, of the second half. By means of the application of this principle to the treatment of diseases of the nose, it is possible easily and frequently to wash the nasal cavity, to disinfect and deodorize it, to remove the sordes which accumulate so easily in it, and to apply to its surface a great number of beneficial medicinal substances, so as to prevent acute affections from extending, and to incline them toward a speedy recovery; to stop hemorrhages, allay irritations and subdue in a remarkable manner chronic affections of the Schneiderian membrane, so as to re-establish a perfectly healthy surface and normal condition of the organ of smell.

The *apparatus* for this purpose consists of a stout rod of iron, about thirty inches in length, and fastened upright into a heavily loaded foot, or, it may be screwed upon a table. Upon this rod moves a sliding rod having a screw at the sliding end so as to fix it at any height; at the other end of the sliding rod is a ring, into which a vessel sits, or may be cemented. This vessel is of glass, having a capacity of a pint or two, and is in the form of a long bottle, contracting at the part seated upon, or cemented into, the ring. It is open above, and also below, but its lower extremity is contracted into a nipple or small-bore muzzle, to which a flexible rubber tube about forty inches in length is to be attached. To the other end of this tube a stop-cock is fixed; upon this a little cup-shaped collar is fastened, and upon this the hard-rubber nozzle is to be fixed. This nozzle should be made to fit the nostril accurately, and should be perforated with four apertures. It is better to have several sized nozzles, to suit different nostrils, and in private practice, each patient should have his or her own nozzle, so as to avoid all possible chances of infection, and ensure cleanliness.

To use the apparatus, fill the glass vessel with the selected fluid, and allow it to pass into the flexible tube as far as the stop-cock; then attach the nozzle, and to make sure that all air is expelled, turn the stop-cock, and allow a little fluid to escape through the

nozzle. Now raise the sliding rod, and fix it at that height which will give the desired pressure. The patient, seated in front of a basin, with his head and face slightly bent over it, is requested to open his mouth slightly and breathe through it exclusively, and to abstain from swallowing. The nozzle is now inserted into one of the nostrils, and held there by the patient's hand of the same side; the little stop-cock is opened, and after a few seconds a continuous and rapid stream of fluid is seen to flow from the opposite nostril into the basin below. Persons who have control over themselves will always bear the injection as here described; but young persons, nervous females, and children become confused, begin to cry, or to swallow and breathe through the nose. In such cases the level of the fluid in the glass should be very little above the level of the external auditory meatus, so that the fluid runs very slowly, or only drops out of the free nostril. The hand of the operator should be upon the India-rubber tube, to close it by compression the moment he sees bubbles come through the nostril, or perceives that the patient swallows or becomes confused.—The higher above the level of the patient's ear the vessel is raised, the greater and more forcible will be the flow; and by lowering it to a level with the ear, it may be so regulated that only single drops at intervals leave the free nostril. In this manner a few ounces of fluid can be made to do the service of pints.

It is always well to let the fluid pass at first under slight pressure, in order to allow the sordes within the nose to be loosened and crusts of dried matter to be softened. When this has been effected, it is useful suddenly to raise the sliding rod and glass vessel, and produce a rapid stream, which will then scour the impurities away. The loosening of crusts and lumps of inspissated mucus is always attended with some irritation, and also with retardation and diminution of the current of fluid. The sudden increase of the pressure, by elevating the sliding rod, is the surest means of causing the least inconvenience to the patient, and effecting in the quickest manner the purpose of the operator.

It is also well to reverse the current now and then, as sordes are much better detached in that manner. If only one nostril is diseased, or the principal seat of the disease, the fluid may be allowed to enter by the opposite side, and to leave by the affected nostril. The current may then be changed, filling the affected nostril, and allowing the current to be discharged by the healthy one; half a dozen changes may thus be beneficially made. This reversal has sometimes the effect of throwing large lumps of inspissated mucus and pus upon the upper side of the soft palate; and as they are too

large to be carried round the septum narium into and through the nasal canal by which the fluid leaves, they are taken into the pharynx, and are immediately ejected by the patient through the mouth. This presence of lumps upon the soft palate is, therefore, sometimes a cause of a sudden interruption of the operation; after their removal, the operation may be continued as before. It is really surprising what an amount of sordes will sometimes be removed from the nose by this rinsing process. Any one who has seen it once will easily conceive the manner in which, by means of these constant accumulations, diseases become chronic, incurable, and lead to fearful suffering and death.

By an examination of the discharges and crusts, under the microscope, we are enabled to determine the part of the nasal cavity from which they come. The upper regions of the nasal cavity are covered by a cylindrical epithelium, which mostly shows two or three layers of cells upon each other. The lower regions of the nasal cavity are lined with a ciliated cylindrical epithelium, the action of which removes particles of dust and fluid toward the nares. When the discharges are purulent, they consist of pus corpuscles only, with hardly any admixture of cylindrical epithelium; this characterizes chronic ulcerations. When these ulcerations become extended, the pus is mixed with cylindrical epithelium which is thus being shed. When the affection of the nose is quite recent, no pus, but only cylindric epithelia are perceived in the secretion. In cases of old follicular ozœna, the crusts have on their soft surface a villous appearance, being condensed mucus, indicating in some slight manner the distribution, size, and shape of the mucous follicles of the Schneiderian membrane. In cases of ulceration with rapid loss of substance, as in specific disease, elements of the deeper fissures, particularly fibrous structures, can be perceived in the discharges. When the nasal cavity is the seat of villous or other descriptions of ulcerated cancer, the elements of these tumors are found in the blackish-brown, thick, and extremely fetid discharges.

Medicinal solutions should be applied at first with the greatest caution, as individuals differ in point of irritability of the nasal cavity; they should be very dilute in the beginning, gradually increasing their strength, after their effect has been well exhausted, by the use of greater quantities applied by a quick flow, or by the use of smaller quantities in a slow current distributed over a longer time of contact.—When the nasal cavity is completely filled with fluid, the sense of smell can no longer be exercised; and the only impingement which the fluids can produce is upon the filaments of sensitive nerves coming from the fifth pair,—but any reflex effects

from the sense of smell are absent. The sensibility of the nasal cavity is about midway between that of the eye and of the mouth; its healthy surface defends itself readily against irritating, chemically-impinging substances, by means of a copious flow of mucus. Ulcerated or excoriated parts lack this power of rapid secretion, and are more readily affected by medicinal solutions than the healthy surfaces. The following are the agents which may be used:

For rinsing the nose, from half an ounce to an ounce of common Salt in a pint of tepid Water, may be used in the quantity of from one to four pints at a sitting. Or Milk, Milk and Water, a Solution of Sugar, etc., may be used. Pure warm water is apt to produce disagreeable sensations, tears, sneezing, a sensation of cold in the head, which may last for some hours, etc. Next to salt, solutions of Phosphate of Soda, Phosphate of Ammonia, and Soda, are advantageous. Their alkalinity has a beneficial influence upon the irritated mucous membrane, and dissolves or loosens any deposits of mucus or pus, which so frequently dry and harden upon the surfaces of the nasal cavity.

To deodorize the nasal cavity, Permanganate of Potassa, one to ten grains to the pint of Water, according to the severity of the case, may be used. It has an alkaline taste, a feeble escharotic action upon healthy, and vascular, or erythematous parts, and forms a faint brownish pellicle over excoriated parts, which dries easily, and upon falling off leaves a healthy surface.

Astringent solutions are, 1. Solution of Alum half an ounce to a quart of tepid Water, in superficial ulceration or blenorrhagic conditions; when used in small quantities, a little Solution of Permanganate of Potassa may be added to it. 2. Solution of Sulphate of Zinc twenty to sixty grains to a quart of tepid water, to which Sulphate of Soda, or Sulphate of Magnesia half an ounce or an ounce, may be added. 3. Solution of Sulphate of Copper, prepared the same as the preceding, No. 2.

Alterative solutions are, 1. Solution of Nitrate of Silver sixteen to thirty-two grains to a quart of Water in which has been previously dissolved from half an ounce to an ounce of Nitrate of Soda.—2. Solution of Chloride of Gold and Soda sixteen to thirty-two grains to a quart of Water, in which from half a drachm to a drachm of Hydrochlorate of Ammonia has been dissolved. This I have found especially useful in scrofulous and syphilitic ulcerations.—3. Compound Solution of Chloride of Zinc, made by adding to a quart of tepid Water, Chloride of Zinc sixteen to thirty-two grains, Chloride of Gold and Soda eight to sixteen grains; used for the same purposes as the preceding, No. 2.

Styptic solutions are composed of the Tincture of Chloride of Iron, Perchloride of Iron, Tannic Acid, etc., added in sufficient quantity to ice-cold water, with or without the addition of salt, with the first two agents.

Agents which exert a healthy influence on morbid mucous tissues, are, infusions or decoctions of the following articles: Golden Seal, Black Cohosh, White Indian Hemp, Solomon's Seal, Geranium, Witch Hazle, Buchu, etc.—Ten fluidounces of Salt water to which one fluidounce of Cologne water is added, forms a useful stimulating solution.—A very useful tonic and astringent preparation is composed of an infusion of equal parts of pulverized Rhatany Root, Peruvian Bark, and Bayberry Bark.—The quantity of fluid that can be retained in both sides of the cavity of the nose, when a person is lying upon his back, will not exceed from four to five fluidrachms; or, from two to two and a half fluidrachms for each side. Allowing the fluid to escape from the free nostril at the rate of the whole contents of the filled side of the nose per minute, an application of a solution for ten minutes would consume about six cubic inches or somewhat less than three and a half fluidounces.

CHRONIC CATARRH.

Chronic Catarrh, also termed Chronic Coryza, is a very common affection. It is generally the result of an improper treatment of the acute form of the disease, or it may manifest itself after an individual has suffered at var ous times from acute attacks. It may also exist as a sequence of other diseases, as, measles, scarlatina, etc. The odor from the Damascus and other roses, frequently occasion chronic coryza. It is a disease proper to mucous membranes, and is especially liable to attack those of delicate constitutions, as well as those of strumous diathesis. The disease is frequently very obstinate, continuing for many years, and involving the trachea, bronchi, and even the conjunctiva, occasioning more or less drowsiness, cough, hawking and spitting up of mucus, and emaciation. Sometimes the malady degenerates into ozœna.

The *symptoms* of chronic catarrh, are, more or less irritation of the mucous lining membrane of the nasal cavities, which may extend into the pharynx, larynx, trachea, and bronchial tubes, and which irritation gives rise to a more or less profuse mucus discharge from the nostrils, an unpleasant sensation of fullness or heaviness in the head, sneezing, and a more or less severe cough, which by improper management or neglect, may terminate in phthisis. All the ethmoidal, maxillary, and frontal sinuses, may

be affected. In very troublesome cases, there is a difficulty in breathing through the nose (nasal dyspnœa), and a nasal twang is imparted to the voice, and the slightest exposure to cold exasperates the disease, causing frontal headache, and if the pharynx and larynx are also involved, occipital headache with more or less soreness of the muscles of the neck. The sense of smell may remain as usual, be impaired, or be completely lost. A catarrhal discharge usually attends nasal polypus, and is frequently the result of an irritation produced by a scrofulous, or syphilitic, etc., local attack, terminating in ozœna, ulceration, or caries, or necrosis of the turbinated bones.

The *rhinoscope* will detect more or less swelling of the membrane, with a deeper red color than natural, and, in some cases, patches of erosion.

As a general rule the *prognosis* is favorable; the unfavorable cases are more commonly those in which the patient neglects attending to the proper measures for its removal.

Where patients laboring under chronic catarrh, are careful to avoid exposures to sudden changes of temperature, or to cold and dampness, it is frequently the case that the malady will gradually disappear, without any therapeutical *treatment*. In other cases, an attention to diet, with moderate exercise daily, regularity of the bowels, and an avoidance of unnecessary exposures, together with the use of some catarrhal snuff, will effect a cure. One of the following mixtures may be used as a snuff: 1. Mix well together two parts each of very finely-powdered Bloodroot, and Bayberry Bark, and one part of very finely-powdered Myrrh.—2. Mix thoroughly together, two parts each of very finely-powdered Bloodroot, Lobelia, and Bayberry Bark, and one part of mild Vegetable Caustic.—3. Mix thoroughly together, very finely-powdered Black Cohosh Root, Geranium Root, Golden Seal Root, each, one ounce, Benzoic Acid, one drachm and a half, Camphor three drachms.

When the disease is severe and obstinate, other measures will be required, as, hydrostatic injections into the nasal cavity with one of the following tepid infusions or solutions, bearing in mind that, when it is suspected that the disease is due to, or is rendered more unyielding by, the presence of a scrofulous or syphilitic taint, those fluids must be preferred which will exert an influence on these maladies.—1. A dilute solution of Chlorate of Soda.—2. A dilute solution of mild Vegetable Caustic.—3. Infusion of equal parts of Black Cohosh, Golden Seal, and Bayberry.—4. Dilute solution of Bromide or Iodide of Ammonium.—5. A dilute solution of Tannic Acid. For other solutions, etc., see page 551. A mixture of one

part of Oil of Turpentine to three or four parts of Sweet Oil of Almonds may be applied to the affected surfaces by means of a small camel's hair-brush, when they can be seen and reached.

Patients of strumous habit of body will, in obstinate cases, require the internal treatment advised for scrofula; those tainted with syphilis, will require the internal treatment recommended for this disease; those subject to rheumatism will require internal treatment for this malady; and those laboring under hepatic disease, or derangement of the digestive organs, will require a suitable treatment for the removal of these complications. In many instances it will be a matter of astonishment, to observe how rapidly a previously intractable catarrh will be cured, after its complications have once been properly treated.

Among the several conditions which may be the result of chronic catarrh, (but which may sometimes originate from other causes), are the following:

1. *Hypertrophy of the nasal mucous membrane* is sometimes met with among feeble and strumous persons, especially children; and occasionally it may extend throughout the whole membrane of both nostrils. It usually comes on gradually, interfering more or less with nasal breathing, which is much worse during cold and wet weather, and may exist for years; sometimes it disappears without treatment. Upon an examination, the mucous membrane will be found tumefied, soft and vascular, usually covered with mucus or muco-pus, and somewhat resembling a polypus, for which it may be mistaken; but it may readily be determined from this tumor, by its situation, its deeper red color, and in not being pedunculated. Mr. Ure states that it is frequently limited to that portion of the mucous membrane which folds back and lies underneath the inferior turbinated bone. The mucous membrane at the border and posterior part of this bone is naturally thick, from the abundance of venous plexuses in the interior. The bone sometimes becomes involved in the disease.—The *treatment* consists in constitutional antistrumous remedies, and local applications of strong Solution of Nitrate of Silver, Solution of Sulphate, or Chloride of Zinc, of Sulphate of Copper, of Alum, of Nitrate of Uranium, of Iodide or Bromide of Ammonium, of Chloride of Gold and Soda, of Tannic Acid, of Perchloride or Persulphate of Iron, etc.—When the hypertrophied parts can be seen and reached, the mixture of Oil of Turpentine and Sweet Oil of Almonds, heretofore referred to, may be used with benefit.

2. *Loss of the sense of smell* may not only arise from catarrhal inflammations of the nasal mucous membrane, but sometimes orig-

inates from chronic cerebral diseases, syphilis, typhoid and exanthematous fevers, etc. When the result of inflammations, or febrile diseases, and not associated with syphilis or affections of the brain, it may frequently be cured by the persistent use for a long time of local tonics and stimulants by injections with hydrostatic pressure, and the internal administration of Quinia, Strychnia, Alcoholic Extract of Black Cohosh, Belladonna, etc.

3. *Perversion of the sense of smell* may be occasioned by various causes, as, derangements of the digestive apparatus, organic cerebral affections, syphilis, uterine affections, hepatic maladies, etc., and sometimes it is a premonitory symptom of epistaxis, apoplexy, or, paralysis. Sometimes, it precedes caries. In most cases, however, it is due to impaired nervous power, resulting from local congestion of some part of the Schneiderian membrane. Certain odors can not be distinguished, and in some instances, the persons affected will experience an unpleasant odor in their own nasal organs, which can not be detected by other persons. It may or may not be associated with follicular laryngitis, by extension of the disease. An examination will reveal a relaxed condition of the mucous membrane of the parts affected, with follicular enlargement, and an abnormally deep-red color, especially of the membrane covering the inferior turbinated bone.—The local *treatment* will be applications or showers of Nitrate of Silver, Tannic Acid, or Sulphate of Iron, etc., in solution; or, hydrostatic injections of the articles named in the preceding paragraph; and which should be used in conjunction with the constitutional treatment named for Follicular Laryngitis. Alkaline solutions introduced by hydrostatic injections, will often be found very beneficial.

4. *Ulcers of the nasal fossæ* may exist with or without much discharge. When a discharge is present, and is of a fetid odor, the disease is named *ozæna*. These ulcers may be the result of frequent catarrhal inflammatory attacks, and may also be associated with, and even be due to, struma, or syphilis. The ulceration may commence in the anterior part of the nose, upon the lower turbinated bone, or upon the nasal septum, and may gradually extend the whole length of one or both nostrils. It may also extend in depth, involving the various subjacent structures. And sometimes it may be associated with ulcerations of various portions of the pharynx, uvula, soft palate, etc. *Rhinoscopy* will detect the tumefied, congested, vivid, red, and ulcerated surfaces in the pharyngo-nasal cavity, and posterior-nasal fossæ, as well as any destruction of the turbinated bone, or of the nasal septum. Both constitutional and local *treatment* will be required, adapted to the peculiar character of

the ulceration; the several means named under Ozœna may be had recourse to, as they may be indicated.

EPISTAXIS.

Epistaxis or Hemorrhage from the Nose is of common occurrence, and may be met with at any period of life. The frequent disposition of the nasal mucous membrane to hemorrhage is due to its great vascularity, the blood exuding principally from the capillaries. Young persons, especially girls, are more subject to nose-bleedings than those of advanced age; and, frequently, when it occurs among the latter, especially when frequent and profuse, it is the premonitory indication of paralysis, apoplexy, or other grave disease.

Epistaxis may be *caused* by any circumstance that will derange the circulation and favor an increased flow of blood to the head, as, fits of passion, violent mental excitements of any kind, long-continued study, severe mental application, active or laborious exercise, fatigue, application of cold to the feet, overeating, violent coughing, exposure to the direct rays of the sun, a sudden or long-continued stooping posture, tight clothing around the neck or body, playing on wind-instruments, intemperance, suppression of accustomed evacuations, etc. It may also be occasioned by the application to the nostrils, or nasal inhalation of irritants and stimulants, also, by blows, falls, picking the nose and abrading its delicate lining membrane, etc. In dyscratic epistaxis the bleeding is frequently owing to erosion or ulceration of this membrane.—Chronic vascular ulcers on the turbinated bones, sometimes occasion the hemorrhage.

Not unfrequently, epistaxis occurs as a critical discharge, as, in apoplexy, amenorrhea, commencing fevers, etc., in which instances it may prove salutary, and should not be checked too suddenly, unless very profuse. When it happens during the latter stages of typhoid fevers, in jaundice, anemia, scorbutus, etc., it is then due to a loss of tone of the vessels of the Schneiderian membrane in conjunction with an abnormal state of the blood, and may prove troublesome and even serious. Sometimes the flow is dependent upon cardiac, hepatic, splenitic, or other organic affections.

The *symptoms* of epistaxis are readily recognized. The hemorrhage may suddenly manifest itself without any premonitory symptoms; or it may be preceded by heat and itching or tingling in the nostrils, pain and weight in the head, dizziness, tinnitus aurium, flashes of light before the eyes; flushed countenance, throbbing

of the temporal or carotid arteries; though it must be recollected that pale and delicate persons are also very apt to suffer from epistaxis. In the passive form there is seldom any precursory symptoms, the slightest touch or least local irritation producing the hemorrhage. Persons who suffer constantly from cold feet, constipation, and slight chilliness, are also apt to be attacked with this form of bleeding.—Generally, the blood flows from one nostril only; but it may be discharged from both, especially when of a serious nature. The quantity discharged may be limited to a few drops or a few drachms, or it may be very profuse, continuing for several days, or carrying off the patient in a few hours, and which is more frequently observed in the passive form of the hemorrhage. The periods of return of the flow, will vary from a few hours, to several days, weeks, months, or even years, and these may occur regularly or very irregularly.

The *prognosis* of epistaxis occurring in healthy persons is generally favorable; but when it affects those laboring under scrofula, syphilitic taint, disease of the heart, brain, or other organs, the prognosis is more or less unfavorable, and must be governed by the circumstances of the case, and the positive or negative influence derived from treatment. When it occurs in advanced years, especially among persons who were not disposed to it previously, it is very apt to be the forerunner of some serious attack. When it occurs during jaundice, or other asthenic maladies, the blood being thin, dark, non-coagulable, and the flow not influenced by remedies, it is very apt to prove fatal.

Treatment. As a general rule, epistaxis requires but little medical interference. Instances, however, occur, in which the hemorrhages are profuse, and frequently repeated, and, when they are not vicarious, measures should be taken to promptly check them. All ligatures, cravats, or tight clothing around the neck, limbs, or body, must be loosened or removed, the patient be kept quiet and in a sitting posture; cold applications, as, cold water, ice, etc., should then be applied to the forehead, nose, and nape of the neck. Should this fail in arresting the flow, various other means, which have been found efficacious, may be adopted, as, for instance, external pressure upon the nose, so as to close the nasal passage for a few minutes; plugging the nostrils with cotton or lint saturated with some astringent fluid, as, infusion of Geranium, or of Marsh Rosemary; Solution of Tannic Acid, Perchloride of Iron, Persulphate of Iron, Tannate of Iron, or, Sulphate of Zinc; elevating the arms in a vertical direction and retaining them in this position for a sufficient length of time, etc.—Patients subject to

these hemorrhages should have their bowels kept regular; the surface of the body should be bathed daily in cool water; and a shower bath, or a pitcher of cool water should be poured upon the back part of the head, and along the spinal column, every morning, drying at once with considerable friction.

When the hemorrhage is abundant and obstinate, not yielding to the means above named, it may become necessary to thoroughly plug the nose throughout its entire passage from the anterior to the posterior nares, with lint or cotton moistened with an astringent. For this purpose, Bellocq's canula will be found a very useful instrument. Upon a similar principle, the introduction of a small bladder, or intestine of a pig, was recommended by the late Prof. W. B. Powell. The agent introduced, should be allowed to remain for three or four days, or until the discharge has permanently ceased. These means should be assisted by measures calculated to divert the circulation to the inferior extremities, as, catharsis, stimulating warm pediluvia, cold applications to the head, etc.

When there is a morbid alteration of the blood, as, in scurvy, jaundice, etc., in conjunction with the means already named, the appropriate remedies to combat the unhealthy condition of the blood must be pursued,—as, the internal use of Sulphite of Lime, Hyposulphites, preparations of Iron, Tannic Acid, Oil of Turpentine, Citrate of Potassa, Bitartrate of Potassa, and alterative remedies—according to the peculiar morbid condition of the blood, or, to the character of the affection to which the hemorrhage is due.

The nose is subject to other affections, principally of a surgical character, which only require a passing notice; they are as follows:

1. *Polypus*, of which several kinds are described by authors, all of which may, however, be comprised under the following heads, viz.: *a. Soft*, or *gelatinous polypus*, of a yellow, yellowish-white, or greenish color, slightly vascular, and somewhat translucent, with a narrow base or neck, but which is occasionally very broad, and growing from the mucous membrane. It is usually attached to the superior and external wall of the nostrils, but occasionally proceeds from the ethmoid cells, the lower meatus, or the thick membrane covering the inferior turbinated bone; it is seldom or never met with on the septum. The *rhinoscope* can usually determine its true position, as well as of any other growths that may present at the posterior nares and pharyngo-nasal cavity. The symptoms observed in polypus are the same as those of other affections interfering with

the integrity of the nasal passages. The *treatment* is, to carefully remove them by torsion and avulsion, by means of a polypus forceps, or a double canula with silver ligature. Afte which the nasal cavity may be injected by hydrostatic pressure, with some fluid preparation calculated to remove morbid action and impart tone to the mucous membrane, as, a very dilute solution of Tannin, of Sulphate of Zinc, or of Bichromate of Potassa, etc., repeating the injection every day or two for several weeks. When the polypus can readily be reached, the application of a saturated solution of Bichromate of Potassa to the accessible portion of it, has in the course of a few days occasioned an inflammation, which sometimes has extended to the nose, and shriveled up the polypus.

b. Hard, or *fibrous polypus*, of a purplish or dark red color, composed of fibers, and vessels (so that hemorrhages are frequently present), with a broad base, and attached to the superior turbinated bone, the nasal septum, or the nasal floor. As with the preceding form, it sometimes attains considerable size, giving rise to the deformity known as *frog-face*. Generally, but one polypus exists, though it is more apt to return, after having been removed, than the soft polypus, and is much more to be feared than this. The most formidable polypus is the naso-pharyngeal, which springs from the basilar process of the occipital bone. Fibrous polypus may become malignant. It requires removal by a surgical operation.

c. Malignant, or *cancerous polypus*, which can only be treated by palliative means.

2. *Calcareous concretions*, or *rhinolithes*, are very rarely met with, and may be detected by inspection, or, by contact with a probe occasioning a dead clicking sound. There may be one or several of them, which may be removed by a hook, or polypus forceps; when covered with mucous membrane, this will first require division, before attempting the extraction of the nasal calculi.

For *Malformations*, *Tumors of the Nasal Septum*, *Abscesses*, *Occlusion and Contraction of the Nostrils*, *Foreign Bodies in the Nose*, and *Diseases of the Frontal Sinuses*, the reader is referred to works on Surgery. The third volume of "Holmes's System of Surgery" contains much valuable information on nasal diseases, from the pen of Mr. Alexander Ure.

DISEASES OF THE THROAT AND AIR PASSAGES.

FOLLICULAR PHARYNGO-LARYNGITIS.

This disease has also been termed "Dysphonia clericorum," or "Clergyman's Sore Throat, Granular Pharyngitis, Papillary Sore Throat, Tubercular Disease of the Fauces and Larynx, and Follicular Disease of the Pharyngo-laryngeal Membrane." It consists in a chronic inflammation of the mucous follicles of the pharynx extending into the larynx, and sometimes into the trachea and esophagus, and is frequently associated with a similar condition of the mucous membrane of the pharyngo-nasal cavity, and a moist chronic bronchitis. It is more frequently met with among males than females, in the proportion of seventeen to five; and is more frequent between the ages of fifteen and thirty, though when once manifested, it may continue for years, unless removed by treatment.

One very common *cause* of this disease is, exposure to sudden vicissitudes of temperature, giving rise to frequent "colds in the head," or catarrhal affections of the throat and air passages; in my own practice I have found it more especially present among strumous persons, those suffering from rheumatism, and those addicted to sexual excesses or masturbation. It is frequently due to derangements of the digestive organs, to influenza, and to exanthematous diseases. Over-exercise of the vocal organs, either in speaking or singing; exercise of the voice while laboring under influenza or a catarrhal inflammation; and public speaking in cool or cold places, having the head uncovered, are among the exciting causes of this malady. It may likewise be produced by inhalation of the fumes or dust of acrid substances, and appears to be a common and obstinate affection among persons inhaling limestone dust, as in towns and cities where the streets are paved with limestone rocks. It often coincides with anterior herpetic eruptions, and patients are sometimes troubled with acne; it is also frequently combined with abdominal plethora. Excessive tobacco smoking is a frequent cause, and with some persons, even very moderate smoking will give rise to it, if persisted in.

The first change observed is an enlargement of the follicles of the pharynx, and perhaps, also, of the pillars of the fauces, of the uvula, of the back of the tongue, of the tonsils, and of the larynx. In the early period of the disease, the follicular enlargement appears like minute red points disseminated over the abnormally reddened mucous membrane; and as the disease insidiously and slowly

advances, these points gradually increase in size, become discoid or ovoid, glistening, and frequently covered over with a thick, adhesive mucus, which must be removed before their condition can be observed. The mucous membrane is unnaturally red, tumid, appearing lax, and thickened from mucous infiltration; patches of erosion may sometimes be observed in those parts where this membrane has been deprived of its epithelial covering. As the disease progresses, the enlarged follicles become indurated, or ulcerated, or secrete a muco-purulent fluid, or become the seat of tuberculous deposit. When the ulceration is extensive, the submucous tissues become involved. If the disease be allowed to progress without treatment, it will more or less gradually produce serious lesions, some of which will be referred to hereafter.

In connection with this disease, there may be elongation and enlargement of the uvula, enlarged tonsils, chronic bronchitis, erosion and ulceration of the epiglottis, and, phthisis with the tuberculous form of the follicular affection, etc.

The *symptoms* vary somewhat with different persons, owing, probably, to the location, degree, and extent of the malady, which may exist for some time without the patient's attention being called to it. A dryness of the throat may be the first symptom observed, from an altered or arrested secretion; or there may be an irritation or tickling sensation in the throat, giving rise to frequent attempts to clear the throat of mucus, by hawking, hemming, or by what is termed a "short hacking cough," and, perhaps, an inclination to swallow. There is also a huskiness or hoarseness of the voice, which is much aggravated by any kind of vocal exercise, with a sensation of more or less irritability of the throat, and which public speakers often endeavor in vain to remove by repeated draughts of water, which only give momentary relief. Among singers a loss of the clearness and sweetness of voice is observed, as well as of one or more notes. As the disease continues to advance, there will be a more or less profuse secretion of mucus, or of a muco-purulent fluid, opaque, of an acrid, very viscid and adhesive character, and proving a source of great irritation; sometimes, however, the mucous membrane will continue dry and irritable, annoying the patient very much. A feeling of constriction in the fauces is usually experienced; the voice may be harsh, hoarse, whispering, and in some cases there will be a complete aphonia.

In a somewhat advanced state of the disease, the irritation or tickling sensation of the throat, as well as the hemming or hawking, will be worse in winter than in summer, and the expectoration will generally be more copious and troublesome in the morn-

ing. Patients who do not dry their feet by a fire, in cold weather, before retiring to bed, or who expose their bare feet to cold floors, are apt to have the irritation augmented for the time being. Frequently, after a prolonged silence, on attempting to speak, there will be an inability to produce a proper sound until the throat has first been cleared of the offending tenacious mucus, by hemming or hawking. The expectoration, at first, is of the character of mucus, then becomes white and frothy, and in the advanced stages it may be streaked with dark or bluish spots or masses, or with more or less blood. In some rare cases, there may be considerable hemorrhage. Passing from a warm to a cold atmosphere or room, often augments the existing irritation, occasioning a short hacking spasmodic cough, and more or less difficulty of breathing; the same symptoms may occur when the patient walks against the wind, or is exposed to dust from sweeping a room, or arising from the streets or roads. The symptoms are almost always aggravated in cold, damp weather, so much so, that it is very common for the patient to suppose that he has contracted a "fresh cold." Cough is by no means a necessary symptom of the disease, and when it is present it is rarely of a marked character, being short and spasmodic, or more like a sudden hawking to clear the throat, and is due to the laryngeal irritation, when this is considerable; when the lungs or bronchi are affected at the same time, a more decided and annoying cough will ordinarily be present.

Several, or all of these symptoms may be present in any one person, and continue through life without causing any alarm, except when hoarseness and spasmodic cough have followed some unusual effort of the vocal organs. Sometimes they disappear entirely, returning only when the organs are tasked too much, or when a cold has been contracted.—If the disease is allowed to advance there will be constitutional symptoms, as, impaired digestion, acceleration of the circulation, dry and rough skin, unequal temperature of the body, debility, emaciation, night sweats, etc., together with other lesions.

If the thyroid cartilage be pressed slightly between the thumb and finger, it will occasion pain or soreness; and the same result will follow if the glands or muscles along the sides of the neck be compressed between the thumb and finger, grasping both sides of the neck at the same time. The *laryngoscope* will reveal various conditions, according to the stage and extent of the disease; the mucous membrane of the pharynx and larynx will be found more or less abnormally red, relaxed, swoln, and thickened, and studded with minute red points, or prominent tumors, together with patches

of erosion or ulceration; there may also be a congested condition of the base of the tongue, and of the epiglottis; the latter being sometimes so far depressed backward or pendent, as to prevent an inspection of the larynx, or, it may be thin, dry, ulcerated, etc. In the larynx, the mucous lining membrane may present a similar congested and dotted appearance, and the vocal cords will be found to have lost more or less of their white color, varying from a gray color tinged with pink to a vivid redness, and the ventricular (false) cords may be considerably swoln. A tenacious fluid will usually be observed covering more or less of the affected membrane.

The *prognosis* of follicular pharyngo-laryngitis is generally favorable; except, when the disease has degenerated into some of its more serious consequences, referred to hereafter. The earlier the period at which the treatment is undertaken, the more prompt will be the cure.—The *pathological appearances* will resemble those observed during life, together with such other changes as may have been effected by the disease, and which need not be repeated here, as they will be described in their appropriate places.

In the milder forms of this affection local *treatment* alone will generally suffice; in the more advanced stages both local and constitutional measures will be required. In the earlier and milder forms, inhalations of the vapor of dilute Acetic Acid, together with frequent garglings of the throat with a mixture of Vinegar, soft Water, each, one gill, Salt a teaspoonful, and an absolute quietness of the voice for some time, will frequently remove the disease. Or, gargles of Borax and Alum; Sulphuret of Potassa; Chlorate of Potassa; Hydrastis and Cimicifuga; Sulphate of Iron; Cimicifuga and Geranium; Tannin; Hamamelis; Statice, Hydrastis and Capsicum, etc., in solution or infusion, may be used with benefit.

The careful application to the throat and fauces of a mixture of one part of Oil of Turpentine and three or four parts of Oil of Sweet Almonds, will frequently be followed by the happiest results. So will inhalations of the vapor of Oil of Turpentine, which in some instances may be improved by the addition of a very small amount of Chloroform. This will be found very efficacious. Medical men appear to be so wholly attached to nitrate of silver in this and other mucous diseases, that they overlook the fact that there are other agents fully as useful, and, in many instances, greatly superior to it.

In the more severe forms, other agents may be required, being introduced upon the affected parts in the form of powder, or solution. The powders usually employed are those of Alum; Sulphate

of Copper one part to ten parts of Sugar of Milk, or of Lycopodium; Sulphate of Iron one part to ten parts of Lycopodium; Chloride of Gold and Soda one part to forty parts of Sugar of Milk; Nitrate of Silver one part to two, three, or four parts of Sugar of Milk, etc. Place a small quantity of the mixture to be used, say a drachm or two, in the form of an impalpable powder, into a wide mouth glass jar capable of holding a pint or a quart; this must then be well closed with a cork holding one vulcanized rubber tube for the mouth, or two for the nostrils. The tube inserted into the cork for the mouth may have a diameter of three-fourths of an inch or an inch; those for the nostrils may be of the same diameter, but the nasal ends should gradually taper off, so as to fit the nostrils. The bottle being well shaken so as to fill its atmosphere with the very finest particles of the powder, the patient will immediately place the tube in his mouth, or the tubes in his nostrils, and take three, five, or ten deep inspirations, which will carry the dust into the larynx, and even into the lungs, sprinkling the air passages in its progress lungward. And this may be repeated as required, two or three times a week. The important point in this inhalation is, to have the powders, the bottle, and the tubes quite dry, and perfectly free from moisture, which may be done by keeping them in a dry and warm place, after having once well dried them.

If the articles are used in liquid form, they may be injected into the larynx by means of the graduated laryngeal syringe, the laryngeal fluid pulverizer, or the fluid pulverizing instrument, which reduces a fluid to so fine a spray or vapor, that it can be readily conveyed even to the air-cells of the lungs by deep inspirations. These instruments can be had of any surgical instrument maker.

Or, the remedies may be directly applied to the interior of the larynx, by means of a large, full-bellied sable hair, camel's hair, or squirrel's hair-brush, placed upon the extremity of a bent whalebone. The use of the sponge probang I have entirely dispensed with, the brush answering the same purpose, and producing less irritation. By means of the laryngeal mirror, the brush may be passed into the larynx to the vocal cords, around the base of the epiglottis, or upon any other part of the throat that may be required. And in cases where the brush can be directly applied to the diseased surfaces, it is probably of more value than any other plan that can be adopted, as there is no risk or danger whatever in applying it to the delicate parts of the air passages.

When a solution of Nitrate of Silver is used, it should be in the

proportion of from forty to sixty grains of the crystals of the silver salt to the fluidounce of distilled water. A solution of Chloride of Lime, or of mild Vegetable caustic, five to fifteen grains of either agent to the fluidounce of water, will often answer a better purpose than the Nitrate of Silver solution. Various substances dissolved in Glycerin, have likewise been used, applying them by means of the brush, as, Nitrate of Silver, Perchloride of Iron, Alum, Sulphate of Morphia, Sulphate of Strychnia, Iodide of Ammonium, Bromide of Ammonium, Chloride of Gold and Soda, Iodide of Silver, Tannin, Chloride of Zinc, Nitrate of Uranium, Sulphate of Copper, Sulphate of Zinc, Iodine, Nitric Acid, etc. The advantage in using Glycerin is, that it adheres more persistently to the mucous membrane, than aqueous fluids, and consequently keeps this membrane under the action of the dissolved agent for a much longer time. Borax and Glycerin is recommended for healing ulcers at the root of the epiglottis.

When it is desired to apply solid caustic to an ulcer, growth, or other morbid condition of the larynx, this may be done by means of a laryngeal caustic-holder, which is so arranged that, after touching the part, it is immediately withdrawn into its sheath. A small stick of Nitrate of Silver may be attached to its cauterizing extremity, or, a small smooth piece of soft wood, moistened with concentrated Nitric Acid. This may be applied to any part of the larynx, by the aid of the laryngoscope, just barely touching the part.

Counter-irritation to the external surface of the throat, directly over the larynx, will always be found useful. The Compound Tincture of Camphor may be well rubbed upon the parts every night and morning; or, a pustular eruption may be produced by the application, two or three times a day, of a liniment composed of Olive Oil, Oil of Turpentine, each, two fluidrachms, Oil of Origanum four fluidrachms, Croton Oil one fluidrachm; mix. In very severe and obstinate cases, and especially when there is aphonia, the Compound Tar Plaster applied alternately to the throat and back of the neck, so as to keep up a constant discharge from one or the other locality, will prove serviceable.—If the uvula is enlarged and elongated, a portion of its inferior extremity should be excised, in order to lessen irritation. Enlargement of the tonsils, if not removed by local applications, will also require to be excised.

Œdema of the epiglottis frequently occurs in this affection, and is generally attended with difficulty of swallowing, aphonia, occasionally ulcerations both of the larynx and epiglottis, and in a few

instances with destruction of the cartilages. It may be reduced by applications of strong solution of Nitrate of Silver from time to time, in conjunction with Iodine and Iron. In obstinate cases, small scarifications made with a proper instrument, assisted by the laryngoscope, will afford prompt and decided relief.

The constitutional treatment consists in the internal employment of the Compound Syrup of Stillingia with Iodide of Potassium, or the Iodine Pill, Iodide of Ammonium, Bromide of Potassium or Ammonium, etc.; in conjunction with a lozenge composed of Hydrastin, Geraniin, and Cimicifugin, or, the Compound Troches of Liquorice.—In the earlier periods of the disease, one of the following preparations will be found very efficacious; the dose of either should be allowed to pass slowly down the throat: 1. Take of Canada Balsam one drachm, Oil of Cubebs two drachms, Oil of Stillingia fifteen minims, Alcohol two drachms; mix, and triturate well together. The dose is five or ten drops on sugar, repeated three or four times a day. 2. Take of Compound Syrup of Spikenard six fluidounces, Fluid Extract of Stillingia two fluidounces, Iodide of Potassium two drachms; mix. The dose is a teaspoonful or two, to be repeated three times a day.

The bowels must be kept regular by small doses of Podophyllin and Leptandrin, or, of Iridin and Leptandrin, which may be given in the form of powder, triturated with sugar, or, in pill form; and the skin must be strictly attended to, by repeated bathings, frictions, and an occasional Spirit Vapor Bath. If the digestive functions are disordered, the appropriate treatment must be pursued therefor. The diet must be especially regulated, avoiding all acrid, irritating, and indigestible aliment, as well as all articles that disagree with the stomach. Dusty and vapory places must be avoided, as well as exposures to damp and windy weather; moderate exercise should be taken daily in the open air. Reading aloud must be prohibited, as well as public speaking, or much talking. In summer, cold douches to the throat and neck may be used as adjuncts.

CHRONIC LARYNGITIS.

Chronic Laryngitis may be primary, or it may follow acute laryngitis; very frequently it ensues as the consequence of several diseases of the throat, especially follicular pharyngo-laryngitis. The disease is a very common one, and is apt to involve the lungs by sympathetic irritation and extension, especially among weak and scrofulous persons. Males are more subject to it than females. Its duration varies from a few weeks to several years.

The *causes* of chronic laryngitis are the same as those of follicular pharyngo-laryngitis. It is frequently dependent upon tubercular phthisis; while again, where there is a predisposition to consumption, the irritation of the lungs induced by the laryngitis, may hasten the pulmonary tuberculosis. Mercury, syphilis, foreign bodies in the larynx, and injuries of the throat, may also give rise to chronic laryngitis.

The *symptoms* of chronic laryngitis are generally very insidious, progressing so gradually, that frequently the disease has advanced to a serious extent, before the patient bestows any particular attention to it, or manifests any anxiety regarding its treatment. Many of the symptoms present in follicular pharyngo-laryngitis, are also present in chronic disease of the windpipe, being due in the former affection to the laryngeal complication. In the milder cases, there will be experienced a slight irritation or tickling in the throat, giving rise to a hawking, or short hacking cough, often followed by expectoration of more or less mucus, and which act occurs so frequently, especially when the patient is speaking, that he is hardly aware of it. This irritation is augmented by inhaling cold air, or dusty particles, by catarrhal inflammations, by sudden changes from heat to cold, and by prolonged or energetic vocal exercise.

The physician is, however, rarely invoked to treat the milder form, it is generally only in the stage of ulceration when his assistance will be sought, and then the symptoms are usually well marked. There will frequently be a dryness of the throat, with considerable irritation or tickling; the voice will be materially altered, being either rough, cracked, hoarse, squeaking, whispering, enfeebled, or completely lost. A sense of uneasiness or pain is felt in the larynx, which may be limited to a small space, or extend over the larynx; and pressure upon the thyroid cartilage will occasion soreness or pain. From the irritation induced by extension of the ulceration, the small laryngeal muscles contract spasmodically, causing a partial or complete approximation of the lips of the glottis, and a constriction at the laryngeal orifice, which affects respiration, causing much difficulty of breathing and cough. The cough is at first dry, short, and hacking; but at a later period, and when the glottis is incapable of being closed, it is loose, continuous, of a peculiar, jerking, hawking character, of high pitch, and followed by expectoration of more or less mucus, sometimes mixed with pus or blood. It will be noticed that it is rarely the case that a coughing fit occurs in this affection, unless it has been immediately preceded by a quick, short, and deep inspiration. The sensibility of the larynx is always more or less increased, and which is principally ob-

served in the fact that cough is readily excited by cold applied to any part of the body, but especially to the soles of the feet, the throat, and upper part of the back; indigestible substances in the alimentary canal, irritants, constipation, inhalation of dust or dry air will also occasion cough. The respiration is generally more difficult at night, and after any physical exertion; and, according to the degree of œdema of the glottis, or approximation of its lips, it may be hissing, whistling, stridulous, or suffocative. When the epiglottis is affected, there will be difficulty of swallowing, and a disposition for particles of food to fall into the glottis.—Epiglottic ulceration, ossification of the cartilages, and the other more serious consequences of the disease, will be treated upon separately.

In the advanced stage of the disease, hectic fever, night sweats, constant irritating cough, profuse expectoration, emaciation and debility are present, which symptoms so strongly resemble those of phthisis, that the disease has been called "laryngeal phthisis." A careful examination of the chest will reveal whether the laryngeal malady be accompanied or not with tuberculosis of the lungs.—When the disease proves fatal, it is either from severe irritative fever, asphyxia, or pulmonary consumption.

An examination by the *laryngoscope* will reveal various appearances, according to the locality and extent of the disease. In many parts of the larynx, the tissues will be observed thickened and indurated from submucous and interstitial deposits of serum, lymph, or albumen; the mucous membrane may be slightly injected, or may possess its natural pale color, but its surface will be rough, irregular and hardened. Ulcerations of variable size, shape, depth, and location may be discovered. The ventricular or false cords are frequently ulcerated, especially on the borders of the ventricles, and to which organs the ulceration often extends. The vocal cords may also be ulcerated, but much less frequently than the ventricular. If the ulcer is seated at the junction or anterior part of the vocal cords, both speaking and coughing will produce soreness and uneasiness; if the anterior or lingual surface of the epiglottis is ulcerated, there will be pain or difficulty in swallowing. Ulceration between the arytenoid cartilages frequently gives rise to vomiting, by reflex irritation. Generally, but not invariably, when the lungs are sound, the ulceration is confined to that part of the larynx *above* the vocal cords; though all parts of the laryngeal surface may be affected by ulceration, extending downward to the trachea and bronchi. Old and extensive ulcerations frequently present a number of soft, reddish, vascular elevations, which have been termed "caruncles." Sometimes ulceration may destroy one or both of the vocal

cords, giving rise to incurable aphonia,—the same result will occur when the vocal cords are permanently separated, with an entire loss of action, deep red color of their mucous covering, and immobility of the arytenoid cartilages. Syphilitic ulcerations usually have a sloughy base. Other morbid changes may also be observed, but they will be specially referred to hereafter. The above are the chief appearances presented by the laryngoscope, in the malady under consideration.—In the examination of the larynx after the cure of extensive ulceration, the general cavity of this organ will be found contracted and irregular, and the vocal cords will have lost their natural appearance.

Associated with the above-named conditions, the mucous membrane of the pharynx may be found thickened and indurated from subjacent deposit, and this may extend to that covering the velum palati, with, probably a loss of some part of its substance, or, perhaps its adhesion to the back part of the pharynx. In other instances, we may find an enlarged or cavernous throat, from atrophic contraction of the pharynx, the result of augmented absorption.—The *pathological appearances* confirm those observed with the laryngoscope.

The *prognosis* of chronic laryngitis is favorable in its simple and mild forms; yet it must be borne in mind that where the disease has once manifested itself and been cured, there is always a subsequent predisposition to its return upon even a slight exposure to its causes. Ulcerations may be healed when of not too long standing or too extensive; the prognosis, however, is less favorable in scrofulous and weakly constitutions, or where there is a disposition to phthisis. The more extensive the ravages of the disease the more unfavorable is the prognosis. And when the laryngeal disease is consecutive upon pulmonary tuberculous excavations, it is incurable. Syphilitic ulceration is frequently curable, especially when the local lesion is not very extensive, and the constitution has not become enfeebled.

The *treatment* of chronic laryngitis, like that of follicular pharyngo-laryngitis, is both local and constitutional. The local measures consist in the application of powders or medicated fluids to the diseased surfaces, by the means named under the treatment of the preceding disease referred to. Wherever ulceration is to be seen, a strong solution of Nitrate of Silver (more commonly forty grains to the fluidounce of distilled water), should be applied to it every day or two by means of the curved brush, aided by the laryngoscope; and the same application should be made to any abnormal appearance in the fauces or pharynx. Or, concentrated Nitric Acid

may be touched upon the ulcerated surfaces, by means of a soft piece of wood moistened with the acid, and fastened into the laryngeal caustic-holder. This course must be persevered in until the ulcers have healed. Frequently, an improvement in the voice will be observed after the first two or three applications, provided the vocal cords and their necessary appendages have not been permanently impaired. If the remedial agents can not be applied in this manner, then some of the other methods referred to under Follicular Pharyngo-laryngitis may be pursued.

Counter-irritation externally over the larynx, or along the sides of the neck, should also be produced, either by rubefaction, pustulation, or suppurative discharge. Excessive irritation, cough, or tendency to spasm of the glottis, may be relieved by the inhalation of some anodyne vapor; and, in many instances, much benefit will be derived from a Belladonna Plaster, or Compound Plaster of Belladonna, worn over the larynx.

The constitutional treatment will be the same as that named under Follicular Pharyngo-laryngitis. Syphilitic ulcerations may be treated locally by Nitrate of Silver, or Chloride of Gold and Soda, in solution, or by Nitric Acid, together with the internal treatment recommended for Constitutional Syphilis.

After the ulcers have healed, there may remain a thickening and weakened action of the vocal cords, with or without dyspnœa, on exercise; an absorption of the interstitial deposit occasioning these symptoms will be followed by permanent relief. This may be effected by the internal use of the Iodide or Bromide of Potassa or of Ammonium; Croton Oil Liniment, or Compound Plaster of Belladonna over the throat and larynx, externally; and the daily local application of the following solution, by means of a suitable sized curved brush.—Take of Chloride of Gold and Soda four grains, Hydro-chlorate of Ammonia eight grains, Distilled Water one fluid-ounce; dissolve the salts in the water. Inspiring Ammoniacal vapor, not too strong, will also be found advantageous, as well as the vapor from Oil of Turpentine.

The general management of the patient, hygiene, etc., will be the same as advised under Follicular Pharyngo-laryngitis.—When some of the more serious complications, to be presently considered, are likely to arise, it has been recommended to make a fistulous opening into the *trachea*, and to keep it constantly patulous; this will afford rest and quiet to the vocal organs during their treatment with the local medications, and, the voice can be restored whenever a finger is placed over the fistulous orifice. This course is said to

have saved the lives of several patients, and has even permitted cures to have been effected; I know nothing of it from experience.

Before closing this article, I would state that in one case of Chronic Laryngitis with ulceration, I applied upon the ulcers by means of a small brush, a mixture of one part of Oil of Turpentine and six parts of Oil of Sweet Almonds. It did not create the amount of irritation I had looked for, and in the course of twenty or thirty minutes after each application, it produced a prolonged relief of all the distressing symptoms. Continuing its use, a permanent cure was effected. I do not know how this may act in other cases, but if as favorable as in the one just referred to, it will become an important and valuable agent in the treatment of this class of diseases, and perhaps, even, in pulmonary phthisis.

It may be proper to again state that all the various laryngeal diseases herein referred to, are frequently associated with tubercular phthisis, either primarily or secondarily. If the disease is primarily seated in the larynx it may extend to the lungs; or, if originally located in the lungs, it may advance upward, producing ulceration, etc., of the larynx. In this association of laryngeal and pulmonary disease, the ulcerations of the former are almost invariably of a tuberculous character; and, like tuberculous ulcers generally, however minute they may be at the commencement, they more or less rapidly extend in width and depth, occasioning fearful ravages. The laryngeal surface of the epiglottis, the larynx, vocal cords, and trachea, are all subject to the attacks of this tubercular ulceration; and, in many instances, the epiglottis will be more or less pendent,—as may be ascertained by a laryngoscopic examination. In all laryngeal diseases, it is the duty of the practitioner to make a careful and thorough exploration of the chest, in order to determine the presence or absence of lung disease.

In these cases, the symptoms are, as a general rule, much more severe than when either disease exists alone, and also progress with more rapidity. There will be a distressing, more or less constant cough, pain in the larynx, difficulty of breathing, purulent expectoration, emaciation, hectic fever, night sweats, etc. Elongation and relaxation of the uvula is often present, augmenting the irritation at the epiglottic region, and causing increased cough, tickling sensation in the throat, and nausea. The fauces are also apt to be in a relaxed condition, and the tonsils lessened in size and covered with follicular enlargements. A change in the voice from a harsh roughness to an almost inaudible whisper may exist when the ulcer-

ation has attacked the vocal cords, as well as when there is ossification of the cartilages present. The other symptoms of laryngeal disease, as well as of phthisis will also be present in a greater or less degree. This complication of diseased organs will frequently exhaust the patient, who will perish before his lung disease has reached its terminal stage.

In many instances, instead of consumption, the laryngeal or pharyngo-laryngeal disease will be complicated with chronic bronchitis, in which case, in addition to the usual laryngeal symptoms, there will be cough of a loud ringing character, and a free expectoration of a clear and viscid mucus, or, of muco-purulent matter.

In either instance, the larynx should be treated by the appropriate means, for, although we may not always expect to effect a cure of the consumption, yet we may greatly relieve the distressing cough and other harassing symptoms, and, by thus checking irritation and even curing the laryngeal ulceration, prolong the patient's life and render him comfortable. The bronchial complication is generally much more remediable than that of the lung.

In conjunction with the remedies administered for the pulmonary, or the bronchial complication, the treatment will be the same as already advised for the several features which the laryngeal disease may present. Using topical applications to the congested and ulcerated parts; inhalations of soothing and astringent fluids, or of pulverized medicated fluids; external counter-irritation to the sides of the neck, and top of the sternum, as well as along the cervical vertebræ; a very excellent counter-irritant in these tuberculous cases is, a strong ethereal solution of Iodine,—it is apt to cause extreme pain and irritation, but generally has a very favorable effect; applications to the interior of the larynx of Olive Oil, Oil of Sweet Almond, Cod Liver Oil, Borax dissolved in Glycerin, or a solution of two, three or four drachms of Bromide of Ammonium in a fluidounce of Glycerin, which may be applied every day or two, by means of a curved brush, in order to allay irritation; and, in some cases, relief will be obtained by inhaling a small quantity of Chloroform, but not to produce anæsthesia. The uvula should be excised if it be elongated, and the patient should not be allowed to use his voice.—Slightly stimulating expectorants will frequently prove serviceable in producing warmth and free expectoration,—as, Senega, Colt's-foot, Bloodroot, Canada Balsam, Gum Ammoniac, etc.,—and, in the bronchial complication, Lobelia, Tolu, Queen of the Meadow, Stillingia, Elecampane, Hydrochlorate of Ammonia, etc.

ULCERATION AND DESTRUCTION OF THE CARTILAGES OF THE WINDPIPE.

When chronic laryngitis, having reached the stage of ulceration, is allowed to progress without treatment, or, is not benefited by the treatment pursued, the ulcers gradually extend in depth and involve the muscles, ligaments, and cartilages. The epiglottis, the arytenoid, cricoid and thyroid cartilages, the vocal cords, and the tracheal rings, are especially exposed to the inroads of this morbid action. The cartilaginous attachments being gradually destroyed by the ulceration, the cartilage implicated, usually the arytenoid, becomes partially displaced giving rise to difficult breathing, frequently of an alarming and spasmodic character. During the stage of displacement, alarming symptoms of suffocation are present, which frequently produce death before any assistance can be rendered. This suffocative respiration is generally due to a loose, displaced portion of cartilage, and, if this can not be promptly removed with slender curved forceps assisted by the laryngoscope, the only chance left for the patient will be tracheotomy, which should be performed immediately. Sooner or later the cartilage itself becomes destroyed, necrosed, and is ultimately expelled, and which affords relief for a time.

The more usual *symptoms* are laryngeal pain and soreness; a wheezing, or noisy and stridulous breathing; hoarseness; oppressed breathing; more or less difficulty of swallowing; on attempting to swallow, a regurgitation of fluids, and sometimes of solid food, through the nostrils; a hacking, distressing cough, frequently of a metallic, barking, or crashing character; a purulent expectoration, fetid, and sometimes streaked with blood; offensive breath, which is an indication of death of the cartilages with purulent accumulations around them; voice wheezy, whispering, or gone; often a violent cough, followed by a tough ropy discharge; a sensation of being choked up with phlegm; repeated attacks of spasm of the glottis, from the irritation produced by the necrosed cartilage, or, frequently following the act of deglutition in which the epiglottis and loosened arytenoid cartilages are brought into irritative contact with each other; more or less ulceration and destruction of the uvula, and other soft tissues of the throat; disengagement at various periods of one or several pieces of necrosed cartilage, generally during cough; paleness; emaciation; night sweats; pulse feeble and small, rapid, or natural; and death from exhaustion, or from suffocation occasioned by a partially detached cartilage, or by

closure of the glottis from œdema or spasm. Although all of these symptoms will not be present in any one case, yet, as a general rule, several of them will be noticed.

The results of a *laryngoscopic examination* will vary according to the seat of the disease, and the condition of the parts; there may be a relaxed and congested condition of the faucial and laryngeal mucous membrane; an abnormal redness, sometimes of a purplish hue; redness of the epiglottis; enlargement of the follicles at the base of the tongue; uvula gone; epiglottis destroyed; aryteno-epiglottidean folds more or less destroyed or deformed; arytenoid cartilages gone; vocal cords gone, either one or both of them, or ulcerated; ventricular cords more or less ulcerated or destroyed; and various other appearances indicative of the extent of the ravages of the ulceration.

The *prognosis* is always unfavorable, depending upon the extent of destruction of the parts, and their location. In some cases, great relief may be afforded; and, in the milder forms of the malady, life may be prolonged several years.—A very imperfect cure can only be hoped for, when irritation has subsided, from an expulsion of the whole of the diseased cartilage, leaving the larynx free for the passage of air; this, however, rarely occurs, owing to the disproportion between the size of the cartilages, and that of the rima glottidis. If the disease is confined to the arytenoid cartilages, as sometimes occurs, they may be expelled by coughing, and the symptoms of "laryngeal phthisis," as the disease under consideration is frequently termed, may cease; but, in cases of this nature, we have more to dread from œdema of the glottis, or from such an inflamed and tumefied condition of the lips of the glottis, as may destroy life by suffocation. The great danger is from a sudden closure of the glottis. The disease is frequently complicated with tubercular phthisis, which the practitioner should in all cases endeavor to ascertain, by a careful and well-conducted examination of the chest.—In the advanced stage of cartilaginous disease, local applications are useless, and internal remedies are of no avail whatever.

Pathological examinations also vary; in addition to a confirmation of the diseased appearances detected by the laryngoscope, the thyroid cartilage may be found perforated by one or more ulcers, or necrosed, denuded of its perichondrium, and enveloped in purulent matter, or, one wing alone may be diseased, or, portions of it may have exfoliated. The arytenoid and cricoid cartilages are more commonly diseased; the former may be denuded anteriorly, may be mortified, or entirely gone; the latter may have its anterior part

gone by mortification, together with the upper tracheal rings; or, it may be destroyed posteriorly by an abscess, or, it may be necrosed, displaced, or, more or less of it be absent. Denudation and destruction of the ligaments are often present; suppurative perichondritis, from inflammation commencing in the cartilaginous structures, is sometimes present, giving rise to abscesses, which may discharge their contents in various directions. Ulcerations may be observed in various parts of the larynx and trachea; and, sometimes, especially in long-standing cases, the cartilages will become wholly or partially ossified. The epiglottis may be enlarged, thickened, swoln, ulcerated, contracted and shrivelled, or destroyed to a greater or less extent. The above are some of the principal effects of the disease, observed in post-mortem investigations.

The *treatment* in this malady, though occasionally followed by a cure, is in nearly all cases of a palliative character, the principal object being to relieve severe symptoms and smooth the patient's passage to the grave. In many respects it will resemble that named for Chronic Laryngitis, adopting the same constitutional and hygienical measures. Absolute rest of the vocal organs is required, and cough must be controlled or alleviated by the proper remedies. Swallowing must be rendered as easy as possible by the adoption of a diet composed of jellies, strong animal broths, and other soft or fluid and nutritious preparations. Where there is much difficulty or soreness in swallowing, or where, from destruction of the epiglottis, there is an inability to swallow liquids, the patient may be fed through a tube passed into the œsophagus. Ulcerations require the same treatment as named under Chronic Laryngitis. The Belladonna Plaster, Terebinthinate Liniments, fomentations of Lobelia and Stramonium Leaves, may be applied to the neck to relieve irritation, and spasm of the glottis; and for the latter symptom, Gelseminum or Lobelia, may be administered internally at the same time, when the danger is not so imminent as to require surgical measures. Dr. Gibb advises a fistulous opening to be made into the trachea, in order to relieve the dyspnœa, and through which, to remove necrosed portions of laryngeal cartilage, as well as to make the necessary local applications to the diseased surfaces,—this holds out a chance for the laryngeal mischief to improve, and in favorable cases to heal up and get well. It should not be left to the last moment, but should be performed as soon as the symptoms indicate necrosis to be present,—and, after immediate danger is overcome by cutting an orifice in the trachea, the thyroid cartilage must be laid open through one of its wings, so that the pent-up dead portion of cartilage can be removed. Then,

if the disease is checked by the local applications made through this wound, it can be closed at a future period by a plastic operation, the fistula lower down being permitted to remain open for the purposes of breathing, as long as may be required.

Syphilitic Disease of the Larynx occurs in broken-down consitutions from the syphilitic dyscrasia, and almost always among those who have taken mercury. The laryngeal disease is generally an extension of the disease from the pharynx and fauces, and is usually associated with secondary eruptions, emaciation, debility, and a peculiar wan appearance. The *symptoms* will vary according to the character and extent of the local affection. Sometimes there will be a rapidly spreading ulceration, giving rise to supra-glottic œdema, followed by sudden death. In most instances, however, the affection assumes a more chronic condition, giving rise to one or more of the symptoms of chronic laryngeal disease, as, partial or complete aphonia, or a hoarse stridor in speaking, suffocative cough, expectoration of pus and blood, pain in some particular part, frequently difficulty in swallowing, and, sometimes, abscess and fatal dyspnœa from its pressure inward, simulating œdema. In nearly all instances there is some amount of supra-glottic œdema, giving rise to a corresponding intensity of dyspnœa. Both the history and the appearance of the patient will indicate the true nature of the laryngeal affection.

Besides the more or less extensive ulceration that may be observed in the fauces, pharynx, tonsils, uvula, and soft palate, and as far upward in the pharyngo-nasal recess as may be, by the rhinoscope, the *laryngeal mirror* will reveal, according to the character of the local malady in the larynx, more or less intense redness of a greater or less portion of the larynx, trachea, and vocal cords; deep red patches in the larynx; an œdematous condition of the ventricular cords, or a thickening of the mucous membrane over the arytenoid cartilages, and at the side of the larynx, in the situation of the ventricular cords; projections of portions of the soft structure of the interior of the larynx in the form of little folds or projections simulating growths; ulceration of various parts, as, of one or both vocal cords, of the aryteno-epiglottidean folds, of the posterior surface of the larynx, of the trachea, of the epiglottis on its lingual surface, its tip, its base, or in the hollow on either side of the frænum of the epiglottis, etc.; more or less œdema of some of the parts above the glottis, etc. Generally the syphilitic ulcers, have a sloughy base, are larger, more extensive, deeper, and irregular,

while the tuberculous are smaller, rounder, more superficial, and scattered over the superficial structures. Some of the appearances referred to under Chronic Laryngitis, Ulceration and Destruction of the Cartilages, Ulcers of the Epiglottis, etc., may likewise be observed.

The *treatment* will consist of constitutional measures for the removal of the syphilitic affection, conjoined with local applications to the morbid surfaces, growths, ulcers, etc., of Nitric Acid, solution of Nitrate of Silver, Chloride of Zinc, Chloride of Gold and Soda, or, a solution of Chloride of Zinc eight grains, Chloride of Gold and Soda four grains, Water one fluidounce; to which three or four grains of Muriate of Morphia may be added if there is much soreness or irritation. To be applied by means of the laryngeal mirror, and instruments heretofore mentioned. Pulverized fluid, or the spray of Nitrate of Silver solution, or of solution of some other preparations heretofore named for the treatment of laryngeal diseases, ulceration, etc., will also be found exceedingly beneficial in syphilitic laryngeal disease.—Should supra-glottic œdema be present, threatening suffocation, *tracheotomy*, not laryngotomy, should be resorted to, because, ulcers frequently exist in the inferior part of the larynx, and a chance is then held out for a better recovery with some voice. If the amount of swelling and obstruction in the larynx, as seen by the laryngoscope, is such that the most successful medicinal treatment could not be expected to remove it for at least several days, speedy suffocation being threatened from narrowing of the glottis, we should always resort to tracheotomy before the lungs have become gorged to such an extent as to render the operation useless.

The ulcers in the fauces, pharynx, pharyngo-nasal recess, tonsils, etc., should also be treated daily by similar local applications, being aided in the operation by the rhinoscope when required. I prefer Nitric Acid to any other agent for application to these ulcers.

DISEASES OF THE EPIGLOTTIS.

In a passive state, when the tongue is protruded forward, the epiglottis should be naturally in an erect or vertical position; but it is not always found in this position, being frequently situated more obliquely, in various degrees from that of its normal standard to an almost horizontal position, and this too in persons presenting no symptoms of disease. This depression backward or PENDENCY OF THE EPIGLOTTIS, is occasionally congenital, when it becomes a matter of considerable danger to children suf-

fering from any of the diseases of childhood involving the throat, as, croup, diphtheria, scarlatinal angina, etc. According to Dr. Gibb, about eleven per cent. of mankind, including adults and children, males and females, have not a vertical or erect epiglottis; and, perhaps, this per centage may eventually be found still greater.—It is generally the result of frequent catarrhal attacks, sore throat, or follicular disease, which renders the contractile power of the glosso-epiglottic ligament more or less enfeebled; and sometimes likewise gives rise to a spasmodic action of the aryteno-epiglottic folds, which occasion a persistent depression backward of the epiglottis. This condition may also be associated with congestion of the cartilage, and the patient's voice becomes thick and guttural, with more or less dyspnœa, a sensation as if some foreign body were at the root of the tongue, efforts to clear the glottis, suffocative attacks, irritation and burning sensation in the throat, feebleness of voice, tickling sensations in the throat, cough, and various odd sensations.

The application of a probang to the lingual surface of a pendent epiglottis is fraught with danger, and no practitioner is free from censure who attempts such applications without having first made himself acquainted with the position of this cartilage by a laryngoscopic examination. For, if the sponge come in contact with this surface of the epiglottis, it must force it farther downward, and for the time being close up the glottis.

The *laryngoscope* will detect the depressed epiglottis, which may be congested, ulcerated, curved toward one side, or doubled up laterally like a scroll, stiff, thickened, etc. Catarrhal or follicular disease of the fauces may also be observed; and, if the epiglottis can be raised by sudden forcible expiratory efforts, more or less laryngeal disease may also be revealed—but it is not in all cases where such efforts will enable the observer to get a view of the larynx.

The *treatment* will vary according to the condition of the epiglottis; if much irritation be present, soothing and anodyne gargles may be used, as, an infusion of Hops, Poppy Leaves, Mullien Leaves, Peach Leaves, etc.; and, in many cases, the addition of one-third or one-half part of Vinegar to the infusion will be advantageous,—or, the gargle may be composed of Vinegar and Water a gill, to which a teaspoonful of Salt may be added, or the same amount of Laudanum. When the irritation is not very severe, tonic and astringent gargles may be used, as, of Golden Seal and Geranium; Witch Hazel and Golden Seal; Blue Cohosh and Golden Seal Bayberry, Marsh Rosemary, Blackberry Root, etc. When there

is a lax, enfeebled condition of the affected parts, gentle stimulants may be added to the gargles, as, infusions or decoctions of Prickly-ash Bark, Virginia Snakeroot, Capsicum, Colt's-foot, Sage, Spirits of Camphor, etc.

The epiglottis should be frequently showered with weak solutions of Perchloride of Iron, Sulphate of Zinc, Nitrate of Silver, ten, twenty, or forty grains to the fluidounce, or, Sulphate of Quinia, or other tonics, etc.; and in very obstinate cases, a drop or two of a dilute solution of Nitrate of Strychnia in Glycerin may be dropped upon the inferior part of the lingual surface of the epiglottis, by means of a graduated laryngeal syringe, and be repeated once or twice a day.

Counter-irritants along the sides of the neck, and on each side of the cervical vertebræ, will frequently prove serviceable as auxiliary means, and, in all instances, any accompanying pharyngeal or laryngeal disease must be treated at the same time; the latter, however, only when the cartilage can be so elevated as to allow the practitioner an opportunity of inspecting it, and applying remedies by the aid of the laryngeal mirror.—Constitutional measures will not be necessary in simple pendency of the epiglottis, unless there be extreme debility, or some syphilitic taint, struma, etc., present.

Ulceration of the Epiglottis may exist independently of any disease of the larynx, but more frequently associated with it; it is the result of inflammation, or may be caused by an extension of pharyngeal or laryngeal disease. The *symptoms* are, hoarseness, soreness, pain, especially in swallowing, and which is located under the cornua of the hyoid bone, irritative cough, and expectoration more or less tinged with blood and increased after eating. Deglutition is very difficult, and on attempting to swallow fluids, they will be frequently ejected through the nostrils: this is especially the case when the epiglottis is partly or wholly destroyed.

In making a *laryngoscopic examination*, care should be taken to thoroughly pull the tongue in a forward direction, when the ulcerations may be seen. Any part of the epiglottis may be ulcerated, but the more frequent parts are the borders, and that portion of it situated close to the base of the tongue. The ulcers are very apt to have ragged edges, and to give an uneven and notched appearance to the margin of the cartilage. If the ulcers are syphilitic, they will have a sloughy base, and are more commonly seated on the lingual surface of the epiglottis; though all ulcers at this loca-

tion must not be deemed syphilitic. When the ulcers are on the laryngeal surface of the epiglottis, this cartilage becomes somewhat flattened instead of crescentic; also enlarged, and thickened from submucous infiltration, and the ulcerations spreading to its border, give to it a serrated appearance. In some ulcerations, the epiglottis will be nearly erect, or pendent, incurvated, or rolled up like a scroll. It must be remembered that, not unfrequently, ulceration of the larynx and epiglottis is associated with, or dependent upon tubercular consumption, in which instances, the symptoms are usually of more aggravated character, and run their course more rapidly; the ulcers, in such cases, differ from those resulting from idiopathic laryngeal disease, in being of a tuberculous character. Bronchitis is also often met with as a complication of the throat disease.

Sometimes, instead of ulcers, *erosions* will be observed upon the border or center of the epiglottis, the result of irritation from follicular disease, or from tubercular phthisis. These erosions seldom, if ever give rise to ulcerations.—Occasionally, the free portion of the epiglottis will be found more or less destroyed, and when this is the case, deglutition will be difficult or wholly impossible.

The *treatment* of ulcerated epiglottis consists in the topical application of strong solution of Nitrate of Silver, of concentrated Nitric Acid on a soft piece of wood, or of Perchloride of Iron, etc., being careful to have the solution used come in contact with every portion of the surface of the ulcer. In strumous patients, after healthy action has commenced in the affected parts, by the use of the above applications, the subsequent treatment may consist in applications of Bromide of Ammonium ten or twenty grains to half a fluidounce of Glycerin; or, Iodine, Iodide of Potassium, each, one scruple, Glycerin one fluidounce; mix. Or, of Iodide of Silver, Iodide of Ammonium, each, five or ten grains to a fluidounce of Water. Re-applying the previous agents occasionally, or whenever the healing process appears retarded. *Erosions* may be removed by a strong solution of Nitrate of Silver applied to the whole cartilage; by the application of the above-named mixture of Iodine and Glycerin; and, in many instances, by a solution of Chloride and Gold and Soda two grains, Hydrochlorate of Ammonia four grains, in Water one fluidounce. These various agents are to be applied by means of a soft brush, or curved syringe, and not by means of a sponge; except the Nitric Acid, which must be applied as heretofore named, page 569.

Soothing and astringent gargles should not be neglected; those named under the treatment of Pendent Epiglottis will be found use-

ful.—If the epiglottis be partially or completely destroyed, of course there can be no hope of restoring it, yet with a view to relieve the patient and perhaps to prolong his life, measures should be adopted to remove any abnormal conditions of the throat, larynx, etc., that may be found remaining; and, indeed, this will be necessary at any time during the ulceration, as soon as the various parts of the larynx can be observed, and remedies be applied by means of the laryngoscope. In all instances, such constitutional treatment should be prescribed as the condition of the patient demands; and the hygienic means should be in accordance with those named under Follicular Pharyngo-laryngitis, and Chronic Laryngitis.

Mucous cysts and *vesicles containing fluid* may be observed upon the laryngeal surface of the epiglottis, requiring to be opened by incision. Sometimes various deformities of this cartilage will be noticed, for which nothing can be done, as, a fissure in the median line, a circular aperture through it, or, it may be twisted or doubled, laterally or backward, or may be elongated.

APHONIA.

Aphonia is a term applied to a complete loss of the voice, including any modifications or alterations of it that are not natural. It is divided into functional aphonia, and organic aphonia.

Functional Aphonia is always associated with either general or local impaired nervous power, or deranged innervation, without any manifest lesion of structure; it may be due to various circumstances, among which may be named—*emotional causes*—as excessive and sudden joy, grief, anger, or fright, etc., or whatever mental emotion will occasion a strong shock to the nervous system, and especially to the laryngeal nerves; and the loss of voice may occur suddenly or within a short time after the mental excitement, continuing for weeks, months, or even years, and then suddenly become restored to its normal condition, without any apparent cause.

Impaired innervation from constitutional influences, which give rise frequently to a very obstinate aphonia. These influences originate from enfeebled conditions of the system, which impair the nervous energy of the larynx, either by direct or reflex action. Profuse hemorrhages, anemia, chlorosis, leucocythemia, leucorrhea, dysmenorrhea, and derangements of the digestive organs, may all give rise to aphonia; so may rheumatism; and, in some instances,

a greater or less suppression or modification of the voice will be met with at the period of menstrual cessation.

Hysteria is frequently a cause of aphonia, but not to such an extent as was supposed in former years. It occurs chiefly among delicate, nervous, or hysterical females, at some time during their catamenial existence, and may be known by being associated with uterine derangements, and other hysterical symptoms. The aphonia usually manifests itself suddenly, and may, after a longer or shorter time, return as suddenly without any treatment, or, it may momentarily return at regular or irregular periods, for a number of times previous to its spontaneous disappearance. Hysterical aphonia has been known to continue for three or four years before it became permanently removed. Not unfrequently the natural voice returns momentarily when the patient is under the influence of strong moral excitement. This form of the disease is sometimes met with among males of a highly nervous and debilitated condition of the system, sedentary persons, and those who are frequently called upon to speak in public in an elevated tone of voice.

Certain local influences may also impair the nervous energy of the vocal chords, producing a more or less complete paralysis accompanied by aphonia, as, overexertion of the voice in singing, reading, public speaking, etc.; congestion of the vessels of the laryngeal mucous membrane, neuralgia of the throat; local paralysis from any cause, especially as a sequel to the exanthematous diseases, diptheria, hooping cough, etc.

Compression of the pneumogastric nerves, or of their branches, will also give rise to aphonia, curable only by the removal of its cause. This cause may be, bronchocele, glandular enlargements, aneurisms, or other morbid growths in the immediate vicinity of the larynx or trachea. Irritation of the branches of the nerves will sometimes cause a more or less complete loss of voice.—Aphonia is occasionally the result of certain *poisons* which have been introduced into the system, producing a nervous exhaustion or paralysis, as, arsenic, antimony, mercury, and, especially, lead. This form of aphonia is generally associated with the effects of the poison in other parts of the system; and, when occasioned by lead, the characteristic blue line will be observed on the margins of the gums.—*Exhausting diseases*, as, cholera, are likewise frequently accompanied by laryngeal difficulties terminating in aphonia.

The character of the aphonia, or the change of voice in all these instances will differ according to whether one or both of the vocal cords are affected, and whether the loss of nervous power is complete or incomplete. There may be more or less considerable

hoarseness, a nasal timbre of the voice, whispering, or complete aphonia.

A *laryngoscopic examination* will discover, in most instances, a normal color of the vocal cords; sometimes they will be observed quite pale or white; and, occasionally, they will present a pinkish redness; or they may be covered with disseminated red spots upon their surfaces; or, one or more red lines (strongly distended veins), may be seen running across them. The mobility of the cords may be observed to vary; in some instances, there will be no movements whatever, in others the movements are imperfect or insufficient, so that the cords do not approch the median line in an equal manner; thus, they may not meet each other, leaving a larger or smaller space between them, according to the degree of paralysis present, or, they may slightly approximate anteriorly, but much less so posteriorly, where they leave quite a space for air to rush through, or, they may approximate more closely at their extremities and less so at their centers, forming thin arcs of a circle, or, although they meet each other properly, yet a slight aperture is formed posteriorly, which allows the air to pass outwardly. Frequently, there will be an abnormal condition in the power of tension in one or both cords, which is generally due to a more or less paralytic condition of the three constrictor muscular groups of the glottis, as, the lateral crico-arytenoid, the arytenoid, and the thyro-arytenoid muscles. Sometimes, but not always, there may be a congestion of the larynx or trachea, or, of both.

The *prognosis* of functional aphonia, as a general rule, is favorable. Though cases will sometimes be met with which obstinately resist all our remedial measures, the aphonia being permanent and incurable; these unyielding cases are due to several causes; as, a constitutional defect in impaired innervation,—some minute or molecular change of the muscular fibers, of which we are at present not cognizant, the result of overstraining of the voice, or of some equally injurious action,—long-standing emotional aphonia with resulting atrophy;—or, mechanical pressure on the nerves.

The *treatment* of functional aphonia, consists principally in the direct application of agents to the vocal cords and surrounding parts, for the purpose of stimulating nervous force, and which agents, in all instances, are applied with the aid of the laryngeal mirror. Thus, by means of the laryngeal shower-syringe or fluid-pulverizer, the parts may be showered every one, two, or three days with a solution of Nitrate of Silver twenty grains to the fluid-ounce; or, other tonic, as, Sulphate of Copper, Sulphate of Zinc, Golden Seal and Geranium, etc. In some instances, especially

when the aphonia is recent, a solution of Nux Vomica or Strychnia carefully showered upon the cords will restore muscular contraction and closure of the glottis, with a return of voice. The above various solutions may be formed of Water, Glycerin, or equal parts of each; and their strength will vary according to their influence, commencing with weak solutions at first. Strychnia solutions should not contain over two grains of the alkaloid to the fluid-ounce, of which not more than from fifteen to twenty-five minims should be used at a time, by means of a graduated laryngeal syringe.—Direct Faradization of the vocal cords and arytenoid cartilages has cured many obstinate and long-standing cases, but it also frequently fails; it is applied by means of an instrument termed the "laryngeal galvanizer," or "electropole." Currents of moderate power only should be employed. For the mode of application the reader is referred to "Althaus on Medical Electricity," to "Medical Uses of Electricity," by Garratt, to "Gibbs on the Throat and Windpipe," and to the works on Laryngeal Diseases, by Elsberg, and by Semeleder.—Stimulating vapors, by inhalation, frequently produce surprising effects, as, the vapor of Oil of Turpentine, Tobacco smoke, vapor of Ammonia, or of Iodine, etc.; but great care should be taken to avoid causing inflammation or too active a degree of irritation.

External applications will also be found serviceable; counter-irritation may be made alternately to the front of the neck, to the sides, and along the course of the cervical vertebræ, by means of the Compound Tincture of Camphor, Compound Liniment of Stillingia, Compound Liniment of Oil of Amber, Croton Oil Liniment; and, in obstinate, long-standing cases, the Compound Tar Plaster may be used. In a few instances I have derived much benefit from an external application of the following preparation, used daily or every other day: Take of Strychnia twenty grains, Veratria forty grains, Oleic Acid four fluidrachms; mix, dissolve the alkaloids, and then add Olive Oil, or Simple Cerate fifteen and a half drachms. Use a small portion of this at a time, rubbing it well into the neck and on each side of the cervical vertebræ, and being extremely careful not to apply it where the skin is scratched or abraded, etc. This will likewise be found a very valuable application in laryngeal spasmodic affections of a suffocative character, or occasioning severe dyspnœa.—When the aphonia is due to certain local influences, a strong ethereal solution of Iodine may be applied to the external throat, with advantage in many cases; it is a powerful counter-irritant, and frequently exerts a more decidedly beneficial influence than other agents of this kind.

Internally, tonics are required; as, the Citrate of Iron and Quinia, Citrate of Iron and Strychnia, Citrate of Iron and Quinia with Strychnia, in conjunction with Alcoholic Extract of Aletris, Black Cohosh, or Blue Cohosh, Oleo-resin of Ptelea, etc. Any renal, hepatic, gastric, or other malady, that may be present, will require suitable treatment, as well as any peculiarity of the constitution, debility, scrofula, syphilis, erysipelas, etc. In the hysterical female, there is almost always some menstrual derangement, which will require especial attention; and the restoration of the normal menstrual function will be followed by a return of the voice. The local measures, referred to above, may also be pursued. Frequently, in aphonia due to hysteria, the voice will return as suddenly as it was lost, and without any appearance of wasting debility, or exhaustion. When the aphonia is due to lead in the system, Iodide of Potassium, of Ammonium, or of Soda, with some preparation of Strychnia, internally.—Faradization of the vocal cords,—and plasters of Sulphur, or of Sulphuret of Potassa to the anterior part of the neck, will be found advantageous.—Gentle exercise, in the open air when possible, nutritious diet, and attentions to the bowels, skin, and kidneys should never be overlooked.

Organic Aphonia may likewise be due to various causes, among the most common of which are the following: *Acute or chronic inflammation* of the mucous membrane of the larynx, epiglottis, and vocal cords, and which may be associated with catarrhal inflammation or bronchitis. In the acute inflammatory attacks, the loss of voice is preceded by hoarseness, and the voice may disappear gradually or quickly, being reduced to a mere whisper, or wholly absent. Pain or soreness is experienced in the larynx, and a *laryngoscopic* examination will find a vivid redness of the vocal cords, especially upon their free margins, and, in some cases, a strongly-distended vein running parallel with the free inner edges of the cords may be seen; the cords may, in some instances, appear bloody, with croupy cough and dyspnœa. The cords are usually more or less tumefied. The larynx will also be observed more or less congested and red. When the aphonia is due to chronic catarrhal inflammation, the vocal cords are not so intensely red as in the acute attack, the larynx is more congested, however, and its lining membrane somewhat swoln and relaxed. Or, there may be only a slight discoloration of the vocal cords, or, they may retain their normal color. The uvula is apt to be relaxed and elongated, and the pharynx and posterior nares may

present a congested appearance. The chronic inflammation, if not removed at an early period, is very liable to effect several changes in the parts, which I will now proceed to consider.

Induration and thickening of the vocal cords is one of the results of chronic inflammation, and is more frequently observed among females. The *laryngeal mirror* will reveal a dark red color of the cords, which have a rounded and elevated appearance, owing to depositions beneath the mucous membrane, or to its thickening. This thickening may also be due to a hypertrophied state of the proper tissue of the cords, or to interstitial deposits. In either case, the vocal cords become somewhat indurated and rigid, with a constricted condition of the orifice of the glottis. In instances of hypertrophy or interstitial deposition, the structures below the glottis are apt to become affected, and foreign growths frequently protrude from some portion of the diseased cords.

Œdema is another result of chronic inflammation of the vocal cords, and which will be more especially referred to hereafter.—Supra-glottic œdema of the vocal cords may be associated with an œdematous enlargement of the ventricular, which latter may become so extensive as to occasion pain and soreness even upon attempting to whisper, and will frequently prevent the true cords from being observed in the laryngeal mirror. It is very apt to be present among patients subject to gout, rheumatism, albuminaria, syphilis, etc.—Sub-glottic œdema exists when there is an effusion of lymph beneath the membrane, and directly involving the cords, so as to wholly impede their action. The larynx has its diameter lessened, the cricoid' cavity becomes nearly filled up by submucous indurated tissue (organized lymph), reducing the voice to a hissing or feeble whisper.—Aphonia may also result from œdema of the glottis, or of the aryteno-epiglottic folds.

Ulceration of the vocal cords is another consequence of chronic inflammation, inducing aphonia, and is much more frequently met with among males than females. If the mucous membrane of one of the vocal cords only is affected, the voice is rendered rough and hoarse, but some degree of vocal resonance remains; if the investing membrane of both vocal cords ulcerates, the voice loses its power and becomes little more than a rough whisper; and if, not merely the mucous membrane, but the proper tissue of the vocal cords are injured or destroyed by the extension of the ulceration, the state of the aphonia is complete, no proper vocal sound is distinguishable, and a whisper, which is simply an articulation of the ordinary respiration, alone remains. The voice is very liable to become more or less altered by ulcers in other parts of the larynx, speaking being

accompanied with a sense of pain, and followed by more or less uneasiness or fatigue. Aphonia may follow ulceration of the fossæ at the roots of the tongue, and on the sides of the aryteno-epiglottic folds. If the ulceration be seated on the posterior wall of the larynx, or between the arytenoid cartilages, vomiting is apt to occur. Sometimes, when the vocal cords are denuded by the ulceration the only alteration observed in the voice, will be its rough and hoarse character.

The *treatment* of organic aphonia from inflammation, induration and thickening, or ulceration, is by local applications of aqueous or glycerine solutions of Nitrate of Silver to the cords, every day or every other day, by means of a laryngeal syringe, a curved camel's hair pencil, or, when it can be accomplished, by inhalation of the dust of the powdered nitrate. The solution may vary from forty to eighty grains of the silver salt to the fluidounce; the weaker solution of the above being more usually employed. Other solutions may sometimes be advantageously employed, as, of Sulphate of Copper, Nitrate of Copper, Aluminated Sulphate of Copper, Sulphate of Zinc, Sulphate of Zinc and Alum, Sulphate of Zinc and Morphia, Perchloride of Iron, Persulphate of Iron, Permanganate of Potassa, Iodide of Silver and Potassium, etc. All of these agents have been used with benefit, but great care should be taken not to have the strength of the solution so great as to destroy the tissues with which they come in contact. In some instances of induration and thickening, or ulceration, a solution of Chloride of Gold and Soda two to four grains to the fluidounce, with four to eight grains of Hydrochlorate of Ammonia, will prove extremely efficacious. And in instances where the application can be made by means of a soft stick as heretofore named, Nitric, Hydrochloric, or Chromic Acid may be touched upon the ulcerated or indurated cords with great advantage. The chromic acid will require a platinum sponge or filamentous asbestos extremity to the porte-caustic, which should be large enough to hold only part of a drop.—In connection with these applications, it will always prove highly advantageous to make counter-irritation externally, upon the neck, the sides of the neck, and along the cervical vertebræ, by rubefaction, pustulation, or suppuration.—Inhalations of warm vapors will frequently afford benefit, as, of gum Ammoniac, Turpentine, Camphor, Iodine, Creosote, Benzoic Acid, Extract of Stramonium, Opium, Aconite, or Arnica, the particular agent employed depending upon the irritation, cough, degree of nervous debility, etc., present.

In addition to attentions to the condition of the skin, bowels, and kidneys, and other necessary hygienic measures, internal remedies

will be required to overcome active inflammatory symptoms, when present; or, in the absence of these active symptoms, alteratives will be demanded, as, Compound Syrup of Stillingia, or one of the several preparations heretofore named of the Iodides and Bromides. A persistent employment of the means recommended will frequently effect a cure in four or six weeks of an aphonia that has been in existence for several years; though it must not be expected to make such rapid cures in all instances. In many persons, the loss of voice will be irremediable; ulceration of the vocal cords may effect such destruction of them as to wholly prevent a return of the voice, or, else, to render it more or less modified from its usual characters when existing during health. But if only the mucous membrane of the cords be ulcerated, a perfect cure may be effected.—It is very rarely the case that œdema can be remedied in time by local medications; the proper course to pursue will be named hereafter, under Œdema of the Larynx.

Foreign growths upon the vocal cords, or, in their immediate vicinity, may also be a cause of organic aphonia. These morbid growths are of various characters, presenting themselves, as, warty excrescences, or growths resembling a cauliflower, papillary vegetations, foliated epithelial growths, etc.; cartilaginous and other tumors; polypi, etc. According to Dr. Gibb, to whose work on Laryngeal Diseases I am largely indebted for the history and management of these maladies, laryngeal tumors are seated mostly above and below the *origin* of the true vocal cords, being larger and more disseminated when above, and smaller and more compact when below. The root of the epiglottis above the vocal cords, and the sub-glottic space anteriorly below the cords, are the points at which these growths are more commonly observed; the next points in frequency are, the anterior free borders of the vocal cords, and progressively backward upon their surface and border; next, the inner surface of the cricoid cartilage, below and between the arytenoid cartilages and vocal cords posteriorly; then, the ventricles of the larynx, the tumors growing from which point are apt to occasion imminent suffocation; and, rarely, they may spring from the false cords and the aryteno-epiglottic folds, as the result of catarrhal, syphilitic, or cancerous disease.—The epiglottis is more subject to those growths considered as syphilitic.—These foreign growths may vary in number from one to ten, and upward, and are of different sizes from that of a pin's head to that of a hazelnut; most generally they are about the size of a small pea.

Polypus is by far the most common species of tumor found in the larynx; it is variable both in form and structure, being roundish, irregularly-shaped, united in clusters, granular, lobulated, sessile or non-pediculated, but most generally pediculated. Its attachments, whether one or several, broad or slender, are seldom traversed by blood-vessels of any size. By some authors the warty or condylomatous growths are included among these polypi.—The *causes* of these morbid growths are not well understood; a persistent low grade of inflammation, a modification of local nutrition, frequent catarrhal attacks of the laryngeal membrane, and the syphilitic dyscrasia, have been considered exciting or predisposing causes, but there is no certainty in these views.—Several writers consider them to be a hypertrophied condition of the mucous membrane, especially involving its epithelial layer; the areolar tissue observed in it, belonging, as is generally known, to the structure of all the mucous membranes; and the fibrous tissue, more commonly observed at the base of these growths, forming, as it were, a transition between the true mucous polypus and the fibrous.

These growths are generally epithelial, being composed of all the elements of the mucous membrane united, but modified in character by the presence of fibrous or fibro-cellular tissue, the latter more especially in long-standing cases. The epithelial scales are of the squamous variety. In some rare instances, the tumors are cystic, fibro-plastic, fatty, and follicular; again, they may be only prolongations of the mucous membrane from a mucous follicle. Sometimes, they arise from an hypertrophied vocal cord whose structure has undergone some interstitial or molecular change.

The *symptoms* commonly present with these laryngeal vegetations, depend somewhat upon their location and size. There is a sensation of a foreign body in the larynx; stiffness or uneasiness in the acts of respiration and deglutition; more or less cough, which may be hoarse, or croupy, paroxysmal, or continuous, and with or without expectoration; more or less dyspnœa accompanying inspiration, or expiration, or both; the voice may be feeble, hoarse, or otherwise modified in its tone and character; paroxysms of suffocation, in one of which death ensues. Sometimes there may be pain or tenderness in the larynx, constricted feeling about the chest, tremulousness of the voice, etc. These symptoms will be found to vary considerably with different patients, owing to the seat, and extent of the growth, and, of themselves, are not positive indications of the existence of polypus.

Generally, in cases of this kind, the larynx, being quite capa

cious, can be easily examined by the *laryngoscope*, which will give a distinct view of the tumor or excrescence, especially when proceeding from the vocal cords, or between them in front, or behind. Those growths provided with a pedicle are more dangerous, but are also more easy to remove.

The *treatment* consists in removing the morbid excrescences either by topical applications, or, by an operation. The agents for their gradual removal are, Nitrate of Silver, Nitric Acid, Chromic Acid, Perchloride of Iron, Sulphate of Copper, Tannin, etc., with one of which, the growths may be touched daily or every other day, by means of the laryngeal porte-caustic, as heretofore explained; and which method is more applicable to those growths upon the upper surface of the vocal cords, no matter how small they may be, which have a firm base. And if this process fails, or if an immediate removal is absolutely necessary, the growths may be removed by the *laryngeal ecraseur*, and this will generally be found the best method in those cases where the attachment of the growth can be encircled by a loop of wire.

This is one of the most difficult operations undertaken for the removal of laryngeal maladies. The most expert operator will frequently fail to encircle the tumor at first, often requiring several attempts before he succeeds, and sometimes fatiguing the patient so much, that that the operation has to be postponed for another sitting. When the operation is once decided upon, the parts should be accustomed to the presence of instruments, by repeated introductions of the laryngeal sound or bougie, which will also assist in overcoming the sensibility of the parts, and render the use of the laryngeal mirror and ecraseur more easy. Immediately before attempting the operation, the sensibility of the parts should be diminished by a few whiffs of Chloroform; by painting the fauces with a solution of Morphia in Chloroform, by means of a camel's hair pencil, also the interior of the larynx by a curved camel hair pencil; or, by the use of large doses of Bromide of Ammonium. The application of the mixture of chloroform and morphia to the inner walls of the larynx, is an unpleasant operation to the patient, but occasions no irritation, and it should be continued for a sufficient length of time, not to cause complete anæsthesia, but merely to diminish the sensibility of the parts and their resistance, from reflex action, to the presence of the instruments. This having been effected, the ecraseur is to be carefully introduced, and its wire noose be passed over the tumor so as to encircle the pedicle or base, when the growth may be removed in the ordinary manner. Should the tumor drop into the trachea, it

will occasion no trouble, being generally expectorated without any difficulty.—In some instances, the excrescences may be removed by small curved forceps, or minute vulsellum scissors; but, no matter what instrument is used, we should endeavor to remove the whole of the tumor at the one sitting, because an irritation may be produced by repeated operations at short intervals apart, which may degenerate into epithelioma and prove fatal. It is only in instances where the growth is large and disseminated, that it will sometimes be required to remove it in small fragments at several sittings. The operation will prove an exceedingly difficult one among children, requiring the presence of an assistant or two. Laryngeal polypus has been likewise removed by the galvanic cautery, applied by means of a laryngeal galvanizer or electropole.—After the removal of the polypus by instruments it will be well at a few subsequent sittings, at intervals of several days, to touch the point at which its base was attached, with a solution of Perchloride of Iron, of Chromic Acid, of Tannin, or of Strychnia, etc., in order to prevent its renewal. Internal remedies will be required in those cases connected with anemia, debility, scrofula, or syphilitic taint, as, Bromide of Iron, Bromide of Ammonium, Extract of Nux Vomica, etc., according to the character of the associated malady.—Sometimes there is a spontaneous detachment of these growths, which are then passed away, perhaps unnoticed, by expectoration.

Cerebral Disease is a very fertile cause of aphonia, from the resulting paralysis of the laryngeal nerves, and which condition may attend any one of the several maladies of the brain heretofore treated upon. If the paralysis be of long standing, the cords undergo a structural change, their color becomes altered, they appear narrow and wasted from atrophy, and present an irregularity of outline. The cure of the aphonia in these cases depends entirely upon that of the brain disease; should this be cured and the aphonia still remain, local applications to the larynx may be made for the purpose of arousing nervous and muscular action, and thus aid in restoring the voice.

Dr. Gibbs states that "if effusion into the substance of the brain be followed by hemiplegia, and aphonia, the arytenoid muscle and vocal cord of the side affected will be found paralyzed, in most instances. In these cases, the cerebral lesion generally affects but the one laryngeal nerve, combined with impaired power in some of the other nerves taking their origin from some neighbor-

ing part of the brain. In some severe instances the palsy is permanent, and speech is irrecoverably gone; there is incurable organic aphonia. Under these circumstances the vocal cords are seen to become atrophied, discolored, shrivelled, and sometimes effected with atheromatous degeneration."

In cases of hemiplegia, the movements of the aryteno-epiglottic fold of the affected side are sluggish, which interferes more or less with deglutition.—Paralysis of the velum palati, known by the nasal twang, the incapacity for suction, the regurgitation of fluids by the nostrils, and an insensibility to the contact of substances, frequently occurs as a sequel of diphtheria; and this may be associated with a relaxed condition of the vocal cords, and a partial or complete aphonia. The proper remedies internally, are, Citrate of Strychnia and Iron, and Iodide of Ammonium internally, with the local application of showers of a solution of Strychnia, or of Iodide of Silver, Iodide of Gold, Nitrate of Silver, Sulphate of Zinc, etc.

HOARSENESS, AND OTHER MODIFICATIONS OF THE VOICE.

Hoarseness or Raucedo may arise from the same causes that occasion aphonia; in the majority of instances, aphonia is preceded by hoarseness, and, in some cases, we may observe hoarseness and aphonia manifesting themselves alternately. A hoarseness of long standing is very liable to ultimately terminate in a permanent loss of voice.

Any condition that interferes with the normal action of the vocal cords will give rise to hoarseness; thus, it may be occasioned by a hyperæmic or congested condition of the larynx involving the mucous membrane of the cords; by a temporary congestion of the membrane covering the thyro-arytenoid muscles, as well as of the aryteno-epiglottidean folds, as, when substances come in contact with them in swallowing, or "go the wrong way,"—which foreign substances impair the action of the laryngeal muscles, by irritation, congestion, and the production of want of harmony and simultaneous action, and, there may also exist at the same time, congestion and tumefaction of the ventricular cords; by acute inflammation of the larynx and trachea; by laryngeal ulceration, and especially of one or both of the vocal cords, either with or without more or less loss of substance; by induration and thickening of the vocal cords, which limits their action, and contracts the diameters of the glottis; by morbid alterations of the proper

structure of the cords, which, in addition to the hoarseness, also render the voice harsh, cracked, and tremulous; by hypertrophy of the cartilages of Wrisberg, when these are present; by laryngeal œdema, whether above or below the glottis,—when below, the hoarseness is usually painful; by a lax condition of the mucous membrane of the ventricular cords and epiglottidean folds, with sometimes swelling, tumefaction, or submucous infiltration; by œdema or congestion of the proper muscular structure of the thyro-artenoid muscles, impairing the contractile power of one or both of them; by pressure upon the bronchi and trachea of external tumors, as, bronchocele, aneurism, intra-thoracic, or cervical tumors, etc., and when the pressure involves the recurrent laryngeal nerves, the vocal cord of the affected side will be found motionless; or, by the presence of epithelial growths, polypi, etc. Hoarseness likewise frequently follows overexertion in public speaking, singing, reading aloud, etc.

Persons who are more or less called upon to speak in public, and especially those whose vocal organs are very sensitive to changes of air from warm to cold, and from dry to moist, are prone to catarrhal attacks, hyperæmia of the vocal organs, relaxation and irritation of the fauces and back part of the throat, elongation of the uvula, a congested or relaxed state of the vocal cords, giving rise to a low husky or hoarse voice, frequently accompanied with dryness and irritation of the throat, more or less pain or soreness in speaking, and a feebleness of the vocal efforts. Those who speak in the open air, or within doors where a very slight draught blows upon the head and neck, or where the temperature is too low, are also liable to these difficulties, and which, if permitted to continue without treatment, will eventuate in follicular pharyngo-laryngitis. In these instances, there will be more or less change in the tone and character of the voice, it may be feeble, in a lower or higher key than natural, may be puerile like that of a child's or woman's, or rough and hoarse, squeaking, ragged, tremulous, and, sometimes, the speaker will be unable to utter a word, at some period during a speech, without first clearing his throat, or swallowing a draught of some fluid; more or less hacking cough also occurs.

Among singers, similar exposures and overexertions, are apt to give rise to a want of harmonious action in the tonic contraction of the vocal muscles, so that the persons will be unable to ascend or descend the notes of the scale, "breaking down," as it is termed, at some part of the scale, whether the lower, the middle, or the upper, but principally, of the middle, in either the chest or falsetto

registers. The varieties of voice usually affected, are, the tenor, contralto, and soprano, the last two in females, and the first in males,—and the compass of the voice is diminished by several notes in some part of the diatonic scale.

When the middle notes are imperfect, and the person is required to ascend the scale slowly from the lower notes, the tension and parallelism of the vocal cords are found to be good and without fault; as the middle notes are reached, both are altered, for the tension becomes irregular and the parallelism is destroyed, especially if the tension of one cord is good and the other is imperfect, for then the fissure of the glottis corresponds to a small, thin segment of a large circle. As the notes now rise, the natural tension of the cords, or of the affected cord, is regained, and both perform their proper vibrating function to the termination of the notes of which the singer has been accustomed to go, whatever that may be. When both cords are affected in the middle notes, they equally lose their power of tension, and consequently of vibration, at that part of the scale, and parallelism, although it may not be wanting, is powerless for perfection of melodious, or rather, harmonious sounds. (*Gibb.*)

There are other conditions of voice, as, double voice, or where it alternately becomes tenor and bass, and stammering, etc., which, however, will not be considered in this work.

A *laryngoscopic examination* will detect in nearly all instances the causes of these vocal peculiarities, and which will generally be found to consist of one or several of the morbid conditions of the vocal organs, named above, as causes of hoarseness. After inspecting the several parts of the larynx in a state of rest, the patient should be requested to utter sounds or notes, and especially those in which a failure has been noticed, that the examiner may observe the action of the vocal cords and their accessories. The patient should also be desired to inspire and expire deeply, in order that the expansion and closure of the glottis, or the extent of these movements, may be ascertained.

The *treatment* in these cases consists in carefully showering the cords and walls of the larynx and trachea with one of the solutions heretofore named, for the purpose of restoring these parts to a healthy condition, as, of Nitrate of Silver, Sulphate of Zinc, Tannin, Chloride of Gold and Soda, Golden Seal and Geranium, etc.; and treating ulcerations, foreign growths, œdema, etc., by the means already named. In some instances of obstinate relaxation of the cords, they may be daily, or semi-daily, showered with two or three minims of a weak solution of Strychnia. In the selection of the proper agent for application to the larynx, etc., considerable judgment is required,

as, what will benefit one patient may augment the symptoms with another.—In many instances, Faradization applied direct to the vocal cords, to various parts of the neck, and to the upper part of the spinal column will prove advantageous. Any abnormal condition of the fauces should be treated by gargles or topical applications, as may be required; strengthening relaxed mucous membranes by the infusion of Golden Seal and Geranium, or other toni-astringent solutions. In some instances, external applications to the throat may be advantageously employed, especially the Belladonna Plaster; counter-irritation is sometimes useful, especially when congestion or chronic inflammation is present; in other cases, it is seldom called for, and may produce debilitating and injurious results.

The diet should be carefully regulated, and gastric acidity, or a disposition to acid eructations, which exert such an unhealthy reaction upon the mucous membrane of the fauces and superior part of the larynx, must be promptly corrected by the Compound Powder of Charcoal, or other antacid or neutralizing agents. A proper attention must be paid to the skin, bowels, and kidneys. The body, and especially the feet, should be warmly clad, as well as the back of the neck and upper part of the back; exposures to cold or dampness must be avoided, and the voice should not be used more than is absolutely necessary for ordinary purposes, but should be kept in a state of rest and quiet until a cure is performed. Moderate physical exercise may be taken daily.

In most instances, constitutional measures will be required, according to the indications present,—chiefly tonics and alteratives. A rheumatic, scrofulous, or syphilitic dyscrasia, will require the appropriate remedies for these affections. In weak, anemic subjects, with want of tension of the cords, the Citrate of Iron with Strychnia, will be found useful as an internal agent.

Although not exactly in place at this part of the work, yet I wish to make few remarks concerning what is generally termed "WEAKNESS OF THE VOICE AND CHEST," a condition that may occur at any period of life, but more usually in early life previous to puberty, and in middle age. It is ordinarily associated with a torpid condition of the liver, and of the digestive organs, habitual constipation, or exhaustion from excessive discharges, and is sometimes a result of excessive heat or cold. Sedentary persons, young females and, those who stoop a great deal, are especially disposed to it. The *symptoms* are, weakness and aching sensation of the chest, a dull pain in the chest behind the inferior part of the sternum, or else,

behind its upper third. Speaking or reading produces a tired sensation of the chest and vocal tube, a feeling in the larynx as if it were strained, and sometimes a transient, short, and hurried respiration. Breathing is slow and languid, with occasional long inspirations, and, in some instances, the patient complains that it is an effort to breathe. The patient becomes listless and has no desire to enter into conversation, and seldom utters more than a "no," or, a "yes," when spoken to. Occasionally, there will be slight palpitations or feebleness of pulsation, and a reduction of the beats to sixty per minute. The skin is commonly dull and pale; and the urine deposits an excess of urates, frequently mixed with oxalate of lime crystals.

No disease of the lungs or air-tubes can be detected by the most careful examination, except that the chest does not expand to its full extent in breathing; percussion elicits a clear sound; and auscultation detects a natural but weak respiration, and diminished intensity of the vocal resonance. The laryngoscope reveals no abnormal condition of the larynx or trachea, except, perhaps, a paleness of the laryngeal mucous membrane, and a general relaxation of the faucial mucous membrane. There appears to be a depressed nervous influence of the lungs and vocal apparatus,—an enfeebled action of the pneumogastric and laryngeal nerves, probably owing to some derangement of that part of the spinal nervous system which supplies the throat and chest with nervous energy and power.

The *treatment* consists in effecting a healthy action of the liver and digestive organs, and in giving tone to the nervous system. To arouse the liver, and stimulate it to normal action, Podophyllin, Oleo-resin of Iris, Leptandrin, Sanguinarin, etc., may be employed as named in the treatment for affections of the liver,—for the digestive organs, some of the agents named in the treatment for affections of the stomach may be used, especially, Hydrastin, Alcoholic Extract of Aletris, Strychnia, Citrate of Iron and Quinia with Strychnia, Oleo-resins of Ptelea, and of Xanthoxylon, etc., and if there is much acidity present, alkalies or absorbents will be required.

Nutritious but moderate diet; *cool* shower baths to the back and chest, together with occasional alkaline bathings of the surface; attention to the condition of the urine; moderate exercise daily in the open air; the maintenance of an erect position, the shoulders being thrown backward; and Faradization to the nape of the neck, and on each side of the cervical and dorsal portions of the spinal column, will aid materially toward a thorough and permanent cure.

ŒDEMA OF THE LARYNX.

Œdema of the Larynx, also termed Œdema of the Glottis, consists in an effusion of a serous or fibrinous character in the submucous cellular tissue of the parts. The disease may be limited to the upper parts of the larynx, implicating the aryteno-epiglottic folds, and not extending to the rima glottidis; sometimes it extends as far as the glottis, involving the above-mentioned folds and also those of the ventricular cords. Occasionally, it involves only the membrane covering the false cords, producing a dangerous form of obstruction; and, in a few instances, it is confined to one side of the larynx. Laryngeal œdema is evidently an inflammatory affection, being associated with acute laryngitis, or occurring as a consequence of other laryngeal affections, and frequently manifesting itself during the course of other maladies, as, measles, scarlet fever, small-pox, typhus and typhoid fevers, etc. It may also be induced by the inhalation or presence of irritating vapors or bodies, as well as by exhausted or enfeebled conditions of the body. Although frequently termed "œdema of the glottis," the true glottis is never involved in the œdema.

Dr. G. D. Gibb, divides œdema of the larynx into two varieties, viz.: *Supra-glottic œdema*, and *sub-glottic œdema* of the larnyx. 1. *Supra-glottic œdema* is situated above the glottis, and may be confined to only a part of the larynx, one side of this organ being puffed out and swoln, and the slit-like aperture of the true glottis converted into a curve; it may also involve the aryteno-epiglottidean folds, as well as the ventricular cords, only a vertical chink at the upper passage being noticed. Most generally the inflammation is low and asthenic, and is confined to the tissues internal to, or beneath the membrane. It occurs under various circumstances and conditions, is frequently coincident with other maladies of the air-passages, and may, even in healthy persons, attack suddenly during the night, and cause death in a few hours. It sometimes arises suddenly as a forerunner or primary symptom of Bright's disease, when its early diagnosis is of great importance, and the profession can not be too soon made aware of it,—in such cases, albumen may be detected in the urine, and the œdema is occasionally attended with aphonia.

The *symptoms* are, at first, a "sense of uneasiness in the larynx, and a continual effort on the part of the patient to expel, by means of a forcible expiration, mucus or other matters which appear to him to be clogging the laryngeal orifice; he also frequently en-

deavors, by repeated attempts at deglutition, to disembarrass the upper part of the throat of some phlegm, or extraneous body which he imagines to have lodged in that situation. The voice is, at the same time, rather hoarse, but respiration remains for the present unimpeded. In the course of a few hours, or of two or three days, according to the rapidity with which the disease advances, the voice becomes hoarser, or sharp and stridulous, and there is occasional difficulty of breathing, more particularly in the act of inspiration; this is not permanent, however, but is succeeded by strong expiratory efforts, which by expelling a little glairy mucus, soon render the respiration tolerably free. If the disease remains unchecked, the dyspnœa in a short time becomes permanent, or offers only slight remissions; the patient sits upright in bed, with the head thrown back, the shoulders elevated, and the whole of the respiratory muscles convulsively engaged in endeavoring to draw air into the chest, while the power of expelling the air with facility still continues. The almost constant dyspnœa is aggravated from time to time by spasmodic attacks of suffocation, which occur more frequently as the obstruction to respiration increases, and the patient dies either in one of these attacks, or, as more commonly happens, in the intervals between them, when we should expect that the air, by penetrating into the chest, would reanimate and restore him." (*Bayle* and *Ryland.*)

In the commencement there is no derangement of the general health, unless some other disease be present, but, as the œdema progresses the pulse becomes weak, soft, small, quick, and irregular, and the system betrays imperfect oxygenation of the blood. There is no difficulty in swallowing, unless the epiglottis is involved; no pain or soreness is complained of, but a sense of constriction in the laryngeal region; there may or may not be inflammation of the fauces; the voice is at first hoarse, then sharp and hissing, and afterward croupal or extinguished; expiration is performed with comparative freedom, while inspiration is prolonged, difficult, and distressing; and a dry, hoarse, and convulsive cough, with paroxysms of suffocation, causing the utmost agitation and distress, is generally present. The intellect and the digestive functions remain unimpaired.

Great care is required in the *diagnosis* of this disease, that its true character be not overlooked. Its distinctive features are, the difficulty of drawing air into the chest, the almost total absence of pain, heat, or soreness in the region of the larynx, and the peculiar sensation of fullness about the upper part of the throat, conveying to the patient the idea of there being a foreign body in

that situation, the removal of which is attempted by repeated efforts at swallowing. A *laryngoscopic examination*, when it can be made, will enable us to detect the difficulty. Two tense, smooth, semi-transparent, globular or oval swellings will be seen, seated immediately behind the epiglottis, and sometimes partly concealed by this cartilage, which meet in the center with a furrow between them, generally more prominent in front. If one side only is affected, a prominent swelling will be observed projecting across the larynx. According to the extent and stage of the œdema, is a view permitted of the vocal cords or of the parts beyond the true glottis. The œdema reaches its highest degree in the ventricular cords, where the strata of areolar tissue are but loosely covered by the mucous membrane, and hence is explained the nature of the urgent dyspnœa which is ready to strangulate the patient. The consistence of the swelling can often be determined by the introduction of the finger into the mouth, but, as sometimes seen, it may be slightly corrugated and loose on its surface. The epiglottis may also be œdematous, and is frequently erect; but remains unaffected when the œdema has not attacked it.

Supra-glottic œdema of the larynx consists in a serous effusion in the submucous cellular tissue of the parts above the glottis, the result of inflammation commencing in this tissue, and not in the mucous membrane. A *post-mortem examination* will detect the tumor or tumors, obstructing the area of the glottis more or less completely, according to their development. The swellings are generally of a pale-yellow color, and devoid of apparent vascularity, and are formed by the effusion of limpid serum into the submucous tissue of the lips of the glottis, and of the folds of mucous membrane which connect the arytenoid cartilages with the epiglottis, as well as into the adherent surface of the mucous membrane itself in the same situation. The œdema may extend to the base and lateral edges of the epiglottis, and to the mucous membrane lining the cricoid cartilage. The posterior and external surface of the larynx, the base of the tongue, and the tonsils, frequently participate in the disease. If the œdema has progressed slowly, the effused fluid is apt to be of a sero-purulent nature. In most instances, tumefaction, varying in size from a sparrow's to a robin's egg, with closure of the upper or false rima glottidis, and serum, are alone noticed.

Since the discovery of the laryngoscope, the *prognosis* in supra-glottic œdema is much more favorable than it was previously; still, a cautious reserve should be maintained, especially in those cases where the symptoms are very severe, or, in which it is impossible

to employ the laryngeal mirror. Although its symptoms are apparently more dangerous than the sub-glottic variety, it is much more tractable to treatment by early scarifications. In laryngeal phthisis, if œdema of the larynx manifests itself, although relief may sometimes be afforded, the case is hopeless.

The *treatment* of supra-glottic œdema of the larynx consists in freely scarifying the œdematous ventricular cords, edges of the epiglottis, aryteno-epiglottidean folds, etc., thus allowing the effused serum, which is the whole cause of the difficulty in breathing, to escape. The operation is performed with scarificators expressly made for this purpose, and is conducted with the aid of the laryngoscope. If necessary, the scarifications may be repeated every four or five hours. Dr. Gibb advises a properly curved bougie, half an inch in diameter, to be passed into the larynx after scarification, for the purpose of compressing the swellings, and forcing out the serum through the punctures made. After scarifying, the vapor of warm water inhaled, will favor the evacuation of the serum; the pulverized fluid or spray of a very strong solution of Tannin may be inhaled in some cases, with advantage, or, of Geranium, Rhatany, etc., and which may be repeated once or twice a day,—or these astringent solutions may be applied by means of a curved brush. In slight cases of œdema, they will, alone, frequently effect a cure. After all danger has passed away, it will be advisable to administer the Iodide or Bromide of Potassium or of Ammonium, for some time, in order to remove any tendency to a renewal of the attack; and a solution of the Chloride of Gold and Soda may also be applied to the parts affected, once or twice daily, by means of a curved brush.

When the means above-named fail, the symptoms rapidly becoming more and more severe; or, when the laryngoscope can not be used, nor scarification be performed; or, if the patient lie in the recumbent position in an exhausted and motionless condition,—*tracheotomy* must be performed. This operation should not be postponed for too long a period; it is preferable to laryngotomy, as it affords rest to the affected larynx, and prevents any irritation that might occur from the constant passage of the air forward and backward. Dr. Gibbs prefers the opening into the trachea to be made *immediately below the cricoid cartilage*, (provided there are no dangerous obstacles present), instead of in the crico-thyroid space.

Syphilitic laryngitis often terminates in supra-glottic œdema, the cavity of the cricoid cartilage being frequently filled up by fibrinous material, in which case, the above-named operation may prove of service.

2. *Sub-glottic œdema of the larynx* is situated below the glottis, and is wholly distinct in its nature and character from that existing above the glottis, the effused material being invariably fibrinous. Dr. Gibb is, I believe, the first person who has described this form of laryngeal œdema. Its *symptoms* are similar to those of the preceding form, as, more or less urgent dyspnœa, hoarse laryngeal whisper, laryngeal cough, a peculiar croupy stridor during inspiration, with great distress, much mucus secretion, etc. The respiration is more stridulous, wheezing and croupal, than the supra-glottic form.

Dr. Gibb remarks, "In my dissections I have sometimes found a thin yet distinct layer of areolar tissue between the cricoid cartilage and mucous membrane, and sometimes it is somewhat lax; under such circumstances, if inflammation were present, a submucous effusion would be liable to occur; but as the resistance is greater below than above the glottis, serum is exuded from the surface of the membrane, and fibrine remains behind." After referring to the opinion of several writers, to the effect that there can be no subglottic œdema, because as no layer of cellular texture exists there, there can be no infiltration, he observes:—"The views enunciated by those whose writings have been quoted, are held by all pathologists, and it might seem an unwarrantable presumption on my part to dispute their correctness; indeed, such is not my intention; but as a searcher after truth, while I acknowledge that, as a rule, œdema of a supra-glottic nature rarely extends below the true glottis, yet the laryngoscope has revealed that isolated or exceptional cases do sometimes occur. If the two forms co-exist, it is not by extension of one to the other, for the simple reason that the effusion in one is chiefly serous, and in the other fibrinous; and, as has been most correctly, and I may say indisputably observed, the true cords themselves do not become œdematous, and therefore the one can not extend or pass into the other.

"*Laryngoscopic examination* can alone determine which form of œdema is present; it will reveal a larger or smaller swelling, or two swellings, below the glottis, and surmounted, as it were, by the vocal cords. The œdema occupies the sides or posterior part of the subglottic region, and, as a rule, never extends farther than the commencement of the first ring of the trachea.

"Subglottic œdema is a more dangerous disease than the other form. Scarifications would be useless in it, from the nature of the effusion, and in the great majority of cases, (although hitherto not suspected), it has no doubt demanded early tracheotomy. It is the

form, also, more likely to demand the permanence of the fistulous opening, and probably has obliterated the passage upward from filling up of the calibre of the cricoid cartilage. Additional information will be very desirable to complete its clinical history." (*Gibb.*)

The *treatment* consists in anodyne poultices or fomentations to the throat, and the internal use of Iodine, Iodide of Potassium or Ammonium, etc., to cause absorption of the effused material, together with showers of solution of Nitrate of Silver, Sulphate of Zinc, etc., to the subglottic region daily. When the symptoms are acute, the vapor from hot water may be inhaled, or, from some anodyne infusion; and, internally, Acetate of Ammonia, Veratrum Viride, Gelseminum, Lobelia, etc., may be administered. To prevent depression or sinking, small quantities of brandy, or other stimulant should be given from time to time, as required. When the symptoms are urgent, tracheotomy should be performed without delay.

SACCHARINE THROAT.

This is a new and distinct malady, first made known to the profession by Dr. Gibb, and which is chiefly met with among those in middle life. It is dependent upon, or associated with, certain changes which the system is undergoing, especially a transformation of the saccharine element, *hepatine*, or *amyloid substance* into fat and its compounds, which produce, either a state of corpulency or a fatty degeneration of the tissues, associated with an atheromatous ulceration of the lining membrane of the cerebral and larger blood-vessels.

The *symptoms* are peculiar. If the vocal apparatus is involved in the change going on in the system, there will frequently be dryness of the throat; a huskiness of the voice; an augmented secretion from the fauces; great irritation of the throat, often requiring some previous preparation of it before the laryngeal mirror can be used; sometimes this irritability of the throat and larynx occasions a harassing cough; the tongue is slightly furred; and the patient complains of a sweet taste in the mouth, sweetness of the saliva, and that food frequently tastes as if it were mixed with sugar. If the fauces be examined, a thin layer of mucus or gelatinous matter, with a predominance of the fatty element, will be observed covering the mucous membrane; if this be removed, in many instances, the parts will have a greasy appearance, and the follicles will be found somewhat enlarged and apparently

secreting an oily fluid. The patient frequently hems very loudly to clear his throat, and the noise is sometimes of a barking or cracked character; and which is due to calcareous degeneration with a mixture of the fatty, associated with true structural change in the yellow elastic tissue of the vocal cords. The face has a greasy appearance, the nose and lips are slightly swoln, the eyes are bright and watery, and there may be an arcus senilis or annulus adiposus, and the conjunctivæ look fatty. The skin of the face is smooth and even, sometimes covered with many small red vessels, ramifying in patches of a stellated form; there may, or may not be corpulence; and the patient complains of a cold which obstinately continues to annoy him, and to which he is very subject. Sometimes sugar will be detected in the urine, but not always.—The pathognomonic symptoms are, the peculiar (atheromatous) expression, the follicular affection, and the peculiar nature of the secretion with the sweet taste invariably present.

A *laryngoscopic examination* will detect the laryngeal mucous membrane congested, relaxed, and freely secreting, with enlargement of the follicles; the faucial mucous membrane will have a muco-gelatinous or oily glistening appearance, with general relaxation, and congestion, and secreting freely—together with more or less prominence of the follicles.

The *treatment* which Dr. Gibb has found the most useful, is the the internal use of Iodide of Ammonium, Bromide of Ammonium, and Nitrate of Uranium, conjoined with some good vegetable astringent tonic, as, the Syrup of Matico in doses of one or two drachms,—and, also, an alterative and astringent local treatment. In the spasmodic cough and dyspnœa, he recommends Cypripedin in doses of three grains, as a sedative and alterative. And to act upon the biliary organs, and, at the same time, maintain regularity of the bowels, he advises Podophyllin and Leptandrin, to be administered every other day.

It is of the utmost importance to regulate the diet, carefully abstaining from all malt beverages, and avoiding too much farinaceous food.—I believe, that in these cases, a judicious combination of the measures named in the treatment of Softening of the Brain, and that of Follicular Pharyngo-laryngitis, will be found useful. The earlier the treatment is commenced, the more prompt and desirable will be the beneficial results.

There are several other affections of the larynx which have been fully described in several monographs upon throat and laryngeal

diseases, and to which the reader is referred. But they occur so rarely that a passing notice is all that is deemed necessary in this work. These are, *Cancer of the Larynx*, *Hydatids in the Larynx and Trachea*, *Gout of the Larynx*, *Deformities of the Larynx*, *Ossification and Calcification of the Cartilages*, etc. Ossification is a natural process occurring in old age, phosphate of lime being largely deposited into the cartilaginous structure, so that it becomes converted into the elements of true bone. But when the cartilages become hardened at an early period of life, it is not from ossification, but most commonly from calcification, carbonate of lime being deposited in the cartilages of the larynx, and generally associated with fatty degeneration of the parts thus calcified. This form of disease is apt to be present among those who are affected with saccharine throat. It is an indication of premature old age, or premature decay of the system, from fatty transformation, and the patient is liable to sudden death at any time from rupture of some of the softened arteries of the brain. In calcification of the larynx, the voice is loud, loose, and husky, or has a feeble, or, sharp-brassy sound, and is often associated with a noisy, barking cough. The vocal cords are seen in the laryngeal mirror to be undergoing atheromatous changes, presenting an irregular patchy appearance with a mixture of yellow and chalky white. The cartilages are brittle, and mixed with minute particles of fat, oil, and cholesterine. The *treatment* is the same as described for Saccharine Throat. Dr. Gibb believes that small doses of Nitrate of Uranium dissolve the calcareous material already deposited in the larynx and blood-vessels.

Chronic Tracheitis may generally be detected by the laryngeal mirror, and requires the same treatment as named for Chronic Laryngitis. The symptoms are similar to those of the latter disease, with the exception of the existence, in the tracheal disease, of a constant pain or tightness at the lower part of the neck, or behind the upper part of the sternum, in most instances. The voice is not impaired unless laryngeal disease be likewise present.

CHRONIC BRONCHITIS.

Chronic Bronchitis is one of the most common diseases met with in this country. It may occur as the result of a neglected or badly treated acute bronchitis, as well as laryngitis, or tracheitis; and it

frequently follows hooping-cough, diphtheria, measles, and other exanthematous affections, protracted biliary maladies, as well as the recession of certain cutaneous diseases. Sometimes it is associated with organic disease of the heart, or tubercular lung disease; and, again, it may be *caused* by a constant exposure to irritating powders, which are inhaled, as, among stone-cutters, millers, workers in metals, etc. But its most common cause is cold, or sudden exposures from heat to cold, from a dry to a moist atmosphere, and vice-versa. It is frequently the case that the disease does not manifest itself during the warm summer months, but only in the winter, and especially when this season is cold, damp, and changeable,—and hence it has been called *Winter Cough;* at other times, there is more or less cough and expectoration even during the warm seasons. It is frequently associated with rheumatism, often disappearing when the rheumatic affection is severe, but returning upon its subsidence.

The *symptoms* of chronic bronchitis vary according to the duration and extent of the affection. There is little or no fever, but sometimes an acceleration of the pulse. The most characteristic symptom is cough, which is frequent and habitual, and is more troublesome and annoying during cold and changeable seasons; but, in the early stage of the malady, it is absent during pleasant, warm weather; indeed the disease may continue in this manner for a life-time without causing any serious consequences, or without the general health suffering any. Frequently, however, it is of a more aggravated character; the cough is more or less persistent and troublesome, with expectoration of a viscid mucus, and both cough and expectoration are apt to be more distressing at night, and in the morning, particularly if the feet, moist with perspiration, come in contact with cold sheets, a cold floor, etc. The cough sometimes occurs in violent paroxysms, and especially when irritating vapors, or floating particles of matter are inhaled, and this is more especially the case when the bronchitis is associated with a laryngeal affection; the cough is somewhat relieved upon the expectoration occurring. At first the expectoration is a thin, transparent, adhesive, frothy mucus, devoid of taste or smell, but, after a longer or shorter period, it becomes thick, muco-purulent, greenish, or yellowish white, sometimes streaked with blood, and in the advanced stages of the disease, it is copious and fetid. When copious, it is termed *bronchorrhœa.* Frequently, small particles of sebaceous matter from the faucial and pharyngeal follicles will be seen in the expectoration, and which have been mistaken for tubercular matter. A dark, blackish, or bluish coloration of the sputum is due to particles of dust, smoke, etc., inhaled by the patient. Calcareous

concretions are likewise occasionally met with in the expectoration of chronic bronchitis.

The cough may be short and hacking, or it may be loud and ringing, and, sometimes, it is dry, being unattended with expectoration. In some instances, the chest will be free from pain; while, in others, there will be more or less soreness or pain.—In the rheumatic variety of bronchitis, coughing is apt to produce a rough, scraping, painful sensation in the bronchi, and the urine will contain an excess of urates of soda and lime.—If the disease is allowed to progress, the skin becomes dry and harsh, the tongue coated, especially in the morning, the appetite more or less impaired, the bowels irregular, and the urine high-colored. Eventually, the pulse becomes quick, weak, and small, the breathing short, hurried, and laborious, particularly on any exertion, with emaciation, night sweats, pale face, hollowness of the eyes, purplishness of the lips, great debility, colliquative diarrhea, and soreness of the nose and lips, and which condition may continue from one to several months, and then prove fatal. The last stages may be mistaken for phthisis, and can only be discriminated from it by ascultation and percussion.

Percussion obtains a clear vesicular resonance, unless the disease be complicated with some other affection of the lungs, as, tuberculosis, solidification, etc., when there will be a corresponding dullness in proportion to the density of the lung. If there be dilatation of a bronchial tube, which may be the case if the disease has been of long standing, there will often be dullness around the dilated part. The vesicular resonance is sometimes temporarily impaired by the presence of an excessive quantity of secretion, but when this is removed by coughing or otherwise, the slight dullness disappears.—Auscultation will detect sounds depending upon the condition of the bronchial mucous membrane, and the quantity of its secretions, as, either dry or moist bronchial rales, or both, variously combined, and which can be heard especially at the lower and back parts of the chest on either side. The dry or sibilant rale, indicates a want of secretion; the mucous rale, the presence of secretion; and large crepitation or gurgling, relaxation and atony of the mucous membrane. Bronchitis may be present, however, without any rales being heard. When it is complicated with other lung diseases, the physical signs peculiar to these diseases will be present.

When bronchitis has associated with it, dilatation of the bronchial tubes, there will not only be dullness on percussion, as already alluded to, but there will be observed, on auscultating, a diminu-

tion in the intensity and duration of the inspiratory resonance, and an augmentation in those of the expiratory sound; if the dilated tube be empty the respiration will be bronchial or cavernous,—if it contain fluid, the moist bronchial or bubbling rales will be detected at irregular periods, and of variable loudness. Sometimes, we also have bronchophony, pectoriloquy, and bronchial or cavernous cough, depending upon the character and extent of the dilatation, and these signs may mislead to a supposition of tuberculous disease in the lungs. But by bearing in mind that dilatation is generally preceded for a long time by cough and expectoration, and that the cavity ordinarily precedes the dullness, while in phthisis the dullness precedes the cavity, we may be better enabled to form a correct diagnosis, more especially when a careful investigation of the physical signs, as well as of the symptoms present, are made—debility, emaciation, pallor, thoracic pains, hemoptysis, night sweats, hectic fever, etc., being more commonly the indications of consumption. However, dilatation and tuberculosis may co-exist. (*See Note*, page 539, *sections* 14 and 25.)

Patients are frequently met with who have labored under chronic bronchitis for many years, having a wheezing respiration, and which becomes hurried by exercise, with a somewhat leaden appearance of the complexion indicating a lack of sufficient oxygen, inspiration being somewhat laborious and expiration prolonged. There is no acceleration of the pulse, nor pain in the chest, but they have a peculiar nervous susceptibility, are subject to dyspnœa or distinct paroxysms of asthma, often attacking them shortly after having retired to rest; their sleep is more or less disturbed; they become unfit for active duty; the heart becomes oppressed and dilated; and they die either from acute bronchitis, dropsy, or consumption.

The *diagnosis* of chronic bronchitis, is, as a general rule, not difficult. The principal and important points, however, which we are to determine, are, as to the complication or non-complication of the disease with others, as, dilatation of the bronchial tubes, chronic pneumonia, emphysema, tubercular phthisis, or chronic pleuritis, etc.; and this can only be effected by a careful observation of the symptoms, and of the physical signs, as these will generally be found present and in accordance with the nature of the complication. When tubercular phthisis is present, there is almost always more or less lesion of the bronchi, and the supervention of bronchitis and emphysema; and the most difficult cases to diagnose are those where the phthisis is ushered in, and its symptoms are masked by bronchitis. But the symptoms which are common to

phthisis and which occur exceptionally in bronchitis may aid us in forming our diagnosis; thus, in phthisis, there are acute pains at the upper part of the chest of one side, or beneath the scapula, the breathing is more or less hurried, the pulse is quick, febrile symptoms often manifest themselves, hemoptysis is common, and the bronchial rales are more usually observed at the anterior upper part of the chest, and usually on one side only. A microscopic examination of the sputum will also find evidences of tubercle and disintegrated lung tissue, which are absent in uncomplicated bronchitis; and these evidences of lung disease may be observed *before* any auscultatory signs of phthisis can be heard.

The *prognosis* in chronic bronchitis is usually favorable as long as the expectoration consists chiefly of mucus; the more this becomes purulent, the less favorable is the prognosis, more especially when it is profuse, with constant dyspnœa, rapid pulse, emaciation, hectic fever, night sweats and colliquative diarrhea; though cases have terminated favorably where the expectoration was somewhat purulent. A dark red, or raw appearance of the tongue, with aphthous ulcerations about the mouth and fauces, are very unfavorable symptoms. The presence of a scrofulous diathesis, or a tendency to phthisis, should render us cautious in our prognosis. Advanced age is unfavorable, and also an acute attack rapidly coming on during the course of the chronic affection. When the bronchitis is complicated with other affections, the prognosis will depend upon the character of the complication, its duration, its extent, and its influence upon the bronchial disease.

The *post-mortem appearances* observed, are, not the vivid red color of the mucous membrane as seen in the acute form, but a livid, violet-colored, yellowish, or brownish tint; mucus and other secretions will be found in the bronchial ramifications, and sometimes the tubes will be filled with secretions of a fibrinous character. Dilatation of one or more of the bronchial tubes is frequently an accompanying lesion. From derangement of the nutrition of the bronchial mucous membrane, this tissue may be thickened, indurated, softened, or ulcerated. Thickening sometimes exists to such an extent as to obliterate the lesser bronchial branches, and to contract or diminish the diameter of the larger ones. If complications exist, the appearances will be in accordance with the nature and extent of the accompanying lesion, and the organ or organs affected by it.

The *treatment* of chronic bronchitis is both local and general, and must be regulated by circumstances, being more active as the symptoms are more severe. Among the local measures that have been

found useful are counter-irritants applied to the external surface of the chest; thus, the Compound Tincture of Camphor, the Compound Liniment of Oil of Amber, or the Compound Liniment of Turpentine, may be rubbed, two or three times daily, over the chest and back, and especially along the cervical and superior half of the dorsal vertebræ. The following will also be found a very useful application: Take of Oil of Turpentine three fluidounces, Oil of Spike four fluidrachms, Oil of Sassafras, Oil of Amber, each, two fluidrachms; mix. In conjunction with this external application, inhalations will be found very advantageous; thus, the vapor from heated vinegar and water, equal parts, or from the same fluid mixture medicated by sedatives, astringents, or stimulants, as may be required. The sedative mixture may be required in case there is great excitability or irritability of the air-tubes; the astringent, where there is an excessive expectoration; and the stimulant or expectorant, where the cough is dry, or expectoration is difficult.—A list of inhaling mixtures will be given at the close of the present treatment.—Nitrate of Silver inhaled, in the manner heretofore explained on page 564, will be found valuable; or, it may be prepared as follows: Take of Lycopodium five drachms, Nitrate of Silver one or two drachms; dissolve the Nitrate in a sufficient quantity of warm soft water, or distilled water, to form a stiff paste with the Lycopodium. Place this paste in thin layers on plates of glass, or on shallow plates; cover it so as to protect it from dust, and from the action of the light, and set the whole in a moderately warm and dry location; when it is thoroughly dried, pulverize it, and keep it in blackened vials.—Solutions of Nitrate of Silver showered into the air-tubes will also be of great efficacy.

The introduction of finely-powdered medicated fluids into the bronchial vessels, by means of nebulizers or spray-producing instruments, will be found exceedingly valuable in the treatment of bronchitis. The remedies that are hereafter recommended for inhalation may mostly be made into solutions or infusions and used for this purpose; some care, however, is required to regulate the strength of the preparations, and the quantity employed at a sitting. A very useful agent in many cases of bronchitis is Carbolic Acid, one part of which may be dissolved in four parts of Alcohol; to use it, add one fluidrachm of this mixture to two parts of Water, and inhale the fine spray from this, once or twice every day, using about a fluidounce at each sitting.—Some of the articles heretofore named as applications to the lining membrane of the air-passages, may also be employed in this malady.

In most instances, the above measures will be all that will be

required to effect a cure; but, sometimes the cough will be quite troublesome, for which sedatives and nauseant expectorants may be advantageously administered; one of the following preparations will be found serviceable:—1. Take of Hydrochlorate of Ammonia, Extract of Liquorice, each, two drachms, Extract of Hyoscyamus half a drachm, Syrup of Tolu one fluidounce, Acetate of Sanguinarina two grains, Water six fluidounces; mix, and dissolve. The dose is a teaspoonful every hour.—2. Take of Honey, Olive Oil, Sweet Spirits of Nitre, and Lemon Juice, each, half a fluidounce; mix. The dose is a teaspoonful several times a day, or whenever the cough is severe.—3. Take of Fluid Extract of Stillingia one fluidounce, Compound Syrup of Spikenard two fluidounces, Tincture of Black Cohosh one fluidounce; mix. The dose is a teaspoonful three or four times a day.—4. Take of Tincture of flower stalks of Mullein, Tincture of Black Cohosh, Tincture of Balm of Gilead Buds, each, half a fluidounce, Syrup of Tolu one fluidounce; mix. The dose is a teaspoonful every hour or two.—5. When the disease occurs in a rheumatic patient, the following cough mixture will prove advantageous: Take of Tincture of Black Cohosh, Tincture of Gelseminum, each, six fluidrachms, Tincture of Aconite Root two fluidrachms, Fluid Extract of Wild Cherry one fluidounce and a half, Fluid Extract of Stillingia six fluidrachms; mix. The dose is from thirty to sixty minims every one, two, or three hours.—6. Take of Gum Ammoniac twenty-four grains, Ipecacuanha six grains, Muriate or Sulphate of Morphia two grains, Carbonate of Ammonia twenty-four grains, Mucilage of Gum Arabic a sufficient quantity; mix, and divide into twelve pills. Coat the pills with a varnish of Tolu dissolved in Chloroform, and keep in well-stopped vials. Dose, two, three, or four a day, in cases where the bronchial secretion is viscid and expectorated with difficulty. Preparations from various other articles have also been used with benefit, as, Tincture of Larch, Lobelia, Indian Turnip, Senega, Ipecacuanha, Canada Balsam, Bitter Candytuft, Matico, Eucalyptus, Ammoniacum, Sulphate of Quinia, etc.

If the expectoration be too profuse, astringents may be used in conjunction with the other agents, as, Alum, Geranium, Tannin, Beth Root, etc.

Emetics will be found a very valuable class of agents in this disease, especially when of long standing, or when the symptoms are obstinate and severe. The Compound Powder of Lobelia may be administered for this purpose, and be repeated every week or two, according to the strength of the patient, until the disease is cured, or has become very much improved. And when the bronchitis fol-

lows some other disease, or occurs primarily in a scrofulous system, the Bromide or Iodide of Ammonium, in conjunction with the Compound Syrup of Stillingia, will be found an invaluable constitutional medication.—Diarrhea may be met by astringents; the Tincture of Chloride of Iron, twenty drops in a wineglassful of Blackberry Root infusion, repeated three or four times a day, will be found very efficacious. In some cases, a mixture of Geranium one grain, Camphor half a grain, Opium one-fourth of a grain, will prove useful,—this dose may be repeated as required, two or three times a day.—In dilatation of the bronchial tubes with moist rales, occasional emetics and nauseant expectorants will be useful, in connection with the local measures already referred to, and the employment, internally, of tonics and alteratives, as, Bromide of Ammonium, Sulphate of Quinia, Citrate of Quinia and Iron with Strychnia, etc.

The bowels should be kept regular, but not actively purged; acidity of the stomach should be corrected; the urinary secretion should be kept in as normal quantity as possible, and the diuretics employed should be of a stimulating, balsamic character, as, Canada Balsam, Balsam of Copaiba, Cubebs, Horseradish Root, Queen of the Meadow Root, Uva Ursi, etc. The surface of the body must be attended to, frequently bathing with an alkaline solution, and giving a Spirit Vapor Bath every two or three weeks, as the strength of the patient will permit. Exercise should be taken in the open air whenever the weather will permit; and flannel should be worn, especially in cold and damp seasons, in order to preserve an equable degree of temperature of the surface of the body, and, in cold weather, much benefit will be derived by drying and toasting the feet before the fire, or, by sleeping with a hot iron or brick to the soles of the feet. The sleeping apartment should be well ventilated, not have more than one or two persons occupying it, and its atmosphere should never be allowed to fall, during the night, below 60° Fahrenheit. And care should be taken in cold weather to protect the air-passages from the direct influence of a cold atmosphere, by wearing a handkerchief or other article over the mouth, when exposed to the open air. The general rules for diet, etc., heretofore mentioned are applicable in the management of this disease. When much debility is present, or, when the digestive functions are torpid or enfeebled, bitter tonics may be employed, and the moderate use of English Porter, Brown Stout, or Scotch Ale, at meal-time, will be found beneficial. By the adoption of the treatment just named, it will rarely be required for a patient to

remove to a warm climate, unless the disease be complicated with a tuberculous tendency of the lungs.

As inhalations are frequently of great value in the treatment of bronchial and pulmonary affections, I will give a list of some that I have employed with much advantage in these maladies. Those which require to be warmed in order to produce a vapor for inhalation, should be placed in a vessel, with a tube attached to be held in the mouth, or in the nostrils. Those which are volatile may be used in the same manner, or, a piece of sponge may be moistened with a teaspoonful or two of the fluid desired, and then be placed in a tumbler, from which the patient may inhale by holding the glass to the mouth and nostrils. Powders may be inhaled as heretofore named on page 564.

1. *For purulent expectoration.* Take of Gum Myrrh half an ounce, Gum Hemlock two drachms, Crude Pyroligneous Acid one fluidounce; mix, and dissolve by heat. A tablespoonful of this mixture may be thrown upon a hot shovel, and the vapors that arise be inhaled.

2. *Alterative and Stimulant.* Take of Nitre twenty grains; Common Salt one drachm; Hydrochlorate of Ammonia one drachm; Water half a pint; mix. Heat and inhale the vapor for ten or twenty minutes at a time.

3. *Soothing solution.* Take of Alcoholic Extract of Conium twenty grains, Camphor twenty grains, Tincture of Benzoin two fluidrachms, Water four fluidounces; mix. About two fluidrachms in a gill of hot water may be inhaled for ten or twenty minutes at a time.

4. *Alterative.* Take of Iodine six grains, Iodide of Potassium twelve grains, Alcohol one fluidrachm, Water three fluidounces; mix. One fluidrachm to be inhaled at a time. In some cases, No. 3 and No. 4, in proper quantity, may be added to six or eight ounces of Water, and the vapor be inhaled; the combination gives rise to effervescence.

5. Take of Iodine three grains, Iodide of Potassium six grains, Tincture of Lobelia one fluidounce, Tincture of Benzoin six fluidrachms, Ethereal Tincture of Conium one drachm and a half, Alcohol half a pint; mix. A drachm or two may be added to a gill of hot water, and the vapor be inhaled for ten or twenty minutes. Useful in tubercular phthisis.

6. *Astringent and Anodyne.* Take of Alcohol four fluidounces,

Naphtha one fluidrachm, Benzoic Acid half a drachm, Tannic Acid eight grains, Chloroform one fluidrachm; mix.

7. *Expectorant.* Take of Pleurisy Root half an ounce, Black Cohosh two ounces, Queen's Root one ounce, Lobelia half an ounce, Ipecacuanha two drachms, Diluted Alcohol one pint; mix. Two fluidrachms of the tincture may be added to half a pint of hot water, and the vapor be inhaled.

8. *Expectorant.* Take of Alcohol six fluidounces, Nitric Acid half a fluidrachm, Tincture of Tolu one fluidounce, Tincture of Camphor half a fluidounce, Oil of Bitter Almonds six minims; mix. A teaspoonful to half a pint of water.

9. *Soothing.* Take of Belladonna Leaves half an ounce, Black Cohosh two ounces, American Hellebore Root half an ounce, Aconite Root two drachms, Chloroform two fluidrachms, Diluted Alcohol one pint; mix. Use in the same quantity as the preceding, when there are febrile symptoms present.

10. *Astringent.* Take of Geranium one ounce, Beth Root one ounce, Golden Seal one ounce, Wild Indigo Bark one ounce, Diluted Alcohol one pint; mix. Used as the preceding, in relaxed conditions of the mucous membrane.

11. *Astringent.* Take of Geranium one ounce, Beth Root one ounce, Witch Hazle Bark two ounces, Balsam of Peru two drachms, Alcohol one pint; mix. Used as the preceding, in hemoptysis.

12. *Alterative.* Take of Chloride of Gold and Soda ten grains, Chlorate of Potassa one drachm, Sugar of Milk two ounces; mix, and reduce to an impalpable powder. Used in tubercular phthisis, inhaling the dust.

13. Take of Mullein Leaves two ounces, Meadow Sweet, Maiden Hair, each, one ounce, Stramonium Leaves half an ounce, Boiling Vinegar one pint; mix, and macerate for one hour. When cold, filter and add an equal quantity of Water in which half an ounce of Salt has been dissolved. Heat a small portion of this, and inhale the vapor for ten or twenty minutes each time. Useful in chronic laryngitis, tracheitis or bronchitis, with cough and irritability of the mucous membrane.

Many other agents and compounds have been used in inhalations in the form of vapor, as, Diluted Hydrocyanic Acid; Chlorine; Chloroformyl; Creosote; Nitric, Acetic, and Hydrochloric Acids; Nitrous Gas; preparations of Bromine; pure Deodorized Alcohol; Acetate of Zinc; Nitrate of Bismuth; Aqua Ammonia; Oil of Turpentine; Canada Balsam; solution of Hydrochlorate of Ammonia; Ethereal Tinctures, of Tolu, Balsam Peru, Storax, Sweet Gum, Poplar Buds, Benzoin, Matico, St. John's Wort, etc. Or,

the vapor of water containing these articles, either alone, or, in various combinations with each other, may be used. Also, the vapor of aqueous or acetous infusions of Sweet Flag, Wild Carrot, Catnip, Black Cohosh, Gelseminum, Blue Flag, Matico, Stramonium, Parsley Root, Elder Flowers, Golden-rod Leaves, Bloodroot, Agrimony, Sweet Fern, St. John's Wort, Horsetail, (*equisetum hyemale*), Cleavers, Frost Wort, Hyssop, Ground Ivy, etc., as well as vapor of Oil of Cajeput, Oil of Sassafras, Oil of Erigeron, Oil of Rosemary, Oil of Cubebs, Oil of Copaiba, Oil of Cinnamon, etc.,—of the method of combining which, the preceding formulæ will give some idea. I have found these to be even of service in phthisis, to relieve cough and other urgent symptoms. Fifteen drops of Hydriodic Ether, inhaled, at a time, and repeated three or four times a day, have proved useful in chronic bronchitis and the early stage of phthisis. These inhalations are frequently serviceable in removing or lessening bronchial and laryngeal cough, in lessening mucus expectoration, and, in the early period of consumption, to lessen the disposition to tuberculous deposit,—they not only bring the remedies in direct contact with the diseased surfaces of the air-vessels, but accustom the patient to full inspiration and expansion of the chest.

EMPHYSEMA OF THE LUNGS.

There are two different pathological conditions of the lungs to which the term "emphysema" has been applied, and which are usually described as *vesicular emphysema* and *interlobular emphysema*.

Vesicular emphysema consists in dilatation or enlargement of the air-cells, in consequence of which the lungs become enlarged, as well as the chest, and the air in the lungs is augmented in amount. This disease is chronic, and may exist for many years in a mild form; occasionally it manifests itself with a considerable degree of severity, and progresses rapidly. It frequently commences in childhood, and is seldom met with after middle life.

The immediate *causes* of this affection are not satisfactorily understood, though it is known to be a sequel of chronic bronchitis and pneumonia. It has been attributed to a deficiency in the elastic force of the lung, from which its tendency to collapse during respiration is impaired, and, the lungs being more or less constantly expanded by the powerful action of the inspiratory muscles, a permanent enlargement of the air-cells, as well as of the chest, is the result.—On the other hand, it has been stated that expiration is a much more powerful act than inspiration, and that

emphysema may occur from any disease which causes contraction and hypertrophy. Dr. Jenner observes: "The atmospheric air moved by the inspiratory effort can exert comparatively little pressure on the inner surface of the air-cells situated at the extreme margin of the base, the root of the lower lobe (*i. e.* that part immediately next the spine and below the primary bronchus), or at the part of the apex situated in the furrow posterior to the trachea on the right side. While violent expiration, being chiefly performed or greatly aided by the abdominal muscles forcing upward the liver, etc., drives the air (in consequence of the highly arched form of the diaphragm in violent expiration) from the central part of the lung, not only through the bronchi toward the larynx, but also toward the circumference of the lungs, *i. e.*, toward those parts which are the least compressed during expiration."—The disease has followed powerful mental excitement, and sometimes appears as a hereditary malady.

The principal *symptom* in this affection is dyspnœa, which is frequently preceded by cough. At first, the difficulty of breathing, which consists principally in the expiratory effort, or in expelling the air from the lungs, is slight, and may continue so for many years without any change for the worse; or, it may gradually become more and more marked, occurring in paroxysms which threaten suffocation. The respiration is frequently of a loud wheezing character, like that of asthma. As the dilatation of the air-cells obliterates some of the capillary vessels, the circulation of blood through the lungs is more or less interfered with, and the walls of the air-cells become atrophied; hence arises, not only the difficult breathing and sense of constriction, but the general venous congestion as indicated by the bluish, leaden tint of the skin and lips, the peculiar expression of anxiety and melancholy, and the disposition to dilatation and hypertrophy of the heart on its right side, palpitations, and, at a later period of the disease, serous effusions in various parts of the body, and, perhaps, Bright's disease. The nostrils are usually dilated, thickened, and vascular, and the lower lip enlarged.

The chest of such patients has always a rounded appearance on one or both sides, according as one or both sides are affected, the shoulders being more or less elevated and leaning forward, while the patient stoops forward, finding more relief in this position. There can not be said to be, however, a bulging of the intercostal spaces, but rather a wide separation of the ribs. Expectoration is liquid, frothy, and mucous; the muscles of the neck are enlarged; and the strength fails in proportion to the degree of dyspnœa.

The dyspnœa is increased by spasmodic contraction of the bronchial tubes, and by certain seasons and changes of temperature. At an advanced stage, there is a change in the heart's position, which will not be felt beating in the præcordial region, and the movements of the diaphragm will be more or less interfered with. The disease is frequently confounded with asthma, which it very much resembles in some of its symptoms.

Percussion yields an unnatural ringing clearness, somewhat tympanitic, and the sense of resistance to the finger is increased. Auscultation detects a feeble or indistinct vesicular resonance. The inspiratory murmur is diminished both in duration and intensity, while the expiratory is prolonged. If the disease be associated with bronchitis or chronic catarrh, the bronchial rales will be present, dry or moist; usually the dry, crepitant rale attends the prolonged expiration; or, the sibilant rale. (*See Note*, page 539, *sections* 24 and 34.)

Emphysema may be *discriminated* from *chronic bronchitis*, as the latter is not attended necessarily with an enlargement of the chest, constant feebleness of the vesicular sound, and paroxysms of difficult expiration. From *dilatation of the bronchial tubes*, in which the respiration is bronchial or cavernous, with increased resonance of the voice, and dullness on percussion; and the same may be said of *pneumonia* and *phthisis*, in the latter of which diseases, there is flatness on percussion. From *aneurism*, by the absence of the symptoms of emphysema, and the dullness on percussing over the swelling, its beatings, and its blowing sound. From *chronic pleurisy*, by dullness on percussion directly over the effusion, and an enlargement or prominence at the inferior portion of the chest. From *pneumothorax*, in which the sound elicited on percussion is tympanitic without having the slightest vesicular quality about it, and, over the point where fluid is present, the percussion elicits flatness, as at the lower part of the chest. The respiratory murmur is much more feeble than in emphysema, there is no thrill nor vocal fremitus, and amphoric respiration, metallic tinkling or gutta cadens, and succussion sounds may be present, which is never the case with emphysema. The dyspnœa of pneumothorax is less of an asthmatic character, and its commencement is usually dated as occurring immediately subsequent to a pain in the chest. The history of the two diseases is not alike.

The *prognosis* of vesicular emphysema is not very favorable. Palliation of symptoms is about all that can be effected, especially in advanced cases, for there is no known remedy capable of restoring elasticity to the distended pulmonary membrane, and

still less of diminishing the capacities of the distended or broken-down air-cells. Some writers have affirmed, that, in recent cases, a treatment which will overcome bronchial irritation, may be followed by a return of the vesicular murmur, and a diminution of the volume of the lung; but cures are rarely made.

The *pathological appearances* are an abnormal enlargement of the vesicles of the lungs, which is more especially observed at the free margin of these organs, together with peculiar appendices of various forms, sizes, and structures, resulting from the rupture of the air-cells. The bronchi are seldom involved. When the chest is opened and the lungs are exposed, bladder-like vesicles will be observed in those parts of the lungs affected, and the affected lung or lungs will not collapse, and its substance is apparently more bulky than in the normal state. The upper lobe of the lung is more frequently affected than the lower. Abnormal conditions of the heart and bronchial tubes are sometimes observed as the results of the emphysema.

The *treatment* will be the same as that for bronchitis, with which the emphysema is commonly associated. The dyspnœa may be relieved by half-grain or grain doses of Extract of Cannabis Indica,—by Ether, or Chloroform. Or, antispasmodics may be inhaled with advantage, as, Ethereal Tincture of Lobelia, or, of Stramonium; or, a mixture of equal parts of Stramonium Leaves, Mullein Leaves, Lobelia Leaves, and Sunflower Leaves, (all dried), may be smoked several times a day, or whenever the breathing is troublesome. The more the paroxyms of dyspnœa can be prevented, the greater will be the chances for an ultimate contraction of the dilated air-cells. A pill composed of Strychnia, Extract of Belladonna, and Alcoholic Extract of Aletris, will frequently be found exceedingly beneficial.

The body should be kept warm; the surface of the body, the bowels, and the kidneys be properly attended to; diet must be carefully regulated; exercise must be moderate; and everything must be avoided that will produce mental or physical agitation, or fatigue, or that will irritate the lungs. Change of air frequently affords great relief. If the heart becomes implicated, the conjoined treatment must be in accordance with the cardiac lesion and its symptoms. Much debility will require tonics, as, the Peroxide of Iron, either alone, or in combination with Strychnia, and Alcoholic Extract of Aletris. Chambers recommends the following to be taken in emphysema of the lungs:—Take of Tincture of Chloride of Iron 20 minims, Ethereal Tincture of Lobelia 15 minims, Camphor Mixure one fluidounce,—mix for a dose; to be repeated three times a day.

Interlobular emphysema is the other variety of pulmonary emphysema, and is caused by the rupture of one or more of the air-cells, in consequence of which the air extravasates into the areolar tissue between the cells. It is *caused* by any violent straining efforts, as, lifting heavy weights, excessive laughter, coughing, the bearing-down efforts in parturition, and by obstacles to respiration, as, in bronchitis, pneumonia, hooping-cough, phthisis, etc. In some instances it has caused sudden death, but usually, of itself, the affection is of no vital importance.

The principle *symptom* is the dyspnœa, which is more or less severe according to the extent of the mischief. When the emphysema occurs at the base of the lung, it may enter the mediastinum, and pass from thence into the subcutaneous areolar tissue of other parts of the body, especially under the jaw and in the neck. The physical signs are the same as those belonging to vesicular emphysema, from which it is often very difficult to discriminate it; if its symptoms come on suddenly, immediately after some violent effort, and especially if the emphysematous condition of the cellular tissue of the neck is manifested, there is a strong probability of its being interlobular emphysema,—but the external emphysema may be due to a rupture of the trachea or bronchial vessels. The *pathological characters* consist of an infiltration of air into the cellular tissue between the pulmonary lobules, giving rise to their enlargement, especially toward the surface of the lung or lungs, at which part will be seen air-vesicles or bladders of various sizes and in greater or less numbers; the pressure of the infiltrated air frequently causes a detachment of the pleura. The air-bubbles or bladder are sometimes observed in the course of the vessels passing through the lungs and running over their surface.—The disease is an exceedingly rare one, and though tedious, is seldom of a serious nature. If *treatment* be required, it will be the same as that for vesicular emphysema. The infiltrated air is ultimately absorbed, and the difficult breathing gradually disappears.

PULMONARY APOPLEXY.

This varies from hemoptysis in being a hemorrhage, or effusion of blood into the parenchyma of the lungs. It is by no means a common affection, and usually occurs in individuals who are affected with some cardiac affection, tubercular phthisis with softening, who are of advanced age, etc. It sometimes attacks very suddenly. The *symptoms* are, great difficulty of breathing, some-

times almost to suffocation, oppression of the chest, hurried and unequal thoracic movements, tightness and more or less pain in the chest. The saliva or expectorated mucus is often streaked with a dark, dirty liquorice-looking blood, and which may be expectorated by itself; it has no fetor, When the air-cells are ruptured, an enormous quantity of blood may be expectorated, and then it will be very difficult, if not impossible, to determine the disease from hemoptysis. The pulse is full and frequent, and of a somewhat vibrating character.

Percussion is clear, unless there is considerable extravasation into the lung substance, when it becomes dull. Auscultation will vary the same as percussion; if the latter is clear no change may be observed in the normal respiratory sounds; if dull, in proportion to the degree of dullness, there will be a feeble or suppressed respiration over the part where the extravasation occurs, or, bronchial respiration, bronchophony, and fremitus may be detected, with moist rales, and in case of a cavity, cavernous sounds. (*See Note*, page 539, *sections* 4, 17, and 18.) In *pneumonia* the difficult breathing increases from the beginning of the malady to its maximum; in pulmonary apoplexy it is more severe at the time of the effusion, and then diminishes. If the expectoration be free from fetor there is no *gangrene* of the lung. In *cancer* of the lung there is more pain, a cough, emaciation, etc.

A *post-mortem examination* shows a dense and dark red appearance of that part of the lung in which the effusion occurs, and which, when cut into, will be found filled with coagulated blood. Rupture of the lung structure may also be noticed. The heart may be affected with hypertrophy of the right ventricle, or, more commonly, obstruction of the mitral orifice.

The *prognosis* is doubtful; the disease often destroys life suddenly; and sometimes by terminating in suppuration and gangrene. When the symptoms are mild, the extravasated blood being enclosed in the air-cells or vesicular structure of the lungs, a recovery may occur.

The *treatment* consists in freely purging the bowels by Croton Oil, or Elaterium, or Blue Flag, etc., and by extensive dry cupping upon the chest. Afterward, counter-irritation to the back, and also to the anterior part of the chest, as well as in the axillary region; together with the internal use of astringents, etc., as, Oil of Turpentine, Warren's Styptic Balsam, Gallic Acid, Tannin, infusion of equal parts of St. John's Wort, Bugle Weed and Beth Root, etc. Oil of Turpentine vapor may also be inhaled, as well as vapor from the infusion just named above. Inhalation of the spray of these infusions,

or of a mixture of Carbolic Acid, Pyroligneous Acid, and Water, will also be of service in some cases. Ice, iced water, acid and astringent fruits, buttermilk, milk, lemonade, and other light, nourishing articles should be prescribed; with other management like that advised under Hemoptysis.

HEMOPTYSIS.

Hemoptysis or Hemorrhage from the Lungs, is generally symptomatic of some serious disorder either of the heart or lungs, more frequently the latter; sometimes, but very rarely, it occurs independent of either cardiac or pulmonary malady, as, from vascular plethora, etc. The blood is hawked or coughed up, and is sometimes so profuse as to prove fatal in two or three days.* The blood most commonly exudes from the capillaries and small arterial ramifications of the mucous membrane of the bronchi, and of the pulmonary parenchyma; it may, however, proceed from an ulcerated or softened blood-vessel. The hemorrhage may occur at any period of life, but is more commonly met with between the ages of eighteen and twenty-five. Sometimes, it will be suddenly manifested in a person not previously supposed to have a tendency to phthisis, and in whom the most careful examination during life, or after death, can not detect any lesion whatever. Frequently, a hemorrhage supposed to be from the lungs, proceeds from the pharynx or larynx, as, in follicular pharyngo-laryngitis, and which is amenable to local treatment.

Hemoptysis may come on without any premonitory *symptoms*, save that of debility, or of peculiar conformation of the thorax. Ordinarily, however, it is preceded by a sense of weight and oppression or pains in the chest, a dry, tickling cough, slight dyspnœa,

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*Several years since I was treating a very interesting young lady for tubercular phthisis, and she was apparently improving very rapidly. Her brother, a young man about nineteen, beloved by his family, had never manifested any symptoms of lung disease, except in his formation, having a narrow chest and prominent shoulders, with a stooping forward. He was suddenly attacked with most profuse hemoptysis, which resisted every means to check it, and which proved fatal on the third day. The shock to the sister was so severe that she sank rapidly, and did not survive him for more than eight days. In her case there had never been any hemorrhage. A post-mortem examination of the lungs of the young man revealed an extensive tuberculated condition of them, but no ulceration nor rupture of blood-vessels could be detected; the bronchial membrane was pale and exsanguineous, and portions of the pulmonary tissue was infiltrated with dark blood.

and a hard, jerking pulse; sometimes, it is preceded by a considerable degree of warmth under the sternum, which shifts around, and very frequently a saltish taste will be experienced shortly before the hemorrhage occurs. At other times, it may be ushered in with shiverings, coldness and weariness of the extremities, pains in the head, back, and loins, costiveness, flatulency, and a rapid, full pulse. Again, it may commence with a tickling sensation at the upper part of the larynx, with an occasional slight hawking or cough,—but when this is the case, the hemorrhage is usually from the larynx.

The amount of blood discharged varies, being sometimes so small as merely to speckle the mucus expectorated, and which is then rarely dangerous, so that it can not properly be termed a "hemoptysis." At other times, however, it is so profuse as to produce sudden and alarming debility, and even a hasty death; or, it may come on daily; at regular or irregular periods; may continue unceasingly for many days together; or, it may happen only once or twice during a life-time. Occasionally, it flows so abundantly as to be ejected through the nostrils as well as through the mouth. In some instances the slightest exertion of the voice, or of the body, or even a powerful mental excitement, will occasion a return of the bleeding; but as often it returns without any such cause. The blood is thin, florid-red, and frothy, but when very abundant, and especially after the first attack, it is not so apt to be frothy; sometimes, especially after one or more bleedings have already happened, it is thick, and of a dark or blackish cast, the result of its retention for a longer or shorter time in the air-passages previous to its being coughed up. In a few cases, the blood will have more of a venous than an arterial appearance from the commencement. The pulse becomes quick, full, and bounding, prostration occurs more or less rapidly in proportion to the quantity of blood lost, the skin has a cold dampness upon it, and the patient becomes greatly alarmed and anxious. The face is sometimes alternately flushed and pale; there may be palpitation; and when the blood is effused into the bronchial divisions, the patient experiences a distressing sense of ebullition in the chest. According to the quantity of the hemorrhage, and the disease of which it may be symptomatic, will be the general symptoms.

As already remarked, in the great majority of instances, hemoptysis is symptomatic of other diseases, especially tubercular phthisis, usually manifesting itself as one of the early symptoms of this malady, though not always present, and frequently disappearing for a long period previous to the fatal termination. "The obliteration of

the minuter twigs of the pulmonary artery speedily follows the deposition of tubercles; for when an injection is thrown into the pulmonary artery, it rarely happens that it can be propelled into the immediate vicinity of the crude tubercles."—"Closure of the pulmonary arteries takes place here precisely as in the instance of the fœtal vessels and of phlebitis; although without there being any ground for our assuming vascular inflammation. The walls of these vessels thicken or swell quite disproportionately; the several tunics merge into a single uniform sero-lardaceous mass; and the calibre, which long continues narrow, though pervious, becomes eventually filled with a thin, reddish, fibrinous plug, transforming the whole vessel into a solid cord. These cords either form a coarse network covered with remnants of lung, and invested with a purulent crust, upon the walls of a cavity, or traverse the latter as bands or bridles. In rare instances, a cord of this description tears, through attenuation, midway between its two ends, before definitive closure of its calibre. Then ensues more or less violent hemorrhage, which often proves suddenly fatal; the vomica and the bronchial tubes corresponding are found replete with coagulated blood, which probably fills in a frothy state the trachea and larynx.

"The above explanation of the deportment of the blood-vessels will, at once, account for the hemorrhage so frequently attendant on tubercular disease. It is often considerable at the outset, and recurs from time to time during the progress of phthisis, although not to such an amount as immediately to threaten life. It is chiefly observed where tubercle is rapidly developed in connection with inflammatory action, or where the pulmonary texture is replete with densely-clustered tubercles. Carswell is, upon the whole, right in stating that the blood is poured out, because the pulmonary veins, being compressed by the multitude of tubercles, are not in a condition to take up the whole of the arterial supply." (*Hasse.*) Hence we may observe from this statement, that while the actual rupture of a large vessel traversing a vomica, may, occasionally, give rise to a bleeding from the lungs, it is much more frequently due to an exhalation from obstructed capillaries.

Other *causes* which impede the return of blood from the lungs, ultimately producing a congested condition of their blood-vessels, giving rise to a sanguineous exhalation from the capillaries of these organs, are, diseases of the aortic or mitral valves, compression of the pulmonary veins by tumors, aneurisms, etc. A profuse and fatal hemorrhage may follow the rupture of an aneurism into the bronchi; and hemorrhage will occasionally manifest itself in pulmonary apoplexy. Hemoptysis may also occur from a local or gen-

eral plethoric condition, due to a retention of customary evacuations, and more especially when the retention is a consequence of some tubercular formation; it may also be manifested without any known cause.

The exciting causes of bleeding from the lungs or bronchial vessels, are, violent exercise; injuries to the chest; severe straining; improper exercise of the lungs in singing, speaking, blowing on wind-instruments, etc.; a diminution of the weight of the atmosphere, as a sudden removal from a denser to a rarer atmosphere; inhalation of irritating particles, etc. Ordinarily, it is not immediately dangerous, though nearly always indicative of a serious malady, and in such instances, those who are strongly predisposed to it, present some faulty confirmation, as, narrow chests, round shoulders, and often signs of phthisis, as, cough, thoracic pains, dyspnœa, etc.—A hemoptysis often occurs toward the termination of pneumonia, pleurisy, small-pox, and some fevers, and if not too profuse, is a favorable indication.—After the hemorrhage has ceased, we should always endeavor to ascertain by percussion, auscultation, etc., whether it depends upon disease of the lungs, or heart, or upon some other condition.

In the *diagnosis* of hemoptysis, we must remember that the blood is at first of a bright, florid character, frothy, is hawked or coughed up, and its appearance is generally preceded by an uneasiness and oppressed sensation in the chest, a sweetish or salty taste, and a sense of tickling in the larynx. After a few attacks of bleeding, it may contain dark clots. In *epistaxis* the blood is never florid and frothy, although it may be coughed or hawked up, is not accompanied with the quick, full, bounding pulse, the cold sweats, great anxiety, and chest symptoms of hemoptysis; and upon stooping forward it will flow from the nostril. In *hematemesis* the blood is dark, thick, and often mixed with the contents of the stomach; it is generally vomited up without either coughing or hawking, and some blood may frequently be observed in the stools. Weight, uneasiness, and tenderness of the epigastric region is ordinarily present, and sometimes nausea. When a *large blood-vessel* or an *aneurism* ruptures, the blood is of an arterial character, is profusely discharged by jets, and speedily terminates fatally. When bleeding proceeds from the *larynx*, *trachea*, or *œsophagus*, which is of rare occurrence, it is seldom profuse, is unaccompanied by any of the local sensations in the chest or stomach, above described, and in many instances, its seat may be recognized by the laryngoscope.

The *pathological appearances* are, a more or less red, livid, and tumefied condition of the bronchial membrane, or, it may be pale

or, softened and tinged with red, or, no symptoms of a pathological state may be observed. A congested or inflammatory appearance of portions of the lungs may also be noticed, their substance being infiltrated with blood; and, if any lesion of the lungs, heart, or large vessels are associated with the hemorrhage, the appearances peculiar to such lesion will also be found present.

The *prognosis* of hemoptysis when profuse is unfavorable; when not so profuse, it is favorable as far as the hemorrhage itself is concerned, but not so far as relates to the disease of which it is symptomatic. If this be of the heart or lungs, the prognosis is more or less unfavorable as to a permanent recovery. If the bleeding be due to a congested condition of the pulmonary organs, from suppressed evacuations, etc., the prognosis is favorable, provided the suppression be not a consequence of pulmonary, cardiac, or tubercular disease.

In the *treatment* of hemoptysis the practitioner should be calm and collected, and pursue his measures with promptness and decision. The patient should be immediately placed in a semi-recumbent position, having the room cool, and well ventilated, and allowing but few persons to be present; in warm weather he may be fanned, or the fresh air may be permitted to blow upon his chest. The most perfect quiet must be enjoined, prohibiting him from talking, and requesting him to suppress cough as much as possible. Warmth and stimulation must be applied, as soon as can be done, to the feet and lower legs, and some Turpentine Liniment may be rubbed upon the chest and back until it produces a glow of warmth, or, burning sensation; and, if the hemorrhage be very profuse and alarming, ligatures should be applied around the thighs and upper part of the arms, near the body, being careful not to tighten them so as to interfere with the circulation of the arteries; and, after the discharge has become arrested, the ligatures may be gradually loosened and removed.

Sometimes, the practitioner may not have the remedy he desires to use, immediately at hand, when he should promptly administer half a teaspoonful of common Salt, or of Oil of Turpentine, repeating the dose every twenty or thirty minutes, according to the urgency of the case, and continuing it, until the bleeding is checked, or until he has received the remedy sent for.

The Tincture of Veratrum Viride, two or three drops every half hour, until it has lessened the rapidity and bounding character of the pulse, will be found a most useful agent, in conjunction with Gallic Acid, in twenty or thirty grain doses every one, two, or four hours according to the urgency of the case. In some instances, a

powder, consisting of Capsicum five grains, Ipecacuanha one or two grains, and Opium half a grain, may be given, every half-hour, hour, or two hours, as may be required; it will be found useful especially where there is much uneasiness and restlessness; this preparation will also be found useful in preventing increased capillary congestion of the bronchi or lungs, or an infiltration of the effused blood into them, which are so apt to follow the hemorrhage, from greater or less impairment of the vital tone of these organs. If nausea result from the Ipecacuanha in this powder, it often induces a sedation that will reduce the vascular action. A mixture composed of Tincture of Chloride of Iron one fluidrachm and a half, Chlorate of Potassa two drachms, Water six fluidounces, has frequently checked the bleeding promptly when given in teaspoonful doses repeated every two or three hours. Inhalation of spray of Diluted Carbolic Acid, or, of solution of Perchloride of Iron, has likewise been successful.

Other agents have been employed with advantage, to lessen arterial action, as, the Tinctures of Aconite, Sheep Laurel, Digitalis, etc. Also to check the hemorrhage, as, Oil of Fleabane, Oil of Fireweed, Warren's Styptic Balsam, Tincture of Matico, or, half fluidrachm doses of a mixture of equal parts of Tincture of Cinnamon, Tincture of Rhatany, and Oil of Turpentine—repeating the dose as may be required. Lycopus Virginicus in infusion, or wineglassful doses of a decoction of equal parts of Black Cohosh, Beth Root, and Lycopus, will also be found useful in those cases where the hemorrhage is persistent; these drinks may also be employed in conjunction with the other remedies employed.

If the hemorrhage occurs in a patient of full habit, much benefit will be derived from an active cathartic, given after the cessation of the discharge, or upon its decline—saline cathartics are the best, as a combination of four drachms of Cream of Tartar, and three drachms of Sulphate of Magnesia, taken in three or four fluidounces of Spearmint Water, or in infusion of Matico, Buchu, Cleavers, etc. If cough be present, some slightly nauseating cough mixture may be prescribed, as, a combination of Tincture of Bloodroot, Syrup of Ipecacuanha, Syrup of Tolu, each, equal parts, to be given in fluidrachm doses, each dose containing one-eighth, or one-sixth of a grain of Sulphate of Morphia. Should a sense of oppression remain in the chest, after the hemorrhage has been checked for some time, with crepitation diffused through one or both lungs, it is generally due to irritation from blood accumulated in the bronchi, and will require for its removal, the cautious employment of a prompt emetic.—Professor Morton, of Philadelphia,

states that the retching and vomiting of sea-sickness does not increase, nor cause a return of, the hemoptysis symptomatic of tubercular consumption.—Sometimes, in the milder forms of hemorrhage, or toward the decline of a profuse bleeding, inhalations of warm vapors will be useful, as, of Diluted Acetic Acid, Oil of Turpentine, Benzoic Acid, or, a combination of Oil of Erigeron one fluidrachm, Oil of Turpentine two fluidrachms, Tincture of Stramonium half a fluidounce.—After the cessation of the hemoptysis, means should be taken to cure or suspend the progress of the malady of which it is symptomatic; and if this can not be done, we must prepare the patient for a return of the bleeding, having him to keep all the necessary remedies near at hand, at the same time keeping his system constantly under the influence of one of the astringent remedies or decoctions already named. Sometimes, the hemoptysis appears periodically, in which case one of the salts of Quinia will be found useful.

Patients of an enfeebled, anemic condition, who are attacked with bleeding from the lungs, should use a mild nourishing diet, consisting chiefly of milk, eggs, oysters, gruel, panada, strong beef tea, etc.; and in passive bleedings three or four grains of Sulphate of Iron, Perchloride of Iron, Iodide of Iron, or other ferruginous preparation, should be taken daily; being very careful, however, not to use iron in active hemorrhages, as it will increase the difficulty. Passive exercise should be taken in the open air, together with very moderate and properly regulated physical exercise to expand the thorax and give tone and development to its contained organs.—Those of full habit should confine themselves, for some time, to a bread and milk diet, with soups, broths, and beef tea used sparingly, and boiled green corn during its season; they should avoid all solid animal food, tea, coffee, all liquors, indigestible, flatulent, and stimulating articles. Oranges, lemons, ripe acid fruits are very proper, and all drinks should be taken cold.—Where persons are disposed to hemoptysis, they should have their bowels kept regular, their digestive organs in a normal condition, and their skin clean and warm; they should not be allowed to sing, talk long or loud, or blow upon wind-instruments, and should avoid elevated, cold situations, preferring a flat or low country where the air is dense, and comfortably warm and dry. Sexual indulgence must also be prohibited in severe cases.

PNEUMOTHORAX.

When air or gas is contained in the pleural cavity, it is termed *pneumothorax;* when, in addition, there is liquid present as well as air, it is termed *pneumothorax with effusion*, or *pneumohydrothorax.* The latter condition is more commonly met with than the former; both affections will be considered under the present caption.

The *symptoms* are generally observed at first, either during or after a fit of coughing, which occasions a rupture and allows air to pass from the lung into the pleural cavity; they are, intense pain; great oppression of the chest; rapid and extreme dyspnœa, according to the rapidity and amount of the effusion, frequently threatening suffocation; usually palpitation of the heart; and a manifestation of great anxiety, pallor, faintness, feebleness, and a rapid, feeble pulse. The patient generally remains in a sitting posture, or, if he lies down, it is invariably on the side affected, as he can not rest an instant on the healthy side. If the accident does not prove immediately fatal, acute pleuritis soon follows, with effusion of fluid. It is only, however, by the physical signs, that we can correctly and positively diagnose this lesion.

The affected side is often more prominent than the other, and percussion yields an unusual degree of clearness or resonance, which is of a decided tympanitic character, and no thrill or fremitus will be felt; if the examination be made while the patient is in a sitting posture, the clear, tympanitic sound will be developed over the upper portion of the chest, while below, it may be dull, or flat, from the presence of fluid. Auscultation detects the respiratory sound feeble, indistinct, or suppressed; amphoric resonance, metallic tinkling, and gutta cadens, may also be present. Succussion will detect a splashing sound when there is fluid as well as air in the pleural cavity. (*See Note*, page 539, *sections* 33 and 35.)

When, during a paroxysm of cough, or directly after, a patient laboring under tubercular phthisis is suddenly attacked in one side of the chest with the symptoms heretofore named, we have true grounds for suspecting perforation of the lung; and our suspicions will be confirmed by a careful examination of the chest by percussion and auscultation. There are, however, some exceptions to this general rule. In some respects the lesion resembles Emphysema of the Lungs, but may be determined from it by the means named under that affection.

The most common *cause* of pneumothorax is a rupture or perforation of the lung, admitting the entrance of air from without

into the cavity of the pleura, giving rise to a compression or collapsed condition of the lung, sometimes forcing it toward or against the spinal column. The perforation is associated mostly with a tuberculous state of the lung, as, an excavation; but it may happen from the formation of an abscess, the result of pneumonia; from gangrene of the lung involving the pleura; from cancer of the lung; from rupture of an enlarged bronchial tube; or of a dilated air-cell; or, from any cause that forms a free passage between the pleural cavity and the bronchi. Sometimes it may occur from perforation of the pleura by wounds; and, very rarely, gas may be exhaled spontaneously from the pleura. The lesion occurs much more frequently in the left lung and pleura, and is most common among those who are disposed to tubercula of the lungs. Occasionally it is met with on both sides.

The *pathological appearances* are those of the tuberculous or other disease associated with the pneumothorax, together with one or more lung (or pleural) perforations of various sizes, in most cases situated near the angles of the third or fourth ribs, and which form a channel of communication between the pleural and the pulmonary cavities. Air will also be observed in the former cavity, and, in the majority of cases, more or less purulent or sero-purulent fluid, which, as well as the air, may or may not be fetid.

When the lesion is associated with tuberculous disease of the lung, and especially in the advanced stage of it, the *prognosis* is unfavorable; in the earlier stage, life may be prolonged for several months. The disease has, in a few instances, existed for five or six years before death occurred. A favorable termination by absorption happens very rarely. More frequently, after pneumothorax has been established, the patient will survive but a few months.

The *treatment* of pneumothorax will be based upon the circumstances occasioning it, being wholly of a palliative character. If it be the result of a perforation from lung disease, occasioning great moral and physical depression at the time of its occurrence, stimulant and restorative measures will be required. If the patient recovers from the immediate influence of the lesion, and symptoms of irritation or inflammation are manifested, these must be met by the ordinary means for such conditions, treating them upon general principles according to the indications; counter-irritants, as, dry cupping over the whole chest will often prove useful. The dyspnœa may often be relieved by the administration of Extract of Cannabis, Stramonium, or Belladonna, Tincture of Aconite, Solution of Morphia, etc. At any time when there is great distress and dyspnœa, and reasonable fears are entertained of suffocation within a

short period, the operation of paracentesis thoracis should be performed, which, if it will not cure, will afford great relief, and aid in lessening the immediate risk of life; indeed, the operation may, in some cases, be repeated several times without incurring any danger, when properly performed. The general treatment will be that proper for the pleural or pulmonary malady, whatever that may be,—more commonly tuberculosis of the lungs.

ASTHMA.

Asthma or Phthisic is a peculiar morbid irritable condition of the nervous system, which, when exposed to certain ordinary influences not affecting the majority of mankind, gives rise to a spasmodic condition of the bronchial muscles, accompanied with a temporary difficulty of breathing, a wheezing sound, and a sense of tightness across the chest. Pure uncomplicated asthma is rarely met with, and is more common in women, while asthma, complicated with bronchitis or heart disease, is more common in men than women, in the proportion of ten to one. The disease may appear at any period of life from infancy to old age, being, however, in advanced life almost always complicated with pulmonary or cardiac disease. In childhood it is more generally due to a sensitive bronchial mucous membrane, resulting from hooping-cough, bronchitis, or measles, (and sometimes to emphysema, and pulmonary collapse), in a constitution somewhat disposed to the disease; and those cases that are perfectly pure and uncomplicated are ordinarily met with between the ages of fifteen and twenty-five. Asthma is a very capricious disease, being, with some patients, developed by causes which cure it in others; being cured by one agent in certain instances, which is perfectly worthless in others, and, frequently, one remedy which removes the paroxysm, for a time or two, of a patient, is forever after of no benefit to him. Again, the disease may, with some, be preceded by certain premonitory symptoms, while, in others, its attacks are sudden and unexpected; or, it may occur at regular or irregular periods, or, without any trace of periodicity whatever; with some the disease is manifested only during the warm seasons, while with others there is a more or less complete exemption from it during warm weather. And in various other ways, as, to its causes, the character of its paroxysms, its behavior under the influence of remedies, etc., does it exhibit its contrariety and capriciousness, being, in these respects, equalled only by hysteria. Death from asthma is exceedingly rare; indeed, it is doubtful whether it ever happens; but when the malady is associated with certain pulmonary

or cardiac lesions, occurring idiopathically, or, as a consequence of the asthma, then a fatal termination frequently occurs.

Precursory *symptoms* are frequently present, so that most asthmatics are fully aware that a paroxysm is coming on; these premonitory signs vary with different patients, both with regard to the time at which they appear, and their nature. They may be experienced only an hour or two previous to the attack, on the preceding night, or, for several days prior. They are, as it were, the commencement of that particular nervous condition which culminates in, or is more completely developed by, the subsequent respiratory phenomena; they are, a sense of fullness in the epigastric region; drowsiness; lassitude; heaviness; headache; flatulency; nausea; diuresis and pale urine; itching sensations, especially under the chin, between the shoulders, and over the sternum; and disturbed rest. With some, there is an unusual mental activity, buoyancy of spirits, and wakefulness; with others, attacks, apparently but not really catarrhal, will be developed; and again, the paroxysm may come on suddenly, without any warnings, and most generally during the night. In most instances it comes on early in the morning, or, when the patient awakes during the night; it may, however, occur at any hour of the day or night. Not unfrequently, the attack will be preceded by neuralgic pains in the testes, the tibia, or in other parts.

As the respiratory phenomena become developed, the breathing becomes more and more distressed and difficult, a sense of tightness across the chest is experienced, and the respiration becomes of a wheezing character; the speech becomes uneasy and difficult, and there is a tendency to cough. The itching comes on as soon as the tightness of breathing is first felt, it is incessant, is not relieved by scratching, and disappears as soon as the paroxysm has reached its height,—however, it is not present in all cases. These phenomena progress more or less rapidly, becoming more and more alarming in their character, and threatening suffocation. The patient is compelled to start up from a horizontal position, and seek a window or door for fresh air, or he may sit immovably in a chair, unable to speak, or even to move his head. The breathing is slow and difficult, more of a gasping character, expiration being much longer than the inspiration, the difficulty being to get the air out of the chest, and which is ultimately affected by a sudden expiratory jerk, and the moment expiration is completed the inspiration begins—there is no pause, the normal post-expiratory rest is lost. At every breath the head is thrown back; the shoulders more and more raised; the head, being, as it were, buried between them; the back

is rounded; the gait stooping; the mouth a little open; the face expressive of the intensest anxiety and distress; the eyes wide open, often strained, turgid, and suffused; the face purplish and distended, or very pale and collapsed; with a cold perspiration oozing from the forehead, and the surface of the body; and the muscles of respiration rigid and tightened like cords, and tugging and straining for every breath that is drawn. The tongue is usually coated; flatulency and constipation are by no means uncommon; the pulse is generally small and feeble, though it may be regular, irregular, slow, or rapid; the urine is abundant, pale, and inodorous, but becomes high-colored, less in quantity, and deposits a sediment on cooling, at the close of the paroxysm. The chest becomes enlarged in every direction during the paroxysm, the abdomen also becomes distended, and as soon as the attack disappears, both the chest and abdomen return to their original size.—The symptoms named continue for a longer or shorter period, from a few minutes to one or two days; but usually, when they occur in the night, they gradually decline on the approach of morning, the breathing becomes freer, coughing and speaking is less difficult, more or less expectoration ensues, much relief is experienced, and the patient usually falls asleep.

The paroxysm may end for the time, in symptoms of decided and more or less prolonged relief, or, it may only be a remission; in the latter case, a sense of tightness across the chest, slight difficulty of breathing, uneasiness on motion, and an inability to remain in the recumbent position, will continue in a slight degree through the succeeding day; on the approach of night, drowsiness, flatulency, difficulty of breathing, and the other symptoms will gradually come on, until they become as violent as on the preceding night. And the paroxysms and remissions may continue in this manner for several successive days, leaving the patient in an exhausted condition, with a slight feeling of tightness across the chest, and considerable tenderness of the muscles on motion.

When a paroxysm of asthma has once happened it is very apt to return at various regular or uncertain periods; sometimes every year or two, at others upon every appreciable variation in the condition of the atmosphere, or, upon every exposure to its exciting cause; and, again, it may recur daily, or every week or two, more especially when complicated with some lung or heart disease. If the disease has existed for a long time, it changes its type, does not produce so much suffering as in former years, but the patient is constantly troubled with more or less difficulty and wheezing of respiration, and these changes are due to the decrease of nervous

irritability and tendency to spasm as life advances, to a gradual loss of reparative power in the lungs, and to an accumulated disorganization or disease of the lungs or heart, from the continued operation of its cause. If the asthma is severe and happens frequently, it soon produces a pulmonary lesion.

Percussion, during a paroxysm, yields an unusual clearness of sound. Auscultation will hardly, if at all, detect the normal vesicular resonance, which is generally replaced by the dry sounds, large and small,—sonorous and sibilant of every variety, note, and pitch. They may be heard in all parts of the chest, high and shrill, whistling, cooing, squeaking, snoring, etc., all occurring simultaneously, or alternately,—and these sounds will frequently vary in the same part. Toward the termination of the paroxysm, if expectoration is about to take place, the moist or bubbling sounds may be observed.

The *cause* of asthma is a peculiar morbid irritability of the nervous system,—or, a morbid sensitiveness of the pulmonary nervous system,—which may be the result of a previous disease, as, pertussis, measles, bronchitis, etc., abnormally influencing the bronchial mucous membrane; which may exist primarily, perhaps from some organic peculiarity of the lungs; or, which may be inherited. When this irritability is aroused by the exciting causes, a spastic contraction of the fiber-cells of the organic or unstriped muscle of the bronchial tubes is produced, their calibre is diminished or narrowed,—a spasmodic bronchial stricture is the result, preventing a free and full expiration, and giving rise to all the attendant asthmatic phenomena. And, in the majority of instances, these phenomena are those of reflex action.

The exciting causes of a paroxysm of asthma are numerous and varied; thus it may be developed by a cold moist atmosphere; sudden changes of temperature; noxious or irritating vapors; dusty or smoky atmosphere; violent mental emotions; suppression of customary evacuations; constipation; irritating or indigestible articles of diet; hearty suppers; full meals; certain peculiar kinds of food; slight but sudden nervous shocks; an unhealthy condition of the blood: a perverted condition of nervous sensitiveness or irritability; use of malt, vinous, or alcoholic drinks; masturbation; sexual indulgence; overexercise, etc. With certain persons an attack of asthma is induced only by certain odors or vapors, as, of ammonia, tobacco smoke, smoke of burning pitch, the effluvium of hay, or of ipecacuanha, or of certain grasses, etc.; with some, the peculiar irritation is never induced except by the action of the one sole cause, as, in the hay or ipecac-asthma; with others, it may

be aroused by any irritant, whenever exposed to its influence. Occasionally the peculiar asthmatic nervous irritability may be produced by metastasis of rheumatism or gout, dyspepsia, frequent catarrhal attacks, scrofulous taint, enlarged liver, aneurisms, tumors, etc. The malady may also be hereditary, and is almost always associated with some faulty conformation of the chest, either as an original, or a secondary condition.

Asthma is termed *intrinsic*, when the exciting cause is applied directly to the lungs; *reflex*, when the source of irritation has a distant seat, as, in the stomach, bowels, uterus, or other peripheral seat; *central*, when from sudden emotion; *organic*, when complicating bronchitis, heart disease, etc.

Asthma is frequently confounded with the dyspnœa of bronchitis, of emphysema, and of heart disease, and it is of importance to *discriminate* between them. Asthma is always preceded by an intolerable sense of want of breath; is free from cough, or if cough is present, it is dry; the breathing is tight, long drawn, laboring, and wheezing; the expiration is much more prolonged than in dyspnœa from emphysema, bronchitis, phthisis, or heart disease; there is no post-expiratory rest; and the almost motionless expiration, which is three, four, or five times longer than the inspiration, is often terminated by a sudden expiratory jerk, which empties out the balance of air remaining in the lungs, and is immediately followed by inspiration. An examination of the expectoration at the close of an asthmatic paroxysm, under the microscope, will detect a homogeneous viscid matter, containing innumerable corpuscles, about $\frac{1}{1500}$th of an inch in diameter, some of which are oval, others oblong, fusiform, caudate, and sub-linear, having the same refracting power, pale, homogeneous, or almost nebular, and apparently devoid of cell-walls. Also larger spherical or oval cells, from $\frac{1}{500}$th to $\frac{1}{800}$th of an inch in diameter, mostly in groups, coarsely granular, and filled with particles of black carbonaceous matter when the patient breathes a smoky atmosphere, but pale, finely granular, and not opaque when this is not the case. Sometimes more or less blood will be present, in some instances amounting to a hemorrhage.

The dyspnœa of *bronchitis* is not paroxysmal, is short, crepitous, and accompanied with cough, and is not wheezing. In pure *emphysema* the dyspnœa is constant, varies but little, and is not wheezing. The dyspnœa of *heart disease* is intolerant of the least exertion, or of the recumbent position, and sitting up, or stillness, may cure the most violent paroxysm in a few minutes, it is more of an orthopnœa than a dyspnœa, the breathing is not labored and

wheezing, but more of a panting and gasping character. The dyspnœa of *anemia*, or of *chlorosis*, is a form of panting breathlessness like that following overexercise in a state of health, it is not wheezing, and is not accompanied by any cardiac or pulmonary signs to explain it, and is probably due to a proper want of oxygenization of the blood owing to its deficiency of red globules. Yet, it must be recollected, however, that we may have a considerable amount of genuine asthma with chronic bronchitis, emphysema, cardiac disease, etc., but then the symptoms of these affections remain after the paroxysm of asthma has passed away. Besides which, the asthmatic attacks, as a general rule, are very rare or very mild when the affection is uncomplicated, but are more severe, and persistent, and occur much more frequently, when it is complicated with lung or heart disease.

A hypertrophy and thickening of the circular fibers of the bronchi, with a diminution of their calibre, giving rise to a constant difficulty of breathing, of greater or less severity, has been observed in asthma, but this is undoubtedly of inflammatory origin. Dilatation of the bronchial tubes is due to bronchitis and not to asthma. The consequences of asthma are really as follows; engorgement of the pulmonary vessels, perhaps, thickening of the walls of the ultimate arterial twigs; loss of tone of the vessels; œdema of the lungs; emphysema of the lungs, which is the most common morbid change observed; and hypertrophy and dilatation of the right side of the heart. The face of an asthmatic becomes thin, pale or dusky, and has rather an anxious expression; the cheeks are hollow; the lines of the face deeply marked; the mouth usually open, and the jaw rather hanging; the eyes are generally prominent, turgid, and watery, more especially when there is cardiac dilatation; the back is rounding; the shoulders high and stooping forward, with the head thrown back; the chest *pigeon-breasted;* the body does not move in walking, the limbs alone move, somewhat awkwardly, as it were; the voice is peculiar, feeble and somewhat hoarse and rough, and, as if the person were tired or out of breath; and a single dry cough is usually present. These appearances and conditions are generally absent in uncomplicated asthma, but are always present in a greater or less degree when lung or heart disease is present, and in proportion to the extent, duration, and character of the complication.

The *prognosis* of uncomplicated asthma, especially in early life, is favorable, but after the fortieth year very few cures are effected. Indeed, it is rarely the case that asthma exists at this period of life without being associated with some lung or cardiac disease that renders it incurable. Children generally outgrow the disease under

proper management, provided there exists no incurable lesion of the lungs or heart; and in adult life and middle age, a cure is possible under similar circumstances. Complications, particularly in advanced years, render asthma absolutely incurable. The longer the period of each paroxysm the greater is the danger of injury to the lungs, and the less favorable is the prognosis. Paroxysms frequently repeated, also tend to produce abnormal conditions of the heart and lungs, and have an unfavorable signification. If the completeness of the recovery between the attacks is perfect, the breathing being free, without any shortness or difficulty whatever, it is favorable, as indicating that the paroxysm has left no permanent morbid influence upon the pulmonary circulation. The right side of the heart rarely becomes dilated by asthma, however severe the dyspnœa may be during the paroxysms, if the intervals between them are considerable, and the recovery in those intervals complete. A continued chronic cough or expectoration, or both co-existing, is a bad sign in asthma, signifying that the asthma is complicated with bronchial inflammation or congestion,—this state has been called "humid asthma." If the asthmatic phenomena appear to be gradually improving, instead of becoming more intense, the attacks being of less severity and less frequent, this is a favorable omen. In many cases the prognosis is determined by the character of the exciting cause of the asthma, especially when this is single, and can be detected; if we can remove or prevent it, the asthma may be cured; if not, the paroxysms will continue to return whenever this cause is present. In all cases, but little encouragement should be given, when the asthma is connected with, or is dependent upon, disease of the heart, lungs, or other vital organs. When the breathing becomes suddenly quick and short, the pulse weak and irregular, with paralysis of the arms, great prostration of strength, scanty urine, and frothing at the mouth, the danger is imminent.

There are no *pathological appearances* peculiar to asthma; those of its complications, when they exist, will alone be observed.

The *treatment* of asthma consists, firstly, in arresting or mitigating the paroxysm; and secondly, in adopting measures during its absence to prevent its return. During the paroxysm one of the most valuable remedies in affording prompt relief is the Compound Tincture of Lobelia and Capsicum, which may be given in nauseating doses, from two to four fluidrachms, every ten, fifteen or twenty minutes. But, in many cases, the practitioner will ascertain that the exciting cause lies in some derangement of the digestive organs, as a full meal, some irritating or indigestible diet, or a constipated condition of the bowels; in these cases, as well as in those

where the exciting cause can not be learned, and there are no contra-indications present, an emetic should be given to relieve the irritation at the stomach, as, the Compound Powder of Lobelia, or the Acetated Tincture of Bloodroot. The existence of heart disease would contraindicate the use of an emetic or nauseant.—And to unload the rectum, a purgative enema should be administered, to which is added half a fluidounce, or a fluidounce of the Compound Tincture of Lobelia. After these agents have operated, should the paroxysm still continue, relaxation of the spasm may be effected by the internal exhibition of the Compound Tincture of Lobelia and Capsicum, as named above. In conjunction with these measures, the throat, neck, and upper portions of the chest and back should be bathed with the Compound Liniment of Oil of Amber, especially in severe cases; applying it with considerable friction, and repeating it two or three times in as many hours. The best position for the patient is, to sit or stand in front of a table of convenient height, with a pillow on it, upon which he may rest his elbows, and throw himself forward.

The inhalation of Chloroform is another prompt and efficient agent to check the asthmatic paroxysm, especially in the uncomplicated form; a few whiffs will relieve the breathing, and it is seldom required to produce insensibility before the spasm yields and the breathing becomes free. It should be administered at as early a period as possible,—at the very commencement of the attack. Nitrous Ether has also been advised as an inhalent.

Among the agents that have been found useful in asthma, to relieve the paroxysm, are, the following:

1. A cupful of clear strong coffee, every half hour or hour; its influence will often gradually wear out and, in some cases, it will develop an attack.

2. Take of Lobelia one pound, Alcohol, Spirit of Nitrous Ether, each, four pints, Sulphuric Ether four fluidrachms; mix, and form a tincture, of which the dose is a fluidrachm or two as often as required. This tincture should be kept perfectly excluded from light.

3. Saturate thin unglazed white paper with a saturated solution of Nitre, and carefully dry it. To use it, ignite one end, and let it burn in a close room in which the patient is seated, so that he can inhale its fumes. One pound of Nitre furnishes, when heated to redness, four hundred pints of oxygen gas.—Nitrate of Ammonia may be similarly employed.

4. Take of pasteboard four ounces; break it down with hot water and form a paste, which should be thoroughly mixed with

Nitre, two ounces, Belladonna, Stramonium, Lobelia, each, in powder, twenty grains, powdered Myrrh, Olibanum, each, two and a half drachms. When mixed, roll into sheets, and cut into small squares,—to be burned in small saucers, the same as the preceding.

5. Take of Sunflower Leaves, Stramonium Leaves, Mullein Leaves, each, one ounce, add to them one ounce of very finely-powdered Nitre, half an ounce of Lobelia Leaves, and two drachms of Benzoic Acid. This may be smoked in a pipe, and will be found of decided advantage in many instances.

6. Touch the fauces and back parts of the throat with a mixture of one part of strong Aqua Ammonia, and six or eight parts of Water.

If the paroxysm be owing to checked perspiration, or to rheumatic metastasis, diaphoresis should be produced as soon as possible, by placing the feet of the patient in hot water, and administering the Compound Tincture of Virginia Snakeroot, every fifteen or thirty minutes, in doses of one or two fluidrachms. And in rheumatic metastasis, additional measures may also be pursued, as, Dry Cupping, or Firing along the spinal column.

Indeed, in all cases, it should be the object of the practitioner to ascertain the exciting cause of the asthma, that he may promptly put into requisition the proper measures to have it removed, avoided, or placed under control. An avoidance or removal of the cause, whether it be residing in a certain locality, the inhalation of certain vapors or odors, the use of certain articles of diet, or, hearty suppers, gastric irritation, constipation, etc., will almost invariably be followed by a permanent cure, or at least by no farther paroxysms as long as the patient remains unexposed to the influence of the exciting cause, whatever this may be. And it will often be the case, that the exposure of a patient to a certain cause will induce an attack, while with another person, the same cause will promptly relieve the asthmatic paroxysm whenever it comes on,—of such a capricious character is the disease.

In the intervals between the paroxysms, treatment must be pursued to effect a radical cure; but we must frequently expect to meet with disappointment. If any complication exists, in addition to the measures pursued to cure the asthma, we must also adopt an appropriate treatment for the cure of the complication; the complication cured permits the asthma to be cured; its relief, lessens the intensity of the asthmatic attack; its persistence, renders the asthma absolutely incurable.

In uncomplicated asthma, to lessen the peculiar irritability of

the pulmonary nervous system, and lessen the disposition to spasm of the bronchial muscles, I have found the following measures to be very valuable: Take of Lobelia Seed, Skunk Cabbage Balls, Mullein Root and Seed, each, one ounce; High Cranberry Bark two ounces; Stramonium Seed, Capsicum, each, half an ounce; Alcohol five pints; mix, and form a tincture. Of this preparation, give from twenty to sixty minims for a dose, repeating it three times every day. Likewise administer the following pills: Take of Sulphate of Quinia half a drachm, Flowers of Sulphur three drachms, Strychnia two grains; Alcoholic Extract of Black Cohosh one drachm, or a sufficient quantity; mix, and divide into sixty pills, of which one is a dose, and should be repeated three times daily, in conjunction with the above tincture. The throat and chest should also be bathed two or three times a day with the Compound Liniment of Oil of Amber.

Other remedies have, however, proved serviceable in the cure of the disease, as follows:

1. Take of Sulphate of Quinia, Extract of Stramonium, each, one scruple; Sulphate of Morphia two grains; Ipecacuanha six grains; Capsicum twenty grains; mix, and divide into twenty pills. One pill is a dose, to be repeated three or four times a day.

2. Take of Extract of Indian Hemp one drachm, Extract of Liquorice, Extract of Dandelion, each, one ounce, Salt of Tartar half an ounce, Water half a pint, Gin one pint and a half; mix, and dissolve. The dose is a tablespoonful, three or four times a day.

3. Take of Sunflower Seed two ounces, Cramp Bark, Rosin Root (*Silphium*), each, one ounce, Sheep Laurel Leaves half an ounce, Stramonium Seed two drachms, Gin or Whisky three pints; mix together and form a tincture, the dose of which is from thirty to sixty minims repeated three times a day. To be used in conjunction with the following: Take of Citrate of Quinia and Iron with Strychnia two drachms, Alcoholic Extract of Aletris, one drachm; mix, and divide into sixty pills, of which the dose is one pill, to be repeated three times a day.

4. Bromide of Ammonium will also be found a very useful agent to allay pulmonary nervous irritability. And in cases termed "humoral asthma," due to some peculiar condition of the blood, or, to the presence of a blood disease, this agent, together with the Bromide of Potassium, or the Iodide of Potassium or of Ammonium, will frequently be found very useful. Indeed, the Bromide of Potassium in doses of fifteen or twenty grains, repeated once or

twice a day, has, in many instances, proved very effectual in preventing a return of asthma.

In all cases of asthma, the most rigid attention to hygienic measures is required, as, regularity of the bowels, kidneys, and skin. Every day or two the whole surface of the body must be bathed with a weak alkaline solution, drying with considerable friction; every fine day the patient should exercise moderately in the open air; damp atmosphere, damp rooms, exposures to cold, and all known causes of an attack must be positively avoided; sleep should be limited to eight or nine hours daily, the bed being rather hard; and the sleeping apartment should be kept well ventilated. The diet should be nutritious, thoroughly masticated, of easy digestibility, and not liable to irritate, produce constipation or flatulence. Acids, pastry, hot bread, high-seasoned food, sweetmeats, and all intoxicating liquors should be positively prohibited. In most cases, asthmatic patients can take a reasonably full meal at the breakfast hour without incurring the risk of an attack; dinner and supper should never be hearty, but moderate, and in many instances, supper will have to be dispensed with altogether. Late suppers especially, must be avoided.

TUBERCULAR CONSUMPTION.

Tubercular Consumption or Phthisis Pulmonalis is one of the most distressing and fatal maladies to which the human family is subject; chiefly selecting the young of either sex as its victims. It is more common in certain northern latitudes, depending probably upon the frequent atmospheric changes occurring therein; and is occasionally met with in the warmer latitudes. It is not generally considered a contagious affection; though instances have occurred where, after sleeping for some time with a patient in the latter stages of the disease, persons supposed to be predisposed to it have shortly thereafter been attacked by it; this point is still one of discussion, and from the facts that have been observed by various physicians, it would appear to be safer for individuals, whether predisposed or not to phthisis, not to be too closely inmated with patients in its latter stages. Females appear to be more liable to the disease than males; but whether this is owing to the excess in number of females over males in the civilized world, I am not prepared to state. It may prove fatal in three months, usually in six, and often continues for a much longer period.

The *symptoms* of consumption vary according to the stage of the

disease. Dr. Edward Smith in a work entitled—"Consumption; its Early and Remedial Stages,"—describes a period of the disease,—a state of cachexia, or a dyscrasia, existing as a morbid condition antecedent to the tubercular deposit, which he terms the *first*, or, *pretubercular*, (*precursory*, Lawson), stage of the disease, and which constitutes the real disease,—the persistence and progress of which gives rise to the various pathological changes subsequently observed. This stage may always be noticed among those who are constitutionally predisposed to phthisis, but is usually less marked among those in whom it occurs accidentally; it is the commencement of a positive morbid action, invariably resulting in a deposition of tubercles, unless it be promptly arrested; in a few instances it may be absent, or if it does exist, it may be in such a minor degree as not to be readily apparent. This pulmonary stage does not invariably present the same features in every instance; they will be found to vary, one set being present with some, another set with others, and so on,—and in those of a marked scrofulous diathesis, or of a strong tendency to phthisis, they will be much more emphatic. These symptoms will generally present several of the following characters, depending upon the temperament, the mental and nervous organization, and the natural degree of excitability of the patient:—There will be a defective condition of the vital powers, as manifested by an unusual vivacity of spirits in the earlier part of the day, alternating with a great depression of spirits during the latter part; in those of lymphatic temperament, the lowness of spirits will be present almost constantly, rarely alternating with an opposite condition; the digestive functions are always more or less deranged; the appetite being irregular, capricious, and uncertain, more or less distaste for fats, meats, acids, or sugar, and often, milk, tea, or coffee,—the tongue being more or less coated with a white film, sometimes brownish or yellowish, its body pale, large, and flabby, except in cases where some irritation is present, when its body will be more or less red, and not unfrequently the papillæ will be observed quite prominent,—in those of sanguine and nervous temperament, the tongue will frequently remain clear, and retain its usual size, color, and appearance,—the amount of food taken will generally be less than previously consumed, although the patient may not be aware of it, until his attention is directed to it,—and after meals there will be a sense of oppression, tenderness upon pressure over the epigastric region frequently observed at any period of the day,—more or less acidity of the stomach, an acid taste in the mouth, and flatulency. Assimilation of food is defective, as shown by the want of nourishment of the general sys-

tem, the weight of the body, as well as its bulk, becoming more or less considerably lessened, but being influenced in some degree by atmospherical conditions, as well as by the kind of food and quantity of fluid taken, and by the degree and amount of exercise. The skin is usually thin, fair, and very sensitive, soft, and cool, and disposed to perspire upon the slightest causes, the perspiration frequently being very acid, so as to be detected by the odor, and perspirations during sleep are generally observed; sometimes, the perspiration is quite offensive, and again, in some cases, it may be abundant without giving off any sour or offensive odor, in which case, considerable debility is apt to be present; indeed, as a general rule, consumptives are predisposed to an abnormally acid condition of the perspiration, which is apt in a few days to stain the linen of of a yellowish color; coldness of the extremities is a common symptom; there is a diminished temperature of the body; a diminution of muscular strength, with a corresponding loss of tone and softness of the muscles,—exercise readily produces fatigue,—running up stairs causes shortness of breath and palpitation,—bodily vigor gradually diminishes,—the pupil enlarges, giving a bright and somewhat staring appearance to the eyes,—and the expression of the countenance becomes altered, the face and skin being sallow or pale, the pallor being unlike that of anemia, with a look of languor and want of vivacity. The circulation is feeble and somewhat quickened, the pulse being variable, but generally slow, feeble and excitable. Respiration is shorter, shallower, feebler, and perhaps quicker. There is an apparent diminution of power to respire, with a loss of bulk of the pectoral muscles, the intercostals, and the muscles of the back. Innervation is invariably lessened more or less considerably.

With these general symptoms, there will frequently be associated others of a secondary, but no less important character. Thus, among females there is a strong disposition to leucorrhea, and to amenorrhea, as well as to other menstrual disturbances. Muscular pains about the chest are very common, especially in the pectoral muscles, and in the muscles attached to the base and inferior angle of the scapula; the former being changeable, increased on deep inspiration, and more common to males; the latter being more common to females, and increased on deep inspiration, or upon moving the arms. The throat is often excessively sensitive, sometimes presenting a paleness of the whole mucous membrane, an apparent elongation of the uvula, a frothy state of the whole throat, a sense of constriction in breathing, and sometimes in swallowing, and a great sensitiveness to the presence of foreign bodies, as the tongue-

spatula, etc. In other instances, pharyngo-laryngeal disease will be present. Sometimes, cough is present, being a reflex act resulting from irritation applied directly to the true seat of the act, the pharynx, or transmitted from distant organs, as, in the bronchi, stomach, pulmonary structure, etc. The cough is short, not severe, and is excited when exposed to a cool, or to a cool and moist atmosphere; sometimes it is increased after meals, or from irritating condiments, and frequently occurs immediately after coition. A small amount of expectoration is often present, occurring more especially in the morning, and is ordinarily due to pharyngeal, or pharyngo-laryngeal disease. The expectoration is glairy, semi-transparent or slightly opaque, more or less tenacious, not frothy, unless associated with bronchitis or pharyngeal irritation, and contains tessellated epithelial cells from the lower part of the pharynx, with large black cells, filled with nuclei and granules. None of the yellow elastic structure of the lungs is found at this stage; but ciliated epithelium, which lines nearly the whole nares and covers the nasal aspect of the soft palate and the nasal end of the pharynx, is also frequently present, especially in those cases where the nasal secretion is very abundant, and much of it passes into the pharynx. As the bronchi, trachea, and larynx, also have ciliated epithelium, its presence in this sputa has sometimes been erroneously attributed to these organs. Occasionally, the expectoration will contain small pellets of a white, soft character, which, when dried, resemble chalk. They are of various sizes, are rarely expectorated in cases in which the disease proceeds to a fatal termination, (except when they occur in the advanced stages), and it is doubtful whether they originate in the lungs. Spitting of blood may also be present in this precursory stage, but not always. It is usually very small in quantity, and is generally derived from the mucous surface of the pharynx and fauces, very seldom, if at all, from the lungs, at this early period; though it may occur from rupture of a small vessel upon the mucous lining of the larger air-tubes, and is probably due to a state of local congestion or increased vascularity, but not necessarily connected with the condition of the lungs. In a few cases, vomiting occurs, more frequently after a meal, always associated with a cough, and is not due to dyspepsia.

In connection with the preceding symptoms, are those of the lungs and chest. Upon an inspection of the chest of a person in the first stage of phthisis, a flattening below the clavicles, and a falling in above the clavicles at the site of the apices of the lungs, will be observed, usually on one side—the diseased side,—the pectoral muscles of each side will also vary in size, and the intercostal

muscles will not exhibit their normal fullness, there will be a tendency to roundness of the shoulders, also to an increase of width between the scapulæ, and flatness above the transverse processes of the scapulæ. At the lower part of the thorax there will be no unusual expansion. The respiratory movements of the chest, especially at its upper anterior and lateral parts will be found lessened; while at the back these movements will be so indistinct as to be detected with difficulty,—of course these diminutions of respiratory movements will be observed more markedly on the side subsequently affected with tubercles, and will vary in amount with each person, according to the amount of deviation from health,—they are invariably present, and gradually increase, leading to other abnormal conditions. Women usually have much more breath movement at the upper part of the chest than men, hence there may be much diminution of it in diseased females, and yet they will present an amount remaining, equal to that which occurs in men,—this is important to note. There will be no increase in the abdominal movements. The force and fullness of the respiratory efforts will be lessened, while the inspiratory effort will be short and feeble, and incapable of fully expanding the chest. These symptoms gradually induce a condition of lessened vitality of the air-vesicles of the lungs, and an unusual tendency to the reception of morbid matters, resulting in tubercular deposits.

In this early stage of the disease, before there is any evidence of the deposition of tubercle, and after it has existed for some time with diminished expansion of the lung, percussion will elicit an appreciable degree of dullness on the clavicles, and, perhaps, over the chest in general, arising, no doubt, from the absence of a full amount of air in the lung tissue. It is generally observed upon one side only, occasionally on both. Auscultation will detect the respiratory murmur feeble, lessened both in force and fullness, and of diminished length,—particularly at one or both apices. If a forced inspiration be made with ease, regularity, and moderate force, the vesicular or respiratory sounds become more normal. A rapid, jerking, or forcible inspiration will develop other sounds, and must be avoided. No rales or signs of bronchitis are present; but if there should be, it will be difficult, if not impossible, to detect the lung disease until they have disappeared.

No particular *pathological appearances* are observed in the lungs in this stage, unless it be toward its termination, when the first elements of tubercular deposition may be seen, consisting of the tubercle cells, which are ordinarily first observed, in greater or less abundance in the least movable parts of the lungs, that is, in their apices,

and which greatly resemble the nucleus of the epithelium cells, with which tubercular deposits may in some way be associated.

It will be observed, that many of the above-named symptoms may be met with in other pathological states of the system than those tending to result in tuberculosis of the lungs, and that a medical man would not be justified in diagnosing the presence of a tuberculous dyscrasia upon them alone. Again, the presence of others of the symptoms referred to, would indicate the actual existence of tuberculous deposit at an early period. Yet, as Dr. Smith has had considerable experience in the treatment of phthisis in the Brompton Hospital, and has undoubtedly bestowed much attention upon this early stage of the disease, we must not too hastily reject his views, but should carefully consider them, with a hope that if not wholly correct, they may lead to other and more perfect information concerning a period of the disease at which we would naturally suppose it to be more amenable to a proper management than at any other. I have, therefore, given the above condensed statement of the results of his investigations, deeming them of sufficient value to interest every physician.

The *first stage*, or early period of tubercular deposits in the lungs, (as usually recognized by physicians,) may present such trivial symptoms as to escape the notice both of the medical man and the patient; or, there may exist a feeble condition of the system, a gradual decline of nervous and muscular energy, a lack of assimilation, without any symptoms by which the disease may be located, or even its nature determined. And this condition may continue for a considerable length of time, until from exposure to an exciting cause, symptoms become rapidly developed, indicating the latter period of the first stage of phthisis, or, the early period of the second stage. Thus we frequently observe that the first symptoms of phthisis are manifested only after an exposure to cold, an attack of pleuritis, or pneumonitis, or, some imprudence in diet.

We must, however, except, from the apparently passive condition just referred to, those instances in which one or both of the progenitors of the patient were affected with phthisis, or where, from lack of pulmonary nervous and muscular power, the peculiar consumptive form of the chest has become developed,—in which instances, it is hardly possible to mistake the true condition of the patient, even at a very early period.

The symptoms ordinarily present, during the first stage of consumption, are, a sense of languor; debility; slight dyspnœa, or shortness of breath, which is much hurried upon physical exertion; and the patient loses in weight. Cough is a very early symptom, it may

be slight, dry, and hacking at first, perhaps induced by a tickling sensation in the trachea, and gradually becomes more frequent and distressing, and attended with expectoration. The expectoration is thin, frothy, transparent; resembling mucus, and, sometimes is dotted or streaked with blood. Indeed, more or less hemoptysis will, in some instances, be the first apparent symptom of phthisis manifested. Pains, at first slight and transient, will be experienced; sometimes, they may be constant; at others, intermittent. Pain is frequently located at the shoulder-joint, and is accompanied with tenderness of the sub-clavicular region; in other cases, it is felt, at first, under the sternum. There is usually a degree of sensitiveness to cold, coldness of the extremities, and a livid or dark appearance of the lips, and roots of the finger nails. With females, amenorrhea is very apt to occur.

At an advanced period of the first stage, these symptoms increase, the breathing becomes more difficult; the cough more severe and distressing; the face flushes, particularly after eating; the palms of the hands and the soles of the feet, are affected with burning heat; the appetite is variable and capricious; the bowels are irregular; the urine is high-colored, depositing a red sediment; the pulse may be natural, or, soft, small, and a little quicker than usual,—sometimes full, hard, and frequent; the tongue may be clean, or present a thin white coat along its center, or toward its root, especially if digestion is impaired; the tip of the tongue, as well as its edges are red; and, even in this stage, hectic fever and night sweats may be present. A very common appearance in the early period of the disease, is a delicate, pearly, transparent appearance of the margin of the gums; occasionally this streak will be reddish. The conjunctiva is pearly white, or slightly bluish.—The fever attending this stage, is remittent, and has in many cases two exacerbations a day,—the first occuring about noon, and the other during the night, or toward morning, generally terminating in a sweat. The symptoms named, will vary considerably with different persons, according to the progress of the disease, the degree of tuberculous dyscrasia, and other modifying circumstances that may be present.

In this stage, there is present a greater or less amount of crude tubercles, which may be disseminated over the entire lung, but are more commonly accumulated near the apex of one or both of the lungs. Bayle observes that the lower lobes of the lungs are affected in chronic bronchitis; but that the upper are affected when tubercles are deposited. As soon as the elasticity of the lung tissue is interfered with by these deposits, percussion will detect a deficiency of the clear or pulmonary resonance in the upper part of the

chest,—over, above, and below the clavicle, and over the scapula,—as compared with that of the opposite side, together with more or less dullness, according to the approach toward an increased density of the lung from consolidation, and a corresponding increase of resistance. Auscultation will detect a shortened inspiration, and a marked prolongation of the expiratory murmur, owing to an impaired condition of the elasticity of the lungs; the vesicular resonance also loses its soft, vesicular character, and becomes rough, and harsh; occasionally, dry crackling, and crumpling sounds will be present; the crumpling sound being usually heard only during inspiration. Bronchophony will also be heard at the apex. If bronchitis be present, its physical signs may also be noticed in addition. (*See Note*, page 539, *sections* 1 and 2.)

The *second stage*, or period of consolidation, in which the tubercles increase both in number and size, so as to compress and obstruct the substance of the lung, presents symptoms similar to those already named as characterizing the advanced period of the first stage, but are of much greater severity. It must be recollected that there is no distinct line of demarcation between the several stages of consumption, but that they gradually pass one into the other. In this stage there will be an accelerated pulse; hectic fever; more difficult breathing; night sweats; a peculiar whiteness and lustre of the eye; a sense of constriction across the chest; cough more severe; great sensitiveness to cold; deep inspiration will produce cough, or occasion pains in the chest; cough or pain is increased when lying upon the affected side; hemoptysis is often present; constipation; derangement of the digestive organs; increased loss of flesh; a red streak along the margin of the gums; a clubbed condition of the fingers; deep-colored skin around the root of the nails; the nails are frequently curved, and present a bluish appearance; and as the stage advances toward its latter period, chilly sensations, or actual chills will be experienced; which may come on at regular or irregular periods; and sometimes diarrhea, or an irregular condition of the bowels will be present. As in the first stage, some of these symptoms may be absent, or the symptoms may vary with different individuals.

But this stage is more positively determined by the physical signs. Inspection will detect an unequal expansion of the chest, especially at its upper part. Percussion will elicit a more marked dullness in the upper part of the chest than in the first stage; there will also be a greater degree of resistance to the percussing finger; and a smart blow upon the intercostal muscles will often produce an irritable or quivering action of these muscles. Aus-

cultation will detect a diminution in the duration and intensity of the inspiratory murmur, while those of the expiratory murmur will be increased, at the upper part of the chest. In health, the expiratory murmur is about one-third as long as that of the inspiratory; while, in phthisis, the former becomes frequently equal to, and even considerably more prolonged in duration than that of the latter; while the latter becomes much diminished. Very frequently the inspiratory murmur will be interrupted in the subclavicular region, the air seeming to enter the lungs at this point by a succession of waves, instead of in a continuous stream, giving rise to the wavy, or jerking inspiration; taken alone, this sign is no evidence of phthisis, but it is of value when associated with prolonged expiratory murmur, and other changes. Dry crepitation, or dry crackling sounds will be more distinctly observed at the apex of the lungs; the vesicular murmur will be feeble or even absent; bronchial respiration and bronchophony will be more marked; while the lower lobes of the lungs will yield puerile respiration. The heart's sounds may frequently be heard in the subclavicular region of one or both sides. Vocal fremitus may also be observed, especially under the shoulder-blades.

Frequently the signs of bronchitis are present, and mask the respiratory murmurs; or, friction sounds from local pleuritic lesions, etc., may exist. If a doubtful sound is removed by cough, in either stage of the disease, or, is superseded by vibration sounds on deep inspiration, it is neither dry crepitation or crackling, nor moist crepitation. A bellows murmur is indicative of anemia. (*See Note*, page 539, *sections* 1, 2, and 16.)

There is a peculiarity that has been observed relative to the pulse of a consumptive; thus, we have strong grounds for suspecting the existence of phthisis when a patient's pulse is above ninety beats in a minute, and he is, at the same time, not much disqualified for exertion. Again, in a state of health, when a person is seated in an easy chair, with his back supported, if his pulse be examined, it will be found to beat slower than when he subsequently assumes the standing position, by from twelve to eighteen beats; in phthisis, the pulse is much less easily accelerated by changes of posture, being equal in either of the above-named positions, or, at all events, with a difference of only four or five beats. The pulse of a consumptive will also be found to vary considerably on different days; and on those days when the pulse is least frequent, the difference produced by change of posture will be found the greatest.

The *third stage*, or period of softening and formation of cavities

may be ushered in with chills occurring at regular or irregular periods, but these are not always present. It is chiefly characterized by increased shortness and hurriedness of respiration; an almost constant cough, often deep and hollow; the voice changed, often being weak and hoarse; the expectoration purulent, greenish or yellowish, flocculent, nummular, sometimes of a dirty-grayish appearance, and showing under the microscope pus-corpuscles, exudation globules, pieces of the structure of the lungs, and granular bodies which are considered as indicating the existence of tubercles—cheesy particles may frequently be noticed in the sputa, especially in an early period of this stage—and, in some instances, the expectoration will contain more or less blood. Debility and emaciation become greatly augmented; the features become sharp; the eyes hollow and languid, or clear and bright with dilated pupils; the nails curve inward and are more less livid in color; the cheek bones become prominent; the hair falls off; hectic fever occurs every day; the feet and ankles become œdematous; night or morning sweats are very profuse and debilitating; the urine will be found to contain an excess of uric acid, also euroerythrin, and, if indigestion be present, oxalate of lime crystals—the sediment of urates is usually of a reddish tint—sometimes the urine is pale and turbid, termed "anemic," and which is apt to occur after considerable hemoptysis, and it soon takes on an ammoniacal, offensive odor in many cases—occasionally, sugar is detected in the urine. Colliquative diarrhea continues obstinate and unyielding; a few weeks previous to dissolution aphthous ulcerations are apt to attack the mouth; and occasionally the patient becomes delirious. More commonly, however, the senses remain to the last, not much impaired, and a peculiar feature of this disease is, that those suffering from it are seldom apprehensive of danger, but flatter themselves with a speedy recovery, the mind being confident and full of hope. The difficulty of breathing is often very distressing in this last stage, and, not unfrequently bed sores (*paratrimma ad decubitum*) are produced, which add greatly to the sufferings of the patient. Death may occur from debility; from peritonitis following intestinal ulceration; from sudden pulmonary congestion; from hemoptysis; from an accumulation of air in the pleural cavity; from exhaustion, etc.

In this stage, at first, the physical signs do not differ much from those already described in the second stage, the dullness on percussion, prolonged expiratory murmur, dry crackling rales, bronchial respiration, bronchophony, etc., being nearly equally marked in the latter period of the second, and the early period of the third stage.

But as the tubercle and lung tissue commence to soften and break down into fluid matter of greater or less consistence, giving rise to cavities in the lungs, other signs will be observed. At first, there will be a still greater inequality in the expansion of the two sides; percussion will elicit a dull sound if the walls of the cavity be dense,—but if they be thin, a tympanitic, amphoric, tubular, or bruit de pot fêlé resonance may be obtained, (*see* page 523); auscultation will detect clickings or moist crepitation in the subclavicular region, indicative of softening,—when cavities form, cavernous respiration will be heard, gurgling, or splashing rales, pectoriloquy, amphoric resonance, cavernous gurgling attending cough, metallic tinkling,—if the cavity be small, a cavernulous rale will be heard,—also, cavernous metallic cough may be observed in the interscapular region. The sounds of the heart may also be very clearly and distinctly heard at the upper part of the chest over the cavity, and a waving impulse in the second intercostal space may frequently be appreciated. (*See Note*, page 539, *sections* 19, 20, 21, 22, 23, and 26.) It must be recollected, however, that should emphysema, or other lesions be present, in addition to those of the tuberculous affection, their physical signs will be superadded, perhaps masking or modifying some of those just named.

Pulmonary phthisis must be *diagnosed* in its various stages, from chronic bronchitis, chronic pleurisy, chronic pneumonia, cancer of the lung, bronchial dilatation, abscess and gangrene of the lung, and which may be effected by carefully observing the physical signs which have been named under each of these diseases, as well as in the quotation from Dobell, in Note on page 539.*

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* The following remarks relative to the diagnosis of tuberculous phthisis, by Dr. Walshe, will be found of much practical utility to the physician: "A young adult who has an obstinate cough, which commenced without coryza, and without any obvious cause, a cough at first dry, and subsequently attended for a time with watery or mucilaginous-looking expectoration, and who has wandering pains about the chest, and loses flesh, even slightly, is, in all probability, phthisical. If there be hemoptysis, to the amount of a drachm even, the diagnosis becomes, if the patient be a male, and positively free from aneurism or mitral disease, almost positive. If, in addition, there be slight dullness under percussion at one apex, with jerking, or divided and harsh respiration, while the resonance of the sternal notch is natural, the diagnosis of the first stage of phthisis becomes next to absolutely certain. But not absolutely certain; for I have known every one of the above conditions exist, (except hemoptysis, the deficiency of which was purely accidental), when one apex was infiltrated with encephaloid cancer, and no cancer had been discovered elsewhere to suggest to the physician its presence in the lung. If there be cough, such as described, and permanent weakness and hoarseness of the voice, the chances are very strong, (provided he be non-syphi-

Phthisis in its first stage may readily be confounded with *chronic bronchitis*, as, cough and expectoration accompany each malady. No positive diagnosis can be made when the bronchial physical signs are present, until percussion elicits dullness, especially at the

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litic), that the patient is phthisical. If decidedly harsh respiration exists at the left apex, or at the right apex behind; if the rhythm of the act be what I have called cog-wheel, (wavy or jerking), and there be dullness, so slight, even, as to require the dynamic test for its discovery, there can be little doubt of the existence of phthisis. If, with the same combination of circumstances, deep inspiration evokes a few clicks of dry crackling rhonchus, the diagnosis of phthisis, so far as I have observed, is absolutely certain. If these clicks, on subsequent examination, grow more liquid, the transition from the first to the second stage may be positively announced.

"If there be slight flattening under one clavicle, with deficiency of expansive movement, harsh respiration, and slight dullness under percussion, without the local or general symptoms of phthisis, the first stage of tuberculization can not be diagnosed with any surety, unless there be incipient signs at the left apex also; the conditions in question, limited to one side, might depend on chronic pneumonia, or on thick induration matter in the pleura. The existence of limited though marked dullness under one clavicle, with bronchial respiration and pectoriloquy, so powerful as to be painful to the ear, the other apex giving natural results, will not justify the diagnosis of phthisis. I have known this combination when the apex of the lung was of model health, and a fibrous mass, the size of a walnut, lay between the two laminæ of the pleura. I would even go further, and say, that the combination in question is rather hostile than otherwise to the admission of phthisis, as, had tuberculous excavation formed at one side, the other lung would, in finite probability, have been affected in an earlier stage.

"Pneumonia limited to the supra-and infra-clavicular regions on one side, and not extending backward, is commonly, but not always, tubercular. Subcrepitant rhonchus, limited to one base posteriorly, is not, as has been said, peculiar to tubercle; it may exist in emphysema, and in mitral disease. Chronic peritonitis, in a young person aged more than fifteen years, provided cancer can be excluded, involves as a necessity tubercles in the lungs; to this law of Louis, it is necessary to add the qualification—provided Bright's disease be also absent. Pleurisy with effusion, which runs a chronic course in spite of ordinary treatment, is, in the majority of cases, tuberculous, or cancerous; the character of the symptoms previous to the pleurisy, will generally decide between the two. Double pleurisy, with effusion, is not, as has been said, significant of tubercle; for it may depend on Bright's disease. If the latter disease can be excluded, carcinoma and pyohemia remain as other possible causes. If a young adult free from secondary syphilis, and spermatorrhea, and not dissolute in his habits, speedily lose flesh without clear cause, he is, in all probability, phthisical, even though no subjective chest symptoms exist. But he is not by any means certainly so, for he may have latent cancer in some important organ, or he may have chronic pneumonia. Nay, he may steadily lose weight, have dry cough, occasional diarrhea, and night sweats and present dullness under percussion, and bronchial respiration under both clavicles, and yet be non-phthisical. I have known all this occur in cases, both when the lungs were infiltrated superiorly with primary encephaloid cancer, and

apex of the left lung. Wasting, and loss of weight are usually much greater in phthisis than in bronchitis, and in inherited cases, the peculiar consumptive formation and appearance may be present.—In *chronic pneumonia* many of the symptoms resemble those of phthisis, as, cough, wasting, vocal fremitus, sinking in of the thorax, prolonged expiration, feeble inspiration, etc. But, in pneumonia, there is its previous existence, besides, there is less emaciation than in phthisis, and the physical signs of consolidation are almost always confined to one lung only, and over its lower lobe; in phthisis, it is the apex where the dullness, etc., are observed. Yet it must be observed that phthisis may appear, at first, in the lower lobe, and pneumonic consolidation take place at the apex of the lung, in which rare instances, the diagnosis will be extremely difficult. Hemoptysis does not occur in chronic pneumonia, except, perhaps, a slight streaking of the expectoration with blood. In obscure cases, the physical examinations should be frequently repeated, to ascertain if deposit continues to occur, affecting those parts of the lung that were healthy at previous examinations; an extension of dullness, with the signs peculiar to the second and third stages will clear up all doubts.—In *chronic pleurisy*, the dullness at the lower part of the lung, the great feebleness or entire suppression of respiratory murmur, the lessened or absent vocal fremitus, together with less constant and severe cough, less emaciation, but little, if any, night perspirations, and no hemoptysis, will determine pleurisy from phthisis. If there be a flattening or falling in of the thorax in chronic pleurisy, it almost always occurs on one side only. Chronic pleurisy, the same as chronic pneumonia, may be associated with phthisis, the physical signs of tubercular deposit at the apex of the left lung, or of both, will be conclusive as to the consumptive disposition.

Cancer of the lung is a rare disease, and most commonly affects but one lung; the side affected is flattened, the dullness on percussion is much greater than in phthisis, respiration may be feeble or absent, or loud and sonorous, with an entire absence of rales,—the pain is more acute and constant than in tubercle, the skin presents the peculiar cancerous aspect, and the expectoration is purulent, frequently resembling currant-jelly. However, tubercle and

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when they contained secondary nodules of the same kind. Failure of weight becomes less valuable as a sign of phthisis, the longer the thirtieth year has been passed. The discovery of cardiac disease with marked symptoms, deposes against, but does not exclude, the existence of active tuberculization. The existence of cancer in any organ is unfavorable to the presence of tuberculous disease, but tubercles and cancer may co-exist in the same lungs."

cancer seldom exist together.—*Bronchial dilatation* may be determined from phthisis, by the disturbance of the general system being much less than that of the latter disease, by the cavity formed by the dilatation being at the central or lower part of the lung, instead of at the apex, with very slight dullness on percussion, and by its being of a stationary character, or changing very slowly; there will also be a more profuse expectoration, sometimes offensive. Night sweats and hemoptysis are absent, and the affection usually occurs at a later period in life than phthisis. In sacculated dilatation there will be a large and coarse dry crackling.—*Abscess of the lung* may also present many of the symptoms of phthisis, but the profuse, fetid, and purulent character of the expectoration, the physical signs of a cavity being at the lower lobe of the lung, but one lung being diseased, and the general system being but slightly impaired, will determine it from the tuberculous affection.—*Gangrene of the lung* also affords the signs peculiar to a cavity, as well as the constitutional disturbances of phthisis, but may be discriminated from the latter malady by the dirty grayish or greenish or dark-brown color and sanious aspect of the sputa, its accompanying fetor, and its subsequent purulent character and diminution or cessation of the fetor. In conjunction with this, the breath is persistently and almost insupportably fetid, being worse during or immediately after coughing. It is more common among children, and is rare in advanced age.

In the diagnosis of phthisis we must recollect that the disease depends upon a peculiar dyscrasia, and is preceded and attended with many of the constitutional disturbances already named; that, as a general rule, the deposition of tubercles commences in the apex of the lungs, usually the left one first, but soon involving the right. Its physical signs are similar to those of other pulmonary lesions, but in no disease do they occur in the same order and combination. Sometimes, even after large cavities have formed, the tubercles become transformed into a cretaceous substance, and instead of tuberculous matter in the expectoration, calcareous masses of larger or smaller size are met with, and this change may be followed by an augmentation of the symptoms and death,—or, the symptoms, as well as the health and strength of the patient, may gradually improve, until all the consumptive indications disappear.

The *cause* of tubercular phthisis is not well understood; it appears to be a peculiar condition of the blood, or of the blood and nervous system, manifested by a feeble vitality, which is ultimately followed by the deposition of tuberculous matter, usually on sur-

faces of membranes possessing an epithelial covering; this tubercular element simply accumulates by new deposits, is unorganized, has its own tendency to decay, and, acting as a foreign body, it interferes with the supply of blood to the parts as well as with the vital functions of the organs containing it, disposing them to decay and disorganization. Thus the tubercle is not the disease itself, but simply one of the results of the disease. Why the lungs are selected for the deposit of the tubercle is, probably, from a want of proper vital integrity in these organs. The disease is almost invariably met with among persons of feeble vitality, either from hereditary transmission, or from accidental causes. The results of post-mortem examinations tend to prove that tubercles may exist in the lungs for years, even to old age, without occasioning any indications of their presence, unless aroused into action by some of the exciting causes.

A predisposition to phthisis is frequently transmitted by parents of feeble vitality to their children; and these, by a proper course of living, may so far check the disease, as to render it latent for several generations, when, under the influence of impaired vitality and the exciting causes, it will re-appear. My own view of the subject is, that, by a proper course of hygienical and therapeutical management, commencing in early childhood and persevering in the measures until adult age, and continuing it for a few generations, a proper amount of vitality may be imparted to the constitutions of, otherwise, tuberculous individuals, and the disease be wholly and thoroughly eradicated from them. Those who appear to be more liable to tubercular phthisis are, generally, of slender make, with long necks, prominent shoulders, narrow chests, fine, clear skin, fair hair, and delicate, rosy complexion; sometimes there will be a disproportionate thickness of the upper lip, a weak voice, perhaps large veins, and great sensitiveness,—but much variation will be observed in these respects. Among 1010 phthisical patients admitted into the Brompton Hospital, nearly one in every four was the offspring of a consumptive parent.

Among the exciting causes which give rise to the disease, or cause its development when existing in a latent condition, none stand more prominent than colds; indeed most patients date the beginning of their pulmonary malady from lying in damp beds, wearing wet clothes, wetting their feet, exposure to a cold damp air, passing, in a state of perspiration, quickly from a warm apartment to cold air, as from a ball-room or other crowded place, and to other circumstances of a similar character. Females appear to be more liable to the disease than males, owing to the peculiar circum-

stances by which they are surrounded; in the young, the disease is more common from the twentieth to the thirtieth year, and in the aged, from the fiftieth to the eightieth.—Among the other exciting causes, may be named the following: damp air; want of exercise; sedentary habits; unwholesome and insufficient food; too early mental application; depressing mental influences; excessive cares; masturbation; sexual excesses; premature or unsound marriages; prolonged lactation; improper treatment of certain maladies; tight lacing; dwelling in damp and confined places; inhalation of deleterious gases; suppression of accustomed evacuations; inhalation of particles of dust, as, among millers, stone-cutters, etc.

The *prognosis* of phthisis depends upon circumstances; that it is a curable disease does not admit of a doubt—but its curability is governed by certain conditions, as, the strength of the predisposition, the state of the general system, the extent and advance of the tuberculous formations, and the stage in which the treatment is commenced. The earlier the period at which the patient can be placed under treatment, the greater will be the chances of cure; in the second and third stages, although cures have been recorded, still the prognosis must always be regarded as unfavorable. Perhaps it would be more truthful to state that, although cures have been observed after the deposit of tubercle, they are but few, and also, that in no case can the practitioner honestly predict a favorable issue.—Hereditary consumption is less controllable than acquired consumption; when the acquired disease occurs in a strongly-marked strumous diathesis, it is also more intractable to treatment. When the tuberculous dyscrasia exists in a minor degree, tubercles occupying only a limited portion of the lungs, a cure may be effected, even after softening has occurred, provided no large cavity be formed; the greater the tuberculous dyscrasia, and the more extensive the deposit, the more unfavorable will be the prognosis.

A persistent anorexia without any attributable cause, deficient powers of digestion, and, on eating considerably, a sense of gastric oppression and weariness of the extremities, are symptoms very favorable to the development or extension of phthisis, in any stage. "When hectic fever has become fully established, the patient is seldom free from diarrhea, perspirations, or profuse expectoration, which seem to exhibit toward each other a certain degree of antagonism. In proportion to the increase of one, the others have a tendency to diminish; and as one becomes checked by treatment, another too often makes its appearance. The issue of nearly every

fatal case of phthisis is immediately attributable to the exhausting effect of one or other of these three symptoms; hence it becomes a matter of practical value to ascertain their comparative influence upon the patient. Diarrhea is the most rapidly destructive; perspiration the next; and expectoration the least so." (*R. P. Cotton.*)

An increase in the weight of the patient, associated with a more healthy condition of the urine is always favorable; yet it must not be forgotten, that frequently the patient will attain a flattering degree of improvement, and then fall back, the power of reparation not being equal to the destructive agency.—Pregnancy may, for the time, arrest the progress of the phthisis, but will not cure it.

Severe cough, profuse expectoration, quick pulse, hectic fever, and night sweats may be present, without any tuberculous affection of the lungs; these symptoms arising from other causes, and yielding to appropriate treatment.

The *pathological appearances* vary according to the stage of the disease. In the first stage more or less numerous tubercles will be observed in the lungs, of various sizes, from that of a small speck to that of a hazel-nut; the smaller ones may be gray and translucent, or colorless and transparent, but as they increase in size they become yellowish and opaque, the yellow speck being first observed in the center. The bronchial and pulmonary tissues in the neighborhood of these deposits may exhibit redness and vascularity, or there may be no perceptible change. Under the microscope, the tubercles appear to be air-cells filled with tuberculous deposit, consisting of granules, tubercle-corpuscles, and non-cellular elements, and sometimes, pus, granular cells, mineral matter, and cholesterine.

In the second stage, these tubercles have lost their firmness, become broken down, and softened; and their softened, pultaceous matter, passes into the bronchial tubes, from whence, during life, it is expectorated. In this stage, pleuritic adhesions may also be observed, from adhesive inflammation.—In the third stage, the substance of the lungs may be so filled with tuberculous matter as to leave but few traces of its original structure; the softening of the tuberculous masses gives rise to cavities, and ulceration, which destroy the lung tissue; these cavities may vary in size from that of a bean to that of an orange, their form depending entirely upon the directions followed by the softening and ulcerated processes, and they usually contain more or less fluid varying in consistence and color, though occasionally they will be empty and lined

throughout with a dense membrane. Sometimes an entire lobe may be converted into one large, jagged, irregular cavity, with bands of pulmonary tissue traversing it in various directions. Many other results of ulceration and disorganization will be observed. In a majority of instances, tubercles may be observed in various other organs of the body.—Should a cure have taken place, either cicatrices will be observed in the lungs, from the tuberculous matter having been expectorated, or absorbed, together with a loss of more or less air-cells to the lung, or, the tubercle will be observed dry, calcareous, and opaque, with dry and detached walls, and often surrounded by shrunken and obliterated lung tissue.

The *treatment* of tubercular phthisis consists of both hygienical and therapeutical measures, each of which is of much importance. Perhaps, of the two, the former is really the more useful and important, yet on no account should the latter be dispensed with; being careful, however, while pursuing it, not to drench the patient's stomach with such an abundance of nauseous mixtures and medicines as to interfere with its normal functions, or create a disgust toward all remedial agents. In the management of a consumptive patient the greatest care and circumspection is required, and the physician should undertake the treatment of no case unless both the patient and his or her friends will agree to strictly follow out the directions in every respect; and the directions must, in all cases, be made to conform as closely as possible to the circumstances and condition of the patient.

As being the first in importance, the hygienical measures will be considered the first. At the commencement, the patient must be removed from all conditions unfavorable to a restoration to health, as, from a foul, heated, or damp atmosphere, from exposures to cold, from sedentary occupations, from the use of tobacco in any form, from abuse of alcoholic drinks, and, masturbation or sexual contact must positively be forbidden. All sources of anxiety, mental despondency, or mental excitement must be removed as much as possible,—but moderate mental excitement, of a cheerful pleasing character, is allowable. The question is, not what we can do to satisfy the patient, or what indulgences can we permit but, what *must be done* in order to effect a cure,—and if the patient can not or will not adopt the necessary measures, there is an end of the matter as far as cure is concerned, and then all that can be done will be to smooth his passage to the grave. Having effected the changes just referred to, the next thing to consider is the diet. All food should be prepared so as to please the taste of the patient. The old-

fashioned plan, even still pursued by a few, of endeavoring to cure phthisis by depressing measures and a low diet, has been productive of much harm, because the lack of nutrition is as destructive to vital action as the disease itself. In this disease the blood must be enriched, and the body be sustained and nourished by proper nutritious diet, which will materially aid in the removal from the system of those elements which favor tuberculous deposits, as well as in effecting a change in the condition of the blood unfavorable to their existence. And, when the vital powers have been once aroused, the food requires to be much increased, to an extent not to distress or overload the stomach.

Nitrogenous food is required for the true transformation of the hydrocarbons, and for the supply of material to be fixed in the nitrogenous tissues. As drinks, water, milk, milk and water, cocoa, chocolate, tea, or coffee, may be used. The milk used should be new and good, taken from a healthy and well fed cow, and should be taken warm. If fats are tolerated, half an ounce of suet, cut finely, may be boiled in one pint of milk. If tea or coffee be used, about one-half of it should consist of milk; and, in cases of gastric acidity, lime-water one part may be added to milk two parts. The milk should be used freely. Beef tea, with salt, or with milk added, also affords considerable nourishment. In some instances, especially where there is a depressed action of the heart, stimulants will prove advantageous, when used in moderation, not sufficient to excite the brain, as, ale, porter, wine, and in many cases, even good French brandy. But these stimulants will not be required where there is an evident improvement going on.—The solid food must also be nutritious, easy of digestion, and not disposed to occasion acidity, flatulence, costiveness, or diarrhea. Of all meats, beef is the best, and pork the worst. The beef should be tender, either as a steak or a roast and should be "underdone" or "rare." Tender mutton, poultry, game, rare-boiled eggs, oysters, salad oil, cod liver oil, neats' foot oil, cocoa-nut oil, good sweet butter, cheese, etc., may also be freely used, together with baked potatoes, wheat bread, gluten bread, boiled rice, plain rice pudding, ripe fruits, lettuce, ice-cream, custards, etc.

The oils, referred to, especially the cod liver, have frequently proved so useful in this disease, as to be considered therapeutic agents,—but they are nutrients, articles of diet also. When they can be obtained pure, they will prove beneficial; but when manufactured from or mixed with lard or some other oils, they are of little value. They may be given in teaspoonful doses, gradually increasing to a tablespoonful, two or three times a day, or as often

as the stomach of the patient will permit. They may be rendered palatable by having them taken in Brandy, Gin, or Whisky, when these stimulants are not contra-indicated; or, in some aromatic syrup, infusion of Walnut Leaves, or milk of Cocoa-nut, which, by the way, forms a useful and agreeable drink for consumptives. A piece of Orange or Lemon-peel, or of Cinnamon Bark, chewed after taking the unmixed Oil, will generally remove its unpleasant taste.

Milk, however, furnishes a large supply of nitrogen to assist in the assimilation of the hydro-carbon or starchy food. Pastries, hot cakes or bread, crude fruits, and other similar articles, must positively be avoided. When the addition of a remedial agent will not render the drink or food unpleasant, nor interfere with the proper action of either, it should be recommended, in order to save too frequent a repetition of doses, which is much dreaded by patients. Starchy diet tends largely to increase the acidity of the blood, while the other hydro-carbon, fat or oil, has an opposite tendency. Full meals should never be permitted; light meals are preferable, and which may be repeated four or five times a day, without overloading or debilitating the digestive organs. Salt may be used freely, as it is of value in all tuberculous affections.

The next important hygienic measure, is, exercise in the open air. If the patient is able to be about, he should endeavor to secure some light business that will require him to travel, and be more or less constantly in the open air, and that will at the same time occupy his mind without requiring too much mental action, or causing any anxiety. Traveling agent, book agent, peddling, etc., are all of this kind, but should be pursued only in temperate climates where the atmosphere, as a general rule, is free from cold and dampness, and where there are no sudden changes of weather. Yet, if he *can* and *will* attend to himself faithfully, and accommodate himself to these changes, by suitable change in clothing, keeping within doors in unsuitable weather, etc., he may even travel in the objectionable climates. For, even with these disadvantages, the travel, change of scenery, open air, mental occupation, etc., are much better than no travel at all. Short, and frequently repeated trips by sea, are advantageous for those only in the early stage of the disease; long sea voyages are to be avoided, as the sea air is too keen, and good diet, good attendance, etc., can rarely be had.—In those cases, however, where this course can not be pursued, exercise should be taken regularly and daily in the open air, and it should be made as much as possible a matter of pleasure or amusement, instead of a task for the preservation of health,—to

accomplish which, agreeable companions should always be in attendance, if possible.

Females may hop, skip, dance about, run, walk, ride on horseback, jump rope, pursue calisthenic exercises, etc. One of the objects in exercising is, to expand the chest, and give greater capacity for the action of the lungs, for, if the patient keep himself in a position with the body doubled up or bent forward, the capacity of the chest will become diminished by the diaphragm being pressed upward by the stomach, and various unpleasant symptoms will result therefrom. In whatever position the patient may be,—walking, sitting, standing, lying, writing, sewing, reading, etc.,—he should never lose sight of the absolute necessity of keeping himself in an erect posture as much as possible, having the shoulders thrown back, the small of the back curved inward, and the head as straight as possible. Nor is this all, the patient should be enjoined to promote expansion of the lungs by deep inspiration, repeating it three or four times every day, for from five to twenty or thirty minutes at a time. Keeping the mouth a little open, and the body erect, he will inhale gently and slowly, until he expands the chest to its utmost limits, then retaining it there for a few seconds, he will allow it to escape just as gently and slowly as it was inhaled. This not only expands the lungs, but also their air-cells, rendering them more expansible, and, at the same time, causes a larger amount of the air, richer in carbonic acid, to be exhaled. After each deep inhalation and exhalation, before commencing the next, a few ordinary inspirations should be taken, and so continued alternately. The air should be pure and not too cold. If severe pain is produced, the inspiration may be carried up to the point of pain, and then expiration be made; and, it will be found, that eventually the pain will cease, and a full inspiration can be taken. These inspirations are to be taken independent of any medicated inhalations.

It will be found very useful to bathe every night with some warm weak alkaline water, drying with a coarse towel and considerable friction, and then anointing the whole body and limbs with Olive Oil, Cod Liver Oil, or Cocoa-nut Oil. Any tendency to indolence, oversleeping, or sleeplessness must be counteracted, and the hours of sleep should be regulated as much as possible. The bedclothing should not be so heavy nor warm as to cause perspiration or disagreeable heat; bed-curtains should be dispensed with, and the sleeping apartment should be well aired during the day, and be kept dry and at a temperature not to exceed 65° Fahrenheit in cold weather; being careful not to have the air filled with dust, soot, or

ashes, nor sulphurous vapor from burning coal, nor carbonic acid gas from burning charcoal. A wood fire is always to be preferred for consumptives.—All mental cares, anxieties, studies, depressions or excitements must be avoided, though cheerfulness is desirable; moderation in everything that is allowable, is beneficial,—excesses are hurtful. Moderate labor, cheerful companions, healthy diversions, indulgence of hopes, and cheerful disposition, are all conducive to a proper state of mind and body favoring a restoration to health.—Cold air, or rather sudden changes from heat to cold, or cold to heat, as well as damp residences, must be avoided. A sedentary occupation, or one requiring constant sitting, and especially with the body inclined forward, should also be avoided, as well as one requiring continuous standing, constant stooping over, or where the person is exposed to dust or irritating vapors.—The body should be kept comfortably warm all the time; cotton, wool, or fur may be worn, and most especial attention should be paid, in this respect, to the chest, back and feet, but not to the neglect of other surfaces. India-rubber overshoes should only be worn in walking, to protect the feet from dampness; but thick leather, or cork-soled shoes are much better.

As a general rule, a residence in cities is to be preferred to one in the country, the air being less bleak and sharp, and better attendance and remedies being more easily attained; but hotels and boarding-houses are by no means favorable places for the residence of consumptives. Changes of air, or occupations, are to be made when for the better; but care should be taken not to change for the worse. Change of climate in the second or third stages of the disease are rarely of service, and not unfrequently accelerate the progress of the disease. In the early period of the disease, a change will hardly be advantageous, unless a residence be held for several years in a proper climate; and such changes will usually prove more serviceable to those in whom the disease is not hereditary. In my opinion the best climate for consumptives is in the Southern temperate latitudes, as, for instance, in Buenos Ayres, etc.,—and a sanitarium in that or some neighboring place, either on the Atlantic or Pacific coast, in which a proper attention would be paid to the hygiene and therapeutics of the patient, combining diet, exercise, amusements, medicine, etc., would be exceedingly advantageous for persons in the early period of phthisis.

In the second and third stages, or rather when the patients can not bear exposure to changeable weather, the rooms they occupy should be artificially heated, and maintained at the degree of tem-

perature above named; this, though injurious in the first stage, will prove decidedly beneficial in the advanced.—The general hygiene as respects other conditions must be in accordance with the rules named in the first part of the work, as well as with the circumstances, condition, and constitution of the patient.

The therapeutical measures will consist of remedies to remove the tendency to tuberculous formations, to impart strength and vigor to the constitution, and to palliate or overcome urgent symptoms. But, it must be constantly borne in mind, that there are no specific remedies for consumption,—and that the tubercles once formed are rarely, if ever, removed by absorption—though their further increase, progress, and activity may often be arrested by proper treatment; those agents that will benefit one patient will be found to exert no beneficial influence upon others, and, in many instances, will even lose their efficacy among the patients who had been previously benefited by their use. Each individual case will require to be treated according to its peculiarities, the constitution and habits of the patient, and other surrounding circumstances. All depletive and debilitating measures by purgation, diuresis, perspiration, or emesis, must positively be avoided.

The first thing to be done is, to improve the organs of nutrition, and maintain them constantly in as normal a condition as possible. The mucous membrane of the stomach should be carefully attended to, in order to preserve a healthy condition of this organ, and perpetuate a good appetite. For this purpose, great advantage will be found from the use of the following pills: Take of Citrate of Iron and Quinia with Strychnia two drachms, Alcoholic Extract of Aletris, Alcoholic Extract of Black Cohosh, each, one drachm; mix, and divide into sixty pills, of which one is a dose, to be repeated three times a day, or these articles may be taken in solution instead of pill form; and the quantity of the Citrate may be varied to suit the peculiarities of the patient's system. Other preparations, will sometimes be found of value, as named under Dyspepsia, and Chronic Inflammation of the Stomach.

As alteratives, the Iodide of Iron, Iodide of Ammonium, Iodine Pill, Bromide of Ammonium, Compound Syrup of Yellow Dock, Compound Syrup of Hypophosphites, etc., may be used with advantage, according to the influence they exert on each individual case. I have in some instances derived much advantage from one of the following compounds, viz.:—1. Take of Bromide of Ammonium one ounce, Citrate of Iron and Strychnia three hundred and eighty-four Troy grains, Citrate of Quinia one drachm, Water one pint; mix, and dissolve. The dose is one fluidrachm three or four times

a day.—2. Take of Compound Syrup of Hypophosphites four fluidounces, Hypophosphite of Quinia one scruple, Phosphorus Water one fluidounce,* Simple Syrup three fluidounces; mix. The dose is a fluidrachm three times a day, before each meal.—3. Take of Tincture of Bloodroot two fluidrachms, Fluid Extract of Wild Cherry six fluidrachms, Infusion of Liquorice Root one pint, Hydrochlorate of Ammonia two drachms; mix. Half a fluidounce may be given every two or three hours.—4. Take of Greek Valerian Root two ounces, Wahoo, Black Cohosh, each, one ounce, Water three pints; mix, boil down slowly to two pints. Strain, add Gum Arabic half an ounce, Rock Candy one pound, Extract of Liquorice four ounces, good Cider Vinegar twelve fluidounces; heat till all is dissolved, and when cold add Tincture of Tolu, Tincture of Opium, Tincture of Catechu, each, four fluidounces. The dose is half a fluidounce three or four times a day. This is also useful for cough and early diarrhea.—5. Take of a Saturated Tincture of Black Cohosh, made with good Whisky, Linseed Oil or Sunflower Seed Oil, each, four fluidounces, Honey two ounces, Garlic, bruised to a pulp, two ounces, Loaf Sugar two ounces, Yolks of three Eggs; mix well together. The dose is half a fluidounce three or four times a day. But it must be recollected that if either of these agents disturb the stomach, or, if the disease is advanced so that the patient can not attend to the hygienical measures already referred to, but little benefit can be expected from them.

Certain alterative, sedative, soothing, or healing influences are supposed to be derived from the inhalation of certain vapors; thus, in the Brompton Hospital the following agents, in various combinations, are stated to have been successfully employed in inhalation, as, Chlorine; Creosote; Conium; Benzoic Acid; Hydrocyanic Acid, diluted; pure Deodorized Alcohol; Oil of Bitter Almonds; Nitric, Benzoic, Acetic, and Tannic Acids; Camphor; Balsam of Tolu; Canada Balsam; Iodine; Aqua Ammonia, etc. As examples, I give the following,—1. Take of Nitric Acid twenty minims, Camphor four drachms, Tannic Acid four drachms, pure Deodorized Alcohol six fluidounces; mix.—2. Take of Acetic Acid, Benzoic Acid, Tincture of Conium, each, two fluidrachms, pure Deodorized Alcohol two fluidounces; mix.—3. Take of Iodine, Iodide of Ammonium, each, twelve grains, Tincture of Conium four fluidounces; mix. These inhalations may be employed as explained under Chronic Bronchitis, page 612.—4. Take of Nitre one scruple, common Salt one drachm, Hydrochlorate of Ammonia one drachm,

*Phosphorus water is the water in which Phosphorus is kept in the stores.

Water one pint; mix, and dissolve. Heat a part of this solution, and inhale the warm vapor that arises. In former years I placed considerable reliance on inhalation of vapors in the cure of phthisis, based upon the statements of others, and upon the fact that it appeared a very rational way of bringing remedies in contact with diseased structures. Of late years, however, my confidence in them is considerably diminished; true, I find them useful in chronic bronchitis, asthma, and to relieve certain urgent symptoms in phthisis, (*see* page 612), but as regards the phthisical disease itself they have not appeared to exert any permanently beneficial influence whatever upon it. As a local application to the lungs, in an early period of the disease, I have derived the greatest amount of benefit for the prevention of tuberculous deposits, from the following compound, now published for the first time—it is to be used in conjunction with slow, deep, and prolonged inspirations and expirations, repeated several times every day, (*also see* No. 12, page 613): Take of Chloride of Gold and Soda one grain, Hydrochlorate of Ammonia two scruples, Water five fluidounces; mix, and dissolve. One or two fluidrachms of this solution should be nebulized or formed into a spray, and in this state be conveyed into the air-passages by deep inspirations. This may be repeated once, twice, or thrice a day. The spray from the following mixture will also frequently be found useful in the early stage of the disease: Take of Carbolic Acid half a fluidrachm, Alcohol four fluidounces, Distilled Water two pints; mix, and use about one fluidounce at a sitting, repeating it two or three times a day. But these spray inhalations, though often beneficial, will not invariably be effectual.

Cough is a peculiarly obstinate and distressing symptom; it may be relieved by one of the following mixtures:—1. Take Fluid Extract of Black Cohosh, Fluid Extract of Wild Cherry, Tincture of Bloodroot, each, one fluidounce, Tincture of Sulphate of Morphia (sixty grains to Alcohol one pint), two fluidrachms; mix. The dose is from half a fluidrachm to a fluidrachm three or four times a day, or whenever the cough is very severe.—2. Rub up thoroughly together, two drachms of White Castile Soap, and one drachm, each, of powdered Opium and Camphor. A pill about the size of a pea may be taken whenever required.—3. Take of Tincture of Cannabis Indica one fluidounce, Solution of Sulphate of Morphia two fluidounces; mix. The dose is a fluidrachm repeated three or four times a day.—4. Take of Creosote ten minims, Sulphate of Morphia from one-fourth of a grain to a grain, Water one pint; mix. Heat this solution, and allow the patient to inhale the vapor. This inhalation has frequently relieved cough when other measures

had proved ineffectual. Many other cough remedies have been presented to the profession, some of which are undoubtedly good, while others are useless. But we must be careful not to employ nauseants, or expectorants, in phthisis, as they are not only not required, but are positively injurious in many instances.

The inhalation of Chloroform one part, pure Deodorized Alcohol three parts, will usually relieve cough promptly, or, in place of Alcohol, Tincture of Camphor may be substituted, or, two parts of Petroleum. In some irritable conditions, I have found relief to follow the use of a preparation composed of Tincture of Black Cohosh, Tincture of Gelseminum, each, five and a half fluidrachms, Tincture of Aconite Root two fluidrachms; mix. The dose is twenty minims every hour or two. Bathing the whole surface of the patient's body with warm water slightly acidulated with vinegar, will often prove useful in relieving obstinate cough. Professor Tully observes,—"In all cases allay the cough by some preparation of Opium, in uniform doses, at short and regular intervals, and used continually. The greater the quantity of Opium required in the twenty-four hours, the greater the number of doses to be made, and the shorter the intervals between them. Where much is required, repeat the dose as often as every three hours; where only a moderate quantity is required, repeat the dose about every six hours—never have the interval longer than this. Always give sufficient to restrain the cough as much as possible. If the cough be difficult of restraint, the Opium may be conjoined with some other narcotics, particularly those which act more especially upon the nerves of respiratory motion, as, Conium, Cyanogen, Hydride of Benzoyle, Nicotiana, Aconite, etc."

Gastric irritability is a frequent accompaniment of phthisis, with nausea, vomiting, and ejection of food. This may frequently be relieved by a mixture of Trisnitrate of Bismuth eight scruples, Mucilage of Gum Arabic two fluidounces, Essence of Lemon one fluidrachm, Lupulin eight scruples. The mixture requires to be thoroughly agitated before taking; the dose is a fluidrachm, as often as required. In some instances, an infusion of equal parts of Asclepias Incarnata and Convallaria Multiflora will be found to answer; and, in others, a draught may be made as follows: Take of Diluted Hydrocyanic Acid three minims, Trisnitrate of Bismuth ten grains, Mucilage of Gum Arabic, Peppermint Water, each, half a fluidounce; mix. This draught may be repeated three times daily.—Hemoptysis may be treated as named under its appropriate head. A fluidrachm of Hydrochloric Acid added

to a pint of water, and the vapor arising therefrom inhaled, will frequently prove serviceable in small hemorrhages.

Night sweats are a source of much distress and exhaustion; when slight, ten or twelve minims of Elixir of Vitriol in about two fluidounces of Water, may be taken at bed-time with advantage; or, an infusion of Sage and Whiteweed; or, a pill composed of one grain, each, of Lupulin, Tannic Acid, and Extract of Hyoscyamus. In obstinate cases, however, one of the following preparations will be found useful: 1. Take of Oxide of Zinc four grains, Extract of Hyoscyamus four grains, or a sufficient quantity to form into two pills, to be taken at bed-time.—2. Hydrochloric Acid, diluted, ten or fifteen minims, in some water, and repeated two or three times a day.—3. Take of Gallic Acid seven grains, Acetate of Morphia one-eighth of a grain, Alcohol q. s. (a few drops), Syrup of Tolu half a fluidrachm; Water one fluidounce; mix, for a draught to be taken at bed-time.—4. Take of Gallic Acid five grains, Muriate of Morphia one-eighth of a grain, Mucilage, a sufficient quantity; mix; for two pills, to be taken at bed-time.—5. Take of Tannin one or two grains, Opium one or two grains, Simple Syrup a sufficient quantity; mix, and form into four pills, of which one may be given every two, three, or four hours through the day. But if opium or morphia be administered in other medicines, some care must be taken as to the quantity used; if necessary, their use may be dispensed with in these preparations.—6. Take of Oxide of Zinc four grains, Tannate of Quinia ten grains, Extract of Conium five grains; mix, divide into four pills, of which one may be given every two, three or four hours daily.—7. Take of Oxide of Zinc twelve grains, Extract of Conium eighteen grains; mix, and divide into six pills, one or two of which may be taken every night.—8. Take of Gallic Acid twenty-four grains, Extract of Indian Hemp three grains, Extract of Chamomile six grains; mix, and divide into six pills, one of which may be taken every night.

In conjunction with these internal measures, the whole surface of the limbs and body should be bathed or sponged daily with a warm mixture of equal parts of Alcohol and Water, to which some Oil of Cinnamon, Tannin, or fixed Oil of Capsicum has been added; and this bathing should not be pushed so far as to produce rubefaction, but only an agreeable glow and dryness of the skin. In some cases, a bath may be used composed of Acetic Acid, Tannin, and Water. If the body is being oiled every night, these baths may be applied during the day. In many instances, the flannel worn next the body may be previously prepared by moist-

ening it with some stimulating and astringent mixture, and wearing it when dry, as, Tincture of Capsicum, and Tannic Acid; or, a mixture of Capsicum one drachm, Wild Ginger eight ounces, Geranium eight ounces, Canella Alba one pound,—all the articles in very fine powder—may be sprinkled from time to time upon the flannel, being careful when worn, that the patient does not inhale any of the effluvia or powder, and thus irritate the lungs and air-passages.

Diarrhea is a very obstinate and exhausting symptom, for which the Trisnitrate of Bismuth will be found available, in doses of from five to ten grains, repeated three times a day; it may be taken in a little Mucilage, or, be combined with three grains of Gum Arabic, and two grains of Magnesia. Other agents have, however, sometimes been of advantage, as, Tincture of Chloride of Iron; or, equal parts of Camphor, Opium, Tannin, and Kino, in doses of three or four grains of the mixture, to be repeated, as required; or, the following will be found of great service: Take of prepared Charcoal two drachms, Tannin, powdered Kino, each, twenty grains, Trisnitrate of Bismuth half a drachm, Opium two grains; mix well together. Put this mixture into a pint of Indian Meal Gruel, Rice Water, Barley Water, or Beef Tea, etc., and let the patient take a tablespoonful of the mixture every hour, stirring it up well each time before taking the dose. Where much exhaustion follows the diarrhea, the following injection will be found advantageous: Take of Tincture of Nux Vomica six fluidrachms, Tincture of Prickly-ash Berries eight fluidounces; mix, and add one fluidrachm to half a fluidounce of a strong infusion of equal parts of Solomon's Seal and Golden Seal, for an injection,—to be retained as long as possible, in the rectum. It may be repeated two or three times a day.—The following has often proved useful as an injection in the diarrhea: Take of Solution of Perchloride of Iron five minims, Solution of Muriate of Morphia, ten, twenty, or thirty drops,* Infusion of Elm one fluidounce; mix, for an injection, to be repeated as often as desired, two, three, or four times a day.—A half teaspoonful, every two hours, of a solution of Sulphate of Iron two drachms, in Whisky four fluidounces, has been useful in relieving cough, night sweats, and diarrhea, and imparting strength.

Other symptoms must be treated on general principles, being

* We must be governed, in the quantity of morphia employed in this injection, by the amount of opium or morphia administered, from time to time, by mouth.

careful never to oppress or embarrass the stomach—endeavoring to counteract and overcome, as far as possible, all the various and diverse morbid symptoms of the case, of whatever nature they may be, by such remedies so managed as will accomplish it the most effectually without producing at the same time any undesirable effects.—The preceding measures are especially applicable to the early stage of phthisis; in the advanced periods, they may be persisted in as far as practicable, and according as the patient's condition will permit; perhaps they may thus occasionally prove advantageous,—but, in the latter stages of the disease, palliative measures, to relieve urgent symptoms, are generally all that we will be enabled to adopt.

CHRONIC PLEURITIS.

Chronic Pleurisy may be a primary affection, or, it may result from a subacute pleuritis, or, occasionally it may be preceded by the acute form of the disease. Sometimes it comes on secondarily during the progress of some other maladies, as, of the lungs, liver, stomach, peritoneum, etc. It is more commonly observed among persons of feeble constitution. It is attended with *empyema*,—a profuse effusion of fluid of a serous, sero-puriform, or sero-albuminous character.

The *symptoms* of chronic pleurisy are not always well marked, and, indeed, are sometimes so mild, that even when copious effusion is present, the existence of the disease will not be suspected. In other instances there will be occasional sharp pains, or "a stitch in the side," occurring generally during inspiration, and often more or less soreness or tenderness upon pressure, or upon moving the arm of the affected side. Sometimes, although there is no dyspnœa, yet the patient will find himself incapable of singing, talking, or reading aloud for any considerable time. The general health may continue unaffected, and without any loss of flesh or weight; and, in some cases, there will be a slight, hacking cough, with or without expectoration. Fever is not generally present, but when it is, it usually appears at night.—When the symptoms are more marked, there will be a hacking cough with or without expectoration, the latter being often very profuse; dry, vague pains in the chest, sometimes quite severe; pallor of countenance; emaciation; respiration short and frequent, and increased on the least exertion or mental excitement; loss of appetite; inability to lie on any other than the affected side; dryness and harshness of the skin; rapid pulse; more or less nervous irritability; hectic fever;

and night sweats. Sometimes the effusion is so great as to produce a manifest protrusion of the intercostal spaces, and even a displacement of the heart, or a curvature of the spine.

However obscure the general symptoms of chronic pleurisy may be, its physical signs are well marked, though modified considerably, according to the duration and amount of the effusion, and the changes undergone by the pleura and lung. Percussion will elicit flatness at the lower and central parts of the lung, or at the side of the thorax, with a marked sense of resistance, and a decrease in the elasticity of the walls of the chest; the flatness will sometimes vary in location upon the patient changing his position, and may frequently be observed, in front, on the opposite side of the sternum; at the apex there may be a tympanitic sound, sometimes having an amphoric character, and occasionally the bruit de pot fêlé. On the unaffected side, the sound on percussion will be very clear; occasionally an emphysematous sound will be observed. The intercostal spaces may be enlarged and protruding, even to convexity, and on pressure, fluctuation may frequently be observed. The affected side does not respond to the respiratory act as fully as the sound side. Auscultation detects an absence or suppression of the respiratory murmur at the lower, central, and lateral parts of the chest, and sometimes over the whole of the side; a bronchial, or broncho-vesicular respiration is frequently observed over the compressed lung; occasionally friction sounds may be detected. Vocal resonance is augmented at the apex of the lung, and occasionally bronchophony, and even pectoriloquy, have been present. The beatings of the heart may also be heard in parts at a distance from this organ. The respiratory murmur of the healthy lung is more intense than natural, and at times much harsher. Vocal fremitus of the affected side is absent. In the interscapular region, as well as in other portions of the affected side, bronchial respiration will be noticed, and, if bronchial dilatation be present, there will also be bronchophony.—Ægophony is seldom present, unless during absorption of the effused fluid, when a gradual shrinking or retraction of the walls of the chest will occur; the affected side becoming flattened, giving dullness on percussion, and a feebler respiration. (*See Note*, page 539, *sections* 24, 30, 31, 32, 33, 35.)

Chronic pleurisy may be complicated with tubercular phthisis, chronic pneumonia, cancer, melanosis, etc., which are very difficult to detect. The disease must be carefully discriminated from hydrothorax, pericardial effusion, abscess in the walls of the chest, emphysema, and pneumothorax, hepatic or splenitic enlargement, tumor within the chest, etc.

The *prognosis* of chronic pleurisy is always unfavorable, and especially so when occurring in enfeebled or strumous systems, when complicated with other lesions, and when hectic fever and night sweats are present, together with scanty urine and œdema of the extremities. Sometimes the disease is cured spontaneously by an absorption of the effused fluid, which generally occurs gradually, the distended side becoming contracted and flattened; and the recovery is more or less complete according to the reduction that has been made in the size and functions of the lung by the previous lesion; being seldom so complete in adults of advanced age, as in the young. At other times the effused fluid may give rise to ulceration and perforation, making a passage through the lungs into the bronchial tubes, from whence it is coughed up; or, it may form an opening through the thoracic parietes, and be discharged externally. Usually, where the chest contracts, the patient is subsequently liable to lesions of the respiratory organs, and an enfeebled or cachectic state, which may end in dropsical or tuberculous affections.

Dr. Williams observes that, "pleurisy is dangerous not from its affecting the blood generally, but from the effects of the local effusion oppressing the lung and otherwise interfering with respiration. The dangers from effusion are not much to be dreaded if that effusion be not very copious, or, if being copious, it is simple."—"It is important to keep in view the effects of considerable effusion, not only in oppressing the lung and interfering with its expansion, but in making pressure on the heart and great blood-vessels."—"The quality of the effusion may be a source of danger as well as the quantity. When the effusion is of a purulent character there are several dangers. There is the chance of purulent absorption; the depressing influence of pent-up matter on the system; and the tendency of the effused fluid to penetrate and make its way through various organs. Other evils may flow from the effusion of plastic lymph. The formation of supple adhesions may not be practically very troublesome; but where caco-plastic lymph is thrown out, contraction occurs, and often gives rise to displacement, obliteration of vessels, and other lesions of serious and inconvenient character."

The *pathological appearances* met with are, thickening of the pleura, which becomes dull and loses its polish and smoothness; false membranes of different forms arising from the throwing out of a gelatinous or albuminous exudation or lymph, and which is susceptible of organization, having blood-vessels running through it; various adhesions of the pleura, which may be soft and easily torn, or, may be changed into a cellular tissue, and, sometimes, even into

a fibrous, cartilaginous, or osseous,—tubercles may also be frequently observed in them. The effused fluid in the pleural character may vary in amount, as well as in appearance,—being colorless, or, yellow and clear, or, containing albuminous flocculi,—or, it may be turbid, tinged with blood, or, resemble jelly, etc. The lung of the affected side will also present appearances according to the degree of compression it has received from the effused fluid. It may be compressed into a very small space and be situated upward in front of the vertebral column; its lobes may be adherent; its parenchyma inelastic, almost bloodless, and without crepitation; there will be adhesions between the lung and pleura; and, sometimes, an effusion into the lung itself. Occasionally, tubercles may be observed in it.

The *treatment* of chronic pleurisy consists in adopting means to diminish or overcome irritation, to promote absorption of the effused fluid, and to sustain the strength of the system. The Compound Tar Plaster should be applied over the diseased region, and a free discharge be kept up by it, for several weeks, if the patient can possibly bear it. It may be applied intermittently, or, alternately upon one-half of the affected side of the thorax, and then upon the other, and should be continued, if the patient's strength will permit, until the pain has been permanently removed, and considerable absorption of the effused liquid has taken place.

To facilitate absorption by stimulating the absorbents, the Bromide or Iodide of Ammonium may be administered internally; or, the Compound Syrup of Stillingia with Iodide of Potassium; or, a solution of Hydrochlorate of Ammonia one hundred and twenty-eight Troy grains, in Fluid Extract of Wild Cherry half a pint; the dose is half a fluidounce three or four times a day.

Cough may be relieved by some of the means already named under Bronchitis, Phthisis, etc. The surface of the body should be bathed daily with some stimulating fluid, and, in drying, considerable friction should be employed so as to produce a glow of heat all over the surface. The bowels should be kept regular, but active purgation must be avoided, as it will be found to produce too much exhaustion; diuretics, and especially those of a stimulating character will be found to answer a much better purpose, as, Queen of the Meadow, Buchu, Pipsissewa, Trailing Arbutus, Button Snake Root, Devil's Bit, Horseradish, Spearmint, etc. The Compound Infusion of Parsley, will be found very useful.—The patient may move about if he is able, and if no irritation is thereby produced; otherwise, he must be kept quiet; and in either case, he should not be allowed to expose himself to cold, sudden atmospheric changes, damp night air, or to too great an amount of exercise. Riding in the

open air, in clear weather, but not to produce fatigue or jar the body, will prove advantageous.

When the effusion is so great as to threaten suffocation, or does not yield to the remedies employed, the operation of paracentesis thoracis has been performed. Although there are obstacles to the universal success of this operation, still it has been followed by cures. The operation, if performed at all, should not be delayed too long, and the spot selected for the puncture will depend upon the situation of the effusion, a complete absence being first ascertained, by auscultation and percussion, of all signs indicating proximity of the lung in the part fixed upon for the puncture. In cases of doubt, an exploring needle may be used at first, to determine the presence of fluid in the cavity. The part usually chosen is, the upper edge of the sixth rib, posterior to the digitation of the serratus major, depending, however, upon the pointing of the fluid. The most eligible sites for the operation are, between the fourth, fifth, sixth, and seventh ribs; and, after the operation, the abdominal and thoracic parietes of the affected side should be pressed upon in order to promote the removal of as much fluid as possible. The operation is described in works on Surgery. After it has been effected, counter-irritation by dry cupping and rubefacients, and tonics, as, Tincture of Chloride of Iron, and nutritious diet, must be employed to complete the cure. The use of Chaissignac's drainage pipe, has also been highly spoken of, for the removal of the effusion. (*See Am. Jour. Med. Sciences*, April, 1852, page 320, *On Pleuritic Effusions and Paracentesis.*)

CHRONIC PNEUMONIA.

Chronic Inflammation of the Lungs is a disease not frequently encountered, more especially its simple form, in which the iron-gray and indurated lung is produced; it is much more frequent in what has been termed its scrofulous or tuberculous form, wherein tubercles are ultimately developed. Chronic Pneumonia very rarely exists as a sequel of the acute form; or, it may exist as a complication of other lung diseases, as, bronchitis, pleuritis, tuberculosis, etc., or of organic disease of the heart; or, it may exist as an original and independent disease.

The *symptoms* greatly resemble those of phthisis, as, cough, expectoration, dyspnœa, accelerated respiration, and quick pulse, and which are augmented on the least exertion. The cough, as well as the expectoration, will vary in character according to the extent and progress of the disease. There is also a loss of appetite, of strength,

and of weight, debility, irregularity of the bowels, morbid condition of the skin, hectic fever, and night sweats, and the patient may die in a few months from exhaustion, from softening of the lung tissue, or from tubercular phthisis. Occasionally the patient may struggle along for several years, when a chronic pulmonary abscess forms, giving rise to the discharge of an offensive purulent matter which finally wears him out.

The physical signs are those of solidification, being similar to those met with in the acute form of the disease. It is very rarely the case, however, that the patient presents himself to the practitioner until he becomes uneasy or alarmed about his symptoms. As the lung diminishes in volume, there will be more or less contraction or sinking in of the thoracic parietes; a lessened movement of the chest-walls on the side affected. Percussion will detect a diminution of clearness, which, as the consolidation increases, becomes more and more dull, and even flat, with a sense of resistance to the percussion-stroke. Auscultation will discover a weak, harsh, or suppressed respiratory murmur at first, with prolonged expiration, but as the disease advances this will change to a bronchial respiration, and a corresponding development of cough and vocal fremitus, and more or less bronchophony. (*See Note*, page 539, *sections* 1, 2, 3, 6, 7, 8, 12, 15, 16, 27, etc.)

We may generally determine chronic pneumonia from *phthisis*, by observing that the dullness on percussion is in the central and lower portions of the lung, while in phthisis it is at the apex, and usually in both lungs; by the history of the case, there having existed a prior acute affection of the lungs; and by the patient not being hereditarily liable to phthisis. Hemorrhage is not so apt to be present in pneumonia, although the expectoration may sometimes be tinged with blood from a bronchial affection. Again, the general symptoms are not so severe as those of phthisis, except toward the fatal termination of the disease.—But, sometimes, we will find it very difficult, if not impossible, to discriminate between the two diseases, as, dullness may be observed in the apex of the lung, with a blowing respiration, moist crackling, and cavernous or gurgling sounds, indicative of tubercle. In this case, hemorrhage is more apt to be present, and also the usual signs of tuberculous disease. Andral states that in chronic pneumonia the upper part of the lung is more frequently affected than in the acute form.

The sinking in of the chest in chronic pneumonia is not so extensive as that in *chronic pleurisy*, being commonly confined to the lower lobe of the lung, or only to the part affected; in pleurisy,

this contraction is more general, or involves only the upper part of the chest.

Dr. Williams, referring to some of the chronic results of pleurisy and pneumonia, observes:—"The most common result is that, the consolidation not being cleared away, deposited matter is left behind, which ultimately undergoes tubercular degeneration. In other cases the result is condensation of the vesicular lung tissue and dilatation of the bronchi. Owing to the condensation of the vesicular tissue, the air does not enter the cells with facility; but the ribs, muscles, and motory apparatus of the parietes continue to act with vigor, driving the air into the impenetrable lung tissue. The necessary mechanical consequence of this is, that the air, acting strongly upon the walls of the tubes into which it is impelled, produces dilatation of the bronchi. This condition of condensation of the vesicular tissue, with dilatation of the bronchial tubes, is apt to be mistaken for phthisis. I have formerly pointed out this result of pleurisy and pneumonia, and explained the manner of its origin and its diagnosis.—It is produced, as I have said, in a purely mechanical manner by the action, on the walls of the tubes, of the air which is driven into them, but can not penetrate the impermeable lung. The physical signs resemble in many respects those of phthisis. There is the dense, dull lung tissue, absence of vesicular breathing, pectoriloquy, and tubular, or even cavernous breathing.

"The diagnosis is difficult, but may be aided in the first place by observing the situation. The signs are not at the upper, but at the lower and central parts of the lung, or at the side of the thorax; and the dullness is very considerable. The opposite conditions prevail in phthisis. Then, as to the general symptoms, there may be all this with a good deal of *embonpoint*, and a ruddy aspect of health, which do not comport with so considerable degree of phthisical disease."—"But I should say that I have seen the consolidation . . . . . undergo tubercular degeneration, and go on to phthisis, ending fatally. Then, too, when the deposit is considerable and unhealthy, and undergoes retraction to a great extent, it may, under a generally cachectic state of the system, end in death, commonly immediately due to dropsy. The expectoration in these cases of condensed lung with dilated air-passages is very commonly offensive. . . . . This fetor may be corrected by inhalations."

The *prognosis* of chronic pneumonia is more favorable in those cases where there is no tendency to tuberculous depositions, where the system does not suffer much, and where the patient is capable of moving about and exercising in the open air, than in an op-

posite condition of things. A diminution of symptoms, with an increase of weight and flesh is favorable; tuberculous signs are almost invariably unfavorable.

The *pathological apearances* will vary, according to the simple or tubercular form of the disease. In the former, the lung will be found more or less atrophied, and presenting red and gray indurations; sometimes the color will be light yellow, dark-gray, or black, or, these several colors may be present, giving a mottled aspect to the lung. Copland states that according to the tissues involved, the hepatization may "assume a granular or oolitic aspect, owing to the thickening of individual vesicles. In some cases, it appears streaked and veined from the hypertrophy of the interlobular septa and cellular tissue around the vessels; in others it is more uniform and darker in color. In this variety, the cellular tissue between the lobules is sometimes thickened to the extent of several lines, and is of a light drab or gray color, like that of miliary granulations, and like those has almost the density of cartilage." Tuberculous formations may often be observed, and when with the solidification there also exist tubercles, and irregular dilatation of the air-cells, the lung will often present a knobby surface.

The *treatment* of chronic pneumonia will consist of counter-irritation over the diseased region by means of the Croton Oil Liniment, or by pustulation with the Compound Tar Plaster; and great care should be taken not to produce exhaustion by any of the internal or external measures that may be pursued. Derivatives and counter-irritation, when not of a depressing nature, are among the most valuable means of treatment. Turpentine liniments to the chest and back, frequently applied, often produce excellent results. In other respects the same medicinal and hygienical measures may be pursued as named under Chronic Pleurisy. In the tuberculous form, or, when the symptoms strongly resemble those of phthisis, the treatment should be the same as advised for this disease. Indeed, the treatment will be, according to the predominance of symptoms, a well selected combination of the measures recommended under Chronic Bronchitis, Phthisis, and Chronic Pleurisy. Inhalations will be found much more serviceable in chronic pneumonia than in tubercular consumption.—The diet must be nourishing, and pure country air, healthful and happy associations, freedom from business and cares, moderate exercise, tonics for debility, chalybeates for anemia, etc, will be found equally as important as the other curative means employed by the medical man.

Pulmonary Œdema or *Œdema of the Lungs* may exist as a primary affection, and is frequently developed in the course of various organic lesions of the lungs, heart, liver, and kidneys. It is also associated with dropsies of other parts. In nearly all fatal pulmonary diseases, in mitral disease, in cardiac hypertrophy, and in Bright's disease, it is very frequently present. The malady consists of an exudation of a serous fluid into the cellular tissue between the pulmonary air vesicles, and into the cells themselves, giving rise to a slight increase in the size of the affected lung; when the infiltration occurs suddenly, causing death, it has been termed *serous apoplexy*. The *symptoms* are cough, difficult breathing, and expectoration of a frothy serum, which are more or less severe, and are much aggravated by exercise. In advanced cases there will be an inability to lie down on account of the difficulty of breathing it produces. Percussion gives a more or less dull sound over the infiltrated lung, an absence of the vesicular resonance, and a marked increase of resistance of the walls of the chest to the percussion stroke. Auscultation detects fine bubbling or the sub-crepitant rale, sometimes a crepitant; a vesiculo-bronchial, or bronchial respiration; and a feebleness or absence of the respiratory murmur.

The *pathological characters* of the disease are, an increase in the density and weight of the affected lung, which imperfectly collapses on opening the thorax, and which is of a pale-grayish, or yellowish color; it does not crepitate, but retains the indentation caused by pressure; when it is divided, a colorless, or yellowish, transparent fluid, frothy from the presence of air-bubbles, exudes in abundance. The *treatment* must be based entirely upon the pathological conditions giving rise to the œdema, and the particular symptoms that may present themselves. No precise mode of treatment can be laid down. Dry cupping, diuretics, and turpentine liniments, are among some of the means to be employed.

Pulmonary Gangrene, or *Gangrene of the Lungs* (*Necropneumonia*), is always the result of inflammatory action, and is more apt to occur in persons of broken-down constitutions, and of intemperate habits, as well as among those whose blood is impure. It may be diffused or circumscribed; the former being more apt to occur in the upper lobes of the lung; the latter in the inferior, and varying in size from that of a pea to that of small orange.

The *symptoms* are dyspnœa, pallor of countenance, quick pulse, excessive prostration, hemorrhage, and emaciation. But no diag-

nosis can be formed from them. The characteristic symptoms are a violent, convulsive, suffocative cough, and the expectoration of a green or brown matter, sometimes accompanied with a discharge of blood; both the breath and the expectoration are insupportably fetid, rendering the apartment in which the patient remains very repulsive. Dr. Williams states that a peculiar feature of the disease is, that when the abominably offensive expectoration has accumulated for a short time in the sputorium, it acquires rather a pleasant odor, resembling very nearly that of the cowslip.

The physical signs are dullness on percussion, being proportioned to the extent of the disease, and scarcely, if at all elicited when the gangrene is confined to a very small space. Auscultation will give, according to the stage of the disease, and over the affected portion of the lung, absence of vesicular murmur, bronchial respiration, augmented vocal sound, bronchophony, mucous rales, gurgling or cavernous sounds, and pectoriloquy. A sudden gangrenous odor, with the appearance of sloughy pulmonary tissue in the expectoration, is almost always due to gangrene. (*See Note*, page 539, *section* 26.)

The *pathological appearances* will be somewhat variable; previous to the sloughing the pulmonary tissue may be solidified. Œdema and inflammatory exudation may be present, as well as an emphysematous condition of some portion of the lung; there may also be evidences of bronchitis; and softened lung tissue with one or more cavities containing an offensive, purulent matter. Adhesions of the pleura, and of the lung, and false membranes lining the cavities may also be observed.

The *treatment* consists in supporting the strength by Bark, Wine-whey, nutritious diet, and other tonic measures; diminishing irritation by Opium, Opium and Camphor, or other sedatives; administering internally forty to sixty minims of Dilute Nitro-hydrochloric Acid several times a day, in some Glycerin; or Chlorate of Potassa with Bark, or Quinia, or Baptisin. And having the patient to frequently inhale the vapor of Chlorine; Creosote; Creosote and Chloroform; fumes from Coffee while being roasted; or other antiseptic vapors.—Cures have been sometimes effected by half-teaspoonful doses, repeated every four hours, of Solution of Chlorinated Soda, in conjunction with inhalations of Oil of Turpentine, to relieve cough, etc.;—teaspoonful doses, repeated three times a day, of Compound Tincture of Cinchona; or, of a mixture of Cod Liver Oil half a fluidounce, Syrup of Superphosphate of Iron one fluidrachm; mix for a dose, to be repeated three times a day,—counter-irritation over the affected side,—and generous diet, with

wine or porter.—Inhalations of the fine spray of diluted Carbolic Acid, and the same agent administered internally, have likewise been of benefit.

Melanosis of the Lung is a malignant affection characterized by the presence of a morbid production, of a black or blackish-brown color, and is sometimes associated with other morbid productions, as, carcinoma, fungoid disease, etc. Most commonly other parts of the body, besides the lungs, are affected with it. Its *causes* are unknown.

The *symptoms* are obscure at first; there may be impeded respiration, emaciation, cachexia, anemia, dropsical effusion, dyspnœa, purplish appearance of the face, and physical signs of consolidation. At an advanced stage, there is abundant expectoration, which is streaked with blood, or may contain some of the black matter. Death is produced from compression or obliteration of the large vessels and bronchial tubes, and by destruction, ulceration, etc., of the adjoining tissues. The melanotic product may be met with in irregular masses, in small dots or points, in thin, unequal plates, or in small nodules; what is termed the "tuberiform" variety of the disease is the most commonly observed,—it consists of smooth, irregular, or tuberculated tumors, varying in size from that of a pin's head to that of an orange, and which are of a globular, ovoid, or pyriform shape. The black matter may be either encysted or non-encysted. At a very early period the black matter is deposited in a fluid state, but becomes more consistent from absorption of its liquid parts; but it may be washed out of the tissues containing it. It colors the fingers black, is without any marked odor or taste, readily unites with water or alcohol, and slowly undergoes putrefaction when exposed to the air or kept in water. It is supposed to be the coloring matter of the blood highly carbonized. There is no positive means of diagnosing the disease. As it is an incurable disease, the only *treatment* will be to give tone to the minute capillary system by means of Tincture of Chloride of Iron; give strength and nourishment to the general system by good diet, Compound Syrup of Hypophosphites, etc.; and to arouse the energies of the system by well-regulated exercise, and other hygienical measures heretofore referred to. The symptoms as they occur will require to be treated on general principles.

Cancer, *Cysts* and *Hydatids*, and *Calcareous Concretions*, are occa-

sionally met with in the lungs, as well as, *Cancer*, *Ulceration*, *Serous Cysts*, *Cartilaginous* and *Osseous deposits* in the pleura, but as there are no positive symptoms or physical signs, by which either of these affections can be diagnosed during life, and no specific rules for their treatment, save "general principles," this notice of them is deemed sufficient.

CHRONIC DISEASES OF THE DIGESTIVE SYSTEM.

UNDER this head will be included chronic diseases of the mouth, œsophagus, stomach, intestines, peritoneum, liver, spleen, etc.

The principal affections of the *mouth* are, the various forms of stomatitis, which are more commonly met with among children, and which seldom assume a chronic character, unless complicated with some disorder of the digestive organs. These affections may be limited to either the palatine arch, the gums, the tongue, or the cheeks, and occasionally the whole of the lining mucous membrane of the mouth will be involved. They may be divided as follows:

1. *Simple ulceration*, in the form of very tender and sensitive superficial ulcers or abrasions, more commonly at the sides and tip of the tongue, which organ is usually redder than natural. They are generally associated with dyspepsia, or some transient derangement of the digestive organs. Regulation of the bowels, a proper attention to diet, and chewing the leaves of Prim (*Ligustrum Vulgare*), will ordinarily be sufficient to cure the ulcerations; if they do not yield to this treatment, they may be touched daily with a solution of Nitrate of Silver.—Sometimes, these ulcers may extend more deeply into the tissues attacked, having clean or foul bases, irregular or regular edges, with or without elevated and hard or callous margins, the result of irritation from rough teeth. The appearance of the ulcers depend greatly upon the condition of the patient and other surrounding circumstances. A proper attention to the teeth, to the digestive functions, and to the general health of the patient, will generally effect a cure. Constant irritation of a simple ulcer, by a rough tooth, may ultimately develop cancerous disease.

2. *Aphthous or Follicular ulceration* is more common among children. They are preceded by vesicles, and the ulcers are small, flat, oval or circular, single or in clusters, with well-defined margins, no elevation nor hardness, but a bright red areola surrounding them, and with smooth, yellowish or grayish, and somewhat sloughy bases. They are always associated with gastric or intestinal disturbance, and are accompanied by the development of a microscopic cryptogamic plant (*Oidium Albicans*), whose roots are implanted in the cellules of the affected epithelium. The disease may extend throughout the alimentary canal. The treatment consists in remedying the irritation existing in the stomach or bowels, by means of mild laxatives, as, the Compound Powder of Rhubarb and Potassa, etc.; and the local application of one of the following preparations:—A decoction of equal parts of Blue Cohosh and Golden Seal; a dilute solution of Perchloride of Iron; or a solution of Chlorate of Potassa,—and these fluids may also be administered internally. Tonics and alteratives will frequently be indicated, in addition. In some cases, a collutory composed of equal parts of finely-powdered Borax, and Honey; or, of one part of Hydrochloric Acid and ten parts of Honey, will be found successful. Solution of Sulphite of Soda, or a dilute Solution of Carbolic Acid, has also been found efficacious, administered internally, and also employed as a collutory.

3. *Strumous ulceration* is always associated with a strumous habit of body. It is preceded by one or more deep-seated, compressible, elastic, and somewhat tender lumps or tumors in the body of the tongue, which slowly proceed to central suppuration and ulceration, forming a small or large irregularly-defined ulcer, unequally excavated, with a thick, unequal margin, a flat, tough base, and a thickness and hardness of the surrounding parts. The treatment named under Scrofula will be useful in this disease, with local applications, to the obstinate abscesses, of a solution of Chloride of Gold and Soda, and the use of a nourishing diet.

4. *Syphilitic ulcerations* may be superficial or deeply seated. They may also appear in the form of deep fissures, alone, or accompanying more defined ulcerations. They may appear at the angles of the mouth, along the edge or upper part of the tongue, the roof of the mouth, and in the throat. When superficial, they are apt to be sore and sensitive; when deep-seated, they are usually preceded by firm, well-defined, inelastic lumps, which soften, and slough or

ulcerate at their centers. The borders of these ulcers are usually irregular, having no redness in or around them, are somewhat firm, and the ulcers are generally indolent. If any inflammation attends, this must be treated first, and upon its removal, the usual constitutional measures for syphilis may be pursued, with local applications of strong Nitric Acid, or, of a mixture of strong Nitric Acid three drachms, Nitrate of Silver ten grains; to be applied daily, or every other day, by means of a porte-caustic of soft wood. (*See Constitutional Syphilis*, page 448.)

5. *Cancerous ulcerations* are occasionally encountered; their treatment belongs exclusively to the department of Surgery,—though apparent cures have been effected in a few rare instances by local applications of Chloride of Zinc, or of Sulphate of Zinc, as well as with some of the preparations named in the Note on Cancer, page 490.

6. *Gangrenous ulceration* is more commonly the result of mercurial action, though supposed by many writers to be due to impure air, bad food, congregating children together, and to occur as a sequel to some of the exanthematous diseases of children, with whom, of course, a mercurial treatment had been pursued. It is sometimes termed Cancrum Oris. There is a tense and shining swelling of one cheek, with a red spot in the center, which is rapidly followed by a deep excavated ulcer, of an ash color, and covered with a brown slough; this is first perceived inside the mouth, and spreads more or less rapidly, destroying the cheeks, gums, etc., in its progress. The breath is insupportably fetid, the saliva putrescent, and the gums white, spongy, and separated from the teeth, or, dark, ulcerated, and gangrenous. The discharge from the ulcers is often very acrid, excoriating parts with which it comes in contact. If not speedily checked, death soon ensues. The treatment consists in keeping the bowels regular by laxative enema, or mild laxatives internally; and restraining diarrhea, when present, by astringent infusions, as, the Tincture of Chloride of Iron, or, Solution of Perchloride of Iron, and sustaining the strength of the patient by beef tea, wine, jellies, ammonia, etc.

Internally, Chlorate of Potassa, in doses of three grains to a child three years of age, may be given in some wine or water, and be repeated every four hours; together with some Tincture of Nux

Vomica, to stimulate the nervous system and prevent the formation of triple phosphates in the urine.

Locally, the surface of the ulcer (having first removed the gangrenous portion in order to reach the healthy tissue), must be washed by a saturated Solution of Sulphate of Zinc, repeating it from time to time as required. Or, strong Nitric Acid may be applied over the whole of the ulcerated surface, making the cauterization complete, and repeating the application every twelve hours, until the gangrenous action is checked. As these cauterizations are very painful, Chloroform, by inhalation, should be carefully employed, and the surrounding healthy parts should be protected from the action of the caustic.

7. *Fissures and Cracks in the Tongue* are frequently troublesome and obstinate to cure, often rendering eating and speaking very painful. Very often they give rise to deep ulcers having an offensive odor. Local applications of Borax one scruple, dissolved in Water and Glycerin two ounces, each, will be found useful; also a strong infusion of Geranium, Golden Seal, and Blue Cohosh, equal parts. Internally, I have found Balsam of Sulphur to be very efficacious. If the general health be impaired, Elixir of Iron and Cinchona, together with a solution of Bromide of Potassium will prove useful.

It must be recollected that, in most cases, redness or rawness of the tongue, either along its sides or over its whole surface, with pain, heat, soreness or tenderness, etc., of the organ, is indicative of some derangement of the organs of digestion, requiring the proper treatment for such derangements. The same may be said of those cases in which the surface of the tongue is covered with a white or brown coat, where its body is pale, etc.—Dr. C. Fleming, of Dublin, speaks very highly of a concentrated solution of Nitrate of Copper as a local application to deep ulcerated clefts in the tongue; the surface of the ulcer should be dried, the application made by means of a piece of soft wood covered with a strand of lamp wick, and then oil should be at once applied so as to cover the application.—Chlorate of Potassa in from five to fifteen grain doses may be given, with other constitutional treatment.

8. *Tumors, Growths, Hypertrophy and Prolapsus of the Tongue*, are sometimes encountered; but they belong more particularly to the department of Surgery.

9. *Cancer of the Tongue* is either of a scirrhous nature, affecting the proper tissue of the tongue, and commencing with a general or partial nodular enlargement, accompanied with darting pains, more or less difficulty in using the tongue, and a constant exspuition; eventually ulceration occurs, giving rise to deep excavations of a foul nature. Or, the disease may only affect the surface of the organ, being epithelial in its character, commencing by induration upon the surface, and terminating in a deep ulcer. The extirpation of the organ is the treatment usually advised in either form of cancer, and this, if undertaken at all, should be done previous to the ulceration, and at an early period of the disease before the neighboring glands have become implicated. Cures are said to have been effected by some of the local applications named in Note on Cancer, page 490.

10. *Neuralgia of the Tongue*, in which the pain is very acute, sharp, or burning and darting, without any abnormal appearance of the organ to the sight or touch, if not a premonitory indication of some cerebral disease, may be treated as advised under Neuralgia, page 282. When associated with other symptoms pointing to paralysis, apoplexy, etc., the treatment recommended for these affections must be pursued.

11. *Elongation of the Uvula* may be the result of repeated catarrhal inflammations, or, it may be due to relaxation of the fauces, as is often observed in follicular pharyngitis. It may also be present in chronic diseases of the air-passages, also in phthisis. It seldom occasions any uneasiness unless its free extremity comes in contact with the base of the tongue, the epiglottis, or surrounding surfaces, when it gives rise to a tickling sensation in the throat, a dry, irritative cough, a sense of uneasiness in the part, or, as if a foreign body was in the throat causing more or less constant efforts at deglutition; sometimes there will be a roughness of the voice, a tendency to vomit, or, even a feeling of suffocation. It is by no means necessary to truncate this organ in every case where it is elongated, as has been too much practised, heretofore, by medical men. When it is associated with digestive disorders, chronic faucial affections, or maladies of the air-passages, astringents and tonics applied to the uvula (together with the treatment for the primary disease,) will generally effect the cure, as, Alum, Tannic Acid, Tannic Acid and Capsicum, Geranium and Hydrastis, etc.,

which may be used in solution, infusion, or ointment. Sometimes Nitrate of Silver, applied locally, will be found useful. If the organ is thickened, indurated, and so elongated as to prove a source of annoyance, it may be partially, but never wholly amputated. But before this is undertaken, attempts to reduce it by applications of the following preparation should be made: Take of Iodine of Ammonium three drachms, Iodide one drachm, Ointment of Rose Water (or Glycerin) three ounces; triturate thoroughly together.

12. *Enlargement* or *Hypertrophy of the Tonsils* in adults may arise from repeated inflammatory attacks, and is usually associated with chronic disease of the throat; in children, it may follow as a sequence to scarlatina, cold, scrofula, etc. Chalky concretions, and cheesy tuberculous matter, are sometimes observed in hypertrophied tonsils. This affection becomes a serious one, only, when it interferes with speaking, hearing, or breathing, and even deglutition, and when it co-exists with follicular disease of the throat; in which cases, it should be removed by excision or caustic, only, when it presents the interference just noticed. When the tonsils are indurated as well as enlarged, various methods have been advised, as excision, enucleation by means of the index finger, or the careful application of caustic, as, Vienna Paste, Chromic Acid, London Paste, (a compound of equal parts of Caustic Soda and Lime, moistened with a little absolute Alcohol,) and applied about once a week;—as this paste has a strong affinity for carbonic acid, losing its properties by exposure to the air, it should be kept in a carefully stopped bottle. Vienna Paste may remain in contact with the tonsil for ten or twenty minutes,—London Paste not more than five seconds; if, in the application of these last named caustics, some other part is accidentally touched with them, Vinegar must be at once applied upon the spot to arrest and neutralize the caustic action. If the enlarged tonsil is in a state of inflammation, this must first be reduced before attempting its removal by excision or caustic, else serious mischief may result; the same rule holds good with elongated uvula.

In ordinary cases, and when the tonsillar hypertrophy is associated with, or is due to scrofula or tuberculosis, there is no necessity for the above treatment. The Iodide, or Bromide of Potassium, or of Ammonium may be administered internally, together with frequent local applications to the enlarged tonsils, of one of the following preparations: 1. Take of Iodide of Ammonium three drachms, Iodine one drachm, Glycerin two fluidounces; tri-

turate together until dissolved. 2. Take of Perchloride of Iron in solution, Glycerin, each, equal parts; mix. 3. Take of Tannic Acid two drachms, Glycerin one fluidounce; mix, and dissolve. 4. Take of Iodide of Zinc three drachms, Iodine one drachm, Glycerin two fluidounces; triturate together.—When these means fail and the enlargement becomes troublesome, its removal may then be undertaken by caustics or excision.

Small cysts in the tonsil are remedied by puncturing them; *ulcerations* of the tonsil may be treated by applications of Nitric Acid, or, by Tannic Acid, Nitrate of Silver, or Perchloride of Iron dissolved in Glycerin.

13. *Chronic Œsophagitis*, or Chronic Inflammation of the Œsophagus, may occur primarily, or may follow the acute form. The *symptoms* will vary in number and in severity, and may sometimes be so mild as not to attract the patient's notice until serious organic changes have occurred,—especially when the disease is idiopathic. More or less pain and a sense of heat or burning is generally present, which may extend from the upper part of the œsophagus to any point between this and the eighth or ninth dorsal vertebræ; sometimes, it will be experienced only at the inferior part of the pharynx and posterior to the glottis; at other times it will be felt back of the sternum and ensiform cartilage. The burning sensation may exist more or less constantly, or, it may only be experienced for an hour or two shortly after each meal. Not unfrequently the patient will complain that a sensation is experienced as if a tense cord, or a foreign body was in the œsophagus in one of the points above named. In other cases, a soreness or tightness will be felt under the sternum or between the shoulder-blades. Dysphagia is often present. Deglutition will augment the severity of these symptoms, especially in the advanced stage of the disease; and when the affection is located in the inferior portion of the canal, more or less hiccough is apt to be present. Substances, when swallowed, may give rise to cough, and are frequently regurgitated or ejected by vomiting. Eructations of an acrid character, or of a ropy fluid nature; short cough; frequent hawking or spitting; relaxed uvula; constipation; dyspepsia; a feeble, irritable pulse; emaciation, etc., may also be present. Chronic laryngitis frequently co-exists and sometimes masks the affection of the œsophagus.

Chronic inflammation of the œsophagus, though a rare disease, is always a serious one, and especially when it attacks those of

debilitated, strumous, or broken-down constitutions. It may be caused by cold, rheumatism, improper use of ice or iced drinks, obstinate dyspepsia, ingestion of stimulating, irritating, or corrosive substances, abuse of emetics, habitual use of alcoholic fluids, tight lacing, and frequently exists as a sequel of some eruptive disease. It may terminate in resolution, or in thickening and induration with a more or less strictured condition, or, in ulceration.

The *treatment* consists in regulating the bowels, skin, and kidneys, overcoming dyspeptic or other co-existing affections, and the internal use of agents that will act upon the walls of the tube, as, for instance, teaspoonful doses of a mixture of Soluble Hydrastin half a drachm, Iodide of Ammonium one drachm, Glycerin three and half fluidounces; to be swallowed slowly, and the dose repeated three or four times a day. Or, Hydrastin and Wayne's Cimicifugin may be used. Soluble Hydrastin, Hydrochlorate of Ammonia, Geraniin, Bromide of Ammonium, Aletridin, etc., may also be used in various combinations. And, sometimes, much benefit will be derived from a mixture composed of Powdered Golden Seal one ounce, Powdered Cubebs two drachms, Sulphur half an ounce; of this ten or twenty grains may be taken in a little water, repeating the dose three times daily.—Counter-irritation is always advantageous; the Croton Oil Liniment may be applied two or three times a day over the painful or burning points, or over the breast, epigastric region, and between the shoulders; or, a liniment composed of Croton Oil half a fluidrachm, Rectified Oil of Amber two fluidounces; mix. But the best and most effectual method of counter-irritation is by means of the puncturing instrument, to which the uncouth and jaw-breaking name of *dermabiotokon* has been given, and which should be freely and frequently applied over the breast and along the cervical and dorsal regions of the spinal column.

14. *Stricture of the Œsophagus* is of two kinds,—spasmodic, and permanent or organic. Spasmodic stricture, or spasm of the œsophagus occurs in nervous and excitable persons, especially among those who are subject to digestive derangements, spinal irritation, and disorders of the reproductive functions. The principal symptoms are, a difficulty or inability to swallow, pain and a sense of tightness in the affected locality, troublesome respiration, sometimes amounting to a suffocative feeling, and more or less anxiety. The attacks may occur periodically or irregularly, usually appear and disappear suddenly, and sometimes come on

while the patient is in the act of swallowing, and with such force and suddenness as to violently project the fluid or solid from the mouth. They also vary in severity and duration. The *treatment* consists in proper attentions to the digestive, renal, and cutaneous functions; counter-irritation to the spinal column; removal of the exciting cause; antispasmodics; and such hygienical and therapeutical measures as are advised in Hysteria and Reflex Paralysis. In some instances a solution of Nitrate of Silver passed into the œsophagus by means of a probang, will afford prompt relief.

Permanent stricture of the œsophagus is much less common than the spasmodic variety. It may be a result of acute or chronic œsophagitis, or it may be due to some morbid malignant condition of the walls of the tube; injuries and acrid or corrosive applications to the tube may also occasion it. The abuse of alcoholic drinks is said to be a frequent cause. It may occur at any age, and is more generally seated in the superior extremity of the œsophagus, at some part posteriorly to the cricoid cartilage; though it may be located at any part of it. Usually, but one stricture exists in the tube.

The *symptoms* are, at first, some transient difficulty in swallowing, with a sense of uneasiness in some part of the œsophagus; as the disease advances, the difficulty of swallowing increases, especially when solids are swallowed,—deglutition becomes slow, difficult, and painful, and the solid will frequently be felt lodged in the tube, passing, after a longer or shorter time, as if forcibly thrust through a narrowed passage. Finally, nothing but fluids will be able to pass into the stomach. In cases where the stricture is seated low in the tube, the portion above the stricture becomes very much dilated into a pouch or expansion, in which the food is retained for a longer or shorter time, and is then ejected by regurgitation, which is sometimes accompanied with a choking cough. With these symptoms there may be dyspnœa, spasm of the œsophagus, a sense of constriction in the canal, pain, soreness, expectoration of viscid mucus, flatulence, gastric acidity, constipation, palpitations, debility, emaciation, sensitiveness of the surface to atmospheric changes, despondency and mental anxiety, exhaustion, and death. But a person may live for many years with this disease, and then die of some other, especially when it is not associated with a malignant condition.

The disease may be readily detected by a careful examination with a gum elastic œsophageal bougie, which should be carried through the stricture in order to determine its extent. In spasmodic stricture solids are much more readily swallowed than

fluids; in permanent stricture the reverse of this occurs, fluids being more readily swallowed than solids.—It must be remembered that, even when the stricture is located at the inferior part of the tube, the patient will be apt to refer the more urgent symptoms to its superior extremity. (*See Nervous Dysphagia*, under *Chronic Gastritis.*)

Permanent stricture of the œsophagus presents a thickening and induration of the mucous lining membrane of this tube and the subjacent cellular tissue; the muscular tissue is rarely implicated, except in severe cases. This thickening occasions a narrowing of the passage, which may occupy only one side of it, or, more commonly, the entire periphery, forming a kind of ring, the aperture of which gradually diminishes in diameter, as the thickening progresses.

The *treatment* consists in an attention to diet and other hygienic measures; in restoring the general health and removing digestive derangements; and the careful introduction of bougies for the purpose of dilating the strictured part. The bougie should, at first, be introduced every four or five days, then every two or three days, and at last every day, increasing its size from time to time as the stricture yields, the same as in urethral stricture, allowing it to remain in the stricture each time, from one to three or four minutes. The bougies may be anointed with Glycerin, in which some Iodide of Ammonium, Bromide of Ammonium, etc., has been dissolved. All irritating applications must be avoided, lest the thickening process be advanced instead of arrested. The stricture having been overcome, ever afterward the patient should be very watchful of his general health, and should continue to repeat the introduction of the larger bougie, every two, four, or six months, as may be required.

The œsophagus is liable to other affections, some of which may be ascertained by means of the laryngoscope, but most of them are rare, very obscure in their symptoms, and have to be treated entirely on general principles; they are, *Ulceration; Congestion; Softening; Perforation; Cartilaginous; Osseous, and Cancerous Degeneration; Polypous growths; Paralysis; Hemorrhage; Gangrene*, etc.

CHRONIC GASTRITIS.

Chronic Inflammation of the Stomach may follow the acute form, but, in many instances, it may exist independently of any previous acute attack. The disease is often confounded with dyspepsia, and when this mistake occurs, if the usual treatment for the latter dis-

ease be pursued, much injury may be thereby accomplished. Chronic gastritis is, however, frequently accompanied with indigestion.

The *symptoms* of chronic gastritis are various, in many cases the only symptoms experienced will be irregular appetite, an uneasy sensation or a weight in the epigastric region, shortly after eating, and an increased redness of the body of the tongue. In others, several of the following symptoms will be present:

More or less distress, weight, fullness, distension, constriction, tormenting heat or burning, or pain is experienced in the region of the stomach, especially after eating; in many cases, pressure upon the epigastric region will produce a sense of soreness or pain, which may sometimes be so severe that the least pressure will cause the patient to cry out; the neighboring parts are not affected by similar pressure, unless the intestines participate in the chronic inflammation. Not unfrequently, spontaneous pains, more severe than those produced by pressure, will be experienced in the region of the stomach; and it is by no means uncommon for patients who have no spontaneous pains, or, very obscure ones, to be suddenly seized, either without any attributable cause, or after an ordinary meal, with severe pains in the epigastric region, and which continue for half an hour, an hour, or even all day. In other cases, instead of pain, there will be a sense of gnawing, of weight, of craving, of sinking, or of epigastric burning, the patients complaining that this is the hottest part of the body; with many, the ingestion of food and even of drinks determines a sensation of scalding, as if boiling water had been introduced, or else, as if "the food passed over a sore." The pains may be acute, dull, or lancinating, often shoot into the neighboring parts, and have their constant seat under the cartilages of the false ribs, being either fixed or alternating from one side to the other. Sometimes the whole abdomen is the seat of spontaneous pains; at other times, the anterior part of the thorax, at which point there often exists a very distressing sense of constriction with oppression and anxiety, which is probably due to sympathetic propagation of the pain from the cœliac plexus to the pulmonary. These pains, etc., may exist only when the stomach is empty, or, they may be present or aggravated when food has been taken into the stomach, generally, immediately after a meal, or an hour or two after. The epigastric region becomes tense and painful to any kind of pressure, whether it be a belt around the body, or the mere contact of the shirt. The patient feels his stomach, becomes dejected, incapable of acting; he keeps as still as possible, dreading to move lest he will have to reject the food by vomiting. Frontal headache, or a disposition to drowsi-

ness, frequently accompanies the gastric distress. In gastric diseases, soreness or pain will frequently be produced by pressure upon the first, second, and third dorsal vertebræ, more especially in cases where the serous tissue is affected.

The appetite is likewise variable; when there is some fever present, and emaciation, the appetite is feeble or lost; but when the malady is of a truly chronic form without any general re-action, the appetite is often very keen, more so than in health. In some instances, the least amount of fluid nourishment can hardly be retained upon the stomach, and it is a matter of astonishment to observe upon what a minute quantity of diet life will be maintained; in these cases solid food, or ordinary quantities of fluids, are almost immediately rejected. Sometimes the appetite is irregular, craving, gnawing, fastidious, or morbid, in which the most inappropriate articles are desired. Frequently, when the most craving appetite exists, a mouthful or two satisfies the patient, or occasions nausea. The thirst is as variable as the appetite, more commonly being augmented. The food retained upon the stomach is more or less imperfectly digested, occasioning acid or nidorous eructations, having the taste of the ingested substances, and which are sometimes so profuse and accompanied with such exhaustion as to be the principal symptom complained of by the patient, who asks to be rid of it at any price. Occasionally, particles of food will also be thrown into the mouth. Frequently a glairy fluid will be copiously thrown up from the stomach, without any particle, taste, or odor of the food or drink taken, and which is sometimes accompanied with a constant and most painful feeling of pyrosis. If there is no vomiting nor regurgitation, a slight ptyalism, evidently due to a minor degree of nausea, will be present. This is the most disagreeable accompaniment of digestion, especially when the fluid secreted is warm.—From the imperfect digestion of food, accumulations of gas take place, which, when passed by the mouth, are sometimes exceedingly offensive.—When the matter vomited is green, it may proceed from the abnormal secretion of the inflamed liver; this organ being often involved in the chronic inflammation.

In most cases the tongue is red, or perfectly natural; in others it has a tendency to dryness; sometimes it is smooth and clean, without presenting any dryness, nor more than natural redness. If the tongue be examined on several occasions, especially at periods when the patient has been without any drink for some time, we will sometimes find it very dry, but becoming moist very readily,—so that this is a very fugitive symptom, readily escaping a superficial and seldom-repeated examination. Frequently this organ will be very

red, or of a vermilion tint, with or without a tendency to dryness; this is a symptom of considerable importance, particularly if, at the same time, either deep and longitudinal fissures run through it, or, it is covered with prominent granulations or papillæ, which are much redder than the organ itself. Among those who have not been addicted to alcoholic drinks or the use of irritants, as well as those in whom the disease manifests itself without any attributable cause, from individual predisposition, from night watchings, from exhaustion, the result of insufficient alimentation, from a too sedentary life, from repeated pregnancies and suckling, or from severe mental troubles, the tongue is often tapering instead of being broad, is covered with a white or yellowish coat which is more marked toward its base, and bright red and granulated at its apex. In such cases, there is almost always an existing complication, either nervous, gastralgic, hypochondriacal, neuralgic, or, a general neurosis. Again, in other cases, the tongue will be covered with a coat of greater or less thickness, beneath which the redness of the organ will be very marked, and, in these instances, the tongue is frequently indented by the teeth; sometimes, this coat will only be observed in the morning, disappearing during the day. As a consequence of the state of the tongue, there will be an acrimonious or clammy taste, with dryness, roughness, or astringency, and which is communicated to the pharynx; at other times, there will be an unpleasant taste in the mouth, or a vitiated taste. Ordinarily, the gums are healthy, but sometimes they are red, congested, or soft, spongy, and readily disposed to bleed; this state may be complicated with aphthæ, or muguet, when the inflammation is very intense, or else toward the end of the disease, when the result is about to prove fatal. In many cases, there is a difficulty of deglutition due to slight inflammation of the pharynx and œsophagus; this symptom is not constant, and usually disappears under the use of demulcents; but sometimes it is very obstinate, leading the patient to believe that his disease is an angina instead of a gastritis.

Chronic gastritis is frequently accompanied with cough; generally, this cough is dry, and comes on by jerks, and consists of a sudden, slightly noisy expiration, without expectoration, occurring, as it were, without the patient being aware of it, he paying little or no attention to it; it is not preceded by the inspiratory effort, by which, in an ordinary cough, the patient prepares to expectorate. At other times, it may be much more severe and noisy, manifesting itself in paroxysms somewhat like the cough of pertussis; again, it may present all the characters of a bronchial cough, with mucous

expectoration. The pharynx, fauces, œsophagus, or larynx may be in an irritable condition, and frequently occasion the cough; and sometimes a fit of coughing will be followed by retching or vomiting. This cough seldom remains during the whole course of the gastric disease; it appears, disappears, and usually follows the phases of increase or diminution of the gastric inflammation; and if the disease becomes aggravated, the bronchial symptoms frequently increase in severity. Cases, proving fatal, have occurred in which the bronchial affection, with sibilant rales, dyspnœa, cough, and expectoration, being more annoying and wearisome than the gastritis, has appeared to be the principal malady, and which, although having appeared a long time after the stomach disease, had drawn off the attention from this latter organ,—this may happen more especially when the gastritis has not been noticed from the first. In some instances, the external symptoms of phthisis are present, and after several months, death occurs.—It is by no means uncommon to observe the ejection of food by vomiting followed by a relief of the cough.—In an advanced stage, the extremities become cold, emaciation ensues more or less rapidly, the patient becomes hypochondrical, and may linger out a term of years in constant misery.

There are very numerous shades in the symptoms and characters of chronic gastritis, according to which the general circulation is more or less affected. Generally, the symptoms are confined to the stomach; the pulse remains calm, the skin is cool, the urine clear, the sleep tranquil, and the strength, the embonpoint, the color of the face, undergo no change; the chronic disease reacts with difficulty upon the organism, so as not readily to communicate an abnormal impulsion to it. But it is not always so; sometimes, either from a certain predisposition, similar to that which occurs chiefly among sanguine subjects in whom the inflammation comes on from excesses in the quantity and quality of the food, or, from the violence of the inflammation, the pulse increases. If the tongue be abnormally red, the pulse will be found small, tense, and thread-like, and between eighty and ninety beats or more in a minute. Usually, however, with the exception of debilitated and emaciated cases, it presents a width and flexibility, although imparting a peculiar sensation of abruptness to the finger. There will be periods of the day when the pulse and the skin will be in a normal condition, but the circulation will become accelerated after a meal,—the arteries will beat forcibly, being often felt by the patient; the skin becomes moist, and thirst occurs; the same phenomena happen during the night, or after a slightly prolonged

exercise. At the same time, there is apt to be a feeling of general debility, drowsiness, or disorder in the head; the urine is high-colored, scanty, unnaturally hot on passing, and gives an abundant reddish deposit on standing; sometimes it is pale, turbid, and yields phosphatic deposits, instead of urates. Either an excess of urates, or of phosphates, or, crystals of oxalate of lime, are usually present. Leucorrhea, in females, often appears simultaneously with the chronic gastritis.—When the stomach alone is affected, constipation, either persistent or occasionally alternating with slight diarrhea, is present.

Chronic gastritis may exist a very long time, even for years, without the patient losing the appearance of good health. It is only when the fever or inflammation increases, that the patient emaciates, with change in the countenance, the complexion becoming cadaverous with the cheeks highly colored; and when the disease takes this unfavorable turn, it is seldom limited to the stomach, but extends to other organs, as, the liver, intestines, peritoneum, bronchi, etc.—Pure uncomplicated gastritis is not so frequently met with as when complicated with enteritis,—the "gastro-enteritis" of authors. Enteritis limited to the small intestines, is very rare; that limited to the large intestines or "colitis," is very common. The enteritis that accompanies gastritis may appear simultaneously with the latter, or, it may come on at a longer or shorter period after the gastritis has manifested itself. Then, in addition to the symptoms already named as proper to the gastritis, there will be a troublesome diarrhea, alternating with constipation; the quantity and quality of the stools being seldom natural. When the disease takes a more favorable turn, the stools become more frequent and less copious; they are consistent, but soft and yellowish, are not accompanied with the tenesmus of the more marked diarrhea, and have no feeling of heat, scalding, or acridity. The diarrhea in gastro-enteritis presents several varieties; in the more severe degree it may be as if purulent, mixed with blood, or else composed of a dark or blackish watery fluid, in which is contained round and hard fecal matters, (*scybala*), and of a fetid odor. Sometimes the diarrhea is very liquid with abundant mucosities, which have been compared to the scrapings of the intestines; or else, with flakes resembling fatty matter. In other instances, the matters passed are composed of half-digested food. Frequently yellow or yellowish stools will alternate with white and liquid ones. I have known patients to discharge from one to three quarts of a white, watery, more or less offensive matter, followed in an hour or two by an apparent healthy stool, and continuing this

daily for several months, without any debility being occasioned therefrom, or other unpleasant symptoms. Frequently, however, colicky pains will be experienced in various parts of the abdomen. Pressure is painful, sometimes on one point, sometimes on another; it is often general, and not limited to the epigastric region, as in simple gastritis.

The *causes* of chronic gastritis are many; it may occasionally follow the acute form of the disease, and frequently succeeds febrile diseases, as, small-pox, scarlatina, typhoid, typhus, etc., and more especially when the already enfeebled stomach, during convalescence, is overexerted or irritated by an excess of food thrown into it. It is very frequently produced by intemperance in eating and drinking, by excessive venery, masturbation, and by the improper employment of emetics and cathartics. Some individuals have a strong predisposing tendency to the disease.—Sometimes the cause is obscure. The affection is more common over forty years of age, and is more especially met with among the intemperate in drinking or eating. It is often associated with ulcers in the stomach.

The principal phenomena of chronic diseases of the stomach, are, inflammation, pain, augmented secretion of fluids or gas, vomiting, dyspepsia, or difficult digestion, and anorexia, or disgust for food. These symptoms, being more or less predominant according to the peculiar nature of the case, and occurring consecutively, or existing simultaneously with the same disease, have more or less attracted the attention of observers. Some of these have considered the increased secretion of fluids as the principal cause of the morbid condition; others have attributed it to the very abundant excretion of gas; a third class to inflammation; a fourth to gastralgia, etc. As a general rule, with the exception of the chronic inflammation, these symptoms are the effects and not the cause of the gastritis.—Certain of the symptoms of chronic gastritis and gastro-enteritis resemble those of other morbid conditions in which these affections are absent, and it is of importance to the practitioner to be enabled to establish the *differential diagnosis*. The principal affections to be discriminated from each other, are the following, viz.:

1. *Gastric derangement*, in which the tongue is large and coated with a yellowish-white fur, the taste is bitter, appetite lost, especially a disgust for meats, feeling of weight and fullness at the stomach, nausea, and vomiting of yellow and bitter matters. If the derangement extends to the intestines, colic, borborygmi, swelling of the abdomen, and alternation of constipation and diarrhea are present. But in gastritis we find in addition to the above symptoms, red spots on the tongue, or else a uniform red-

ness with a tendency to dryness, the tongue pointed, thirst, pain on pressure over the epigastrium, and more or less acute spontaneous pains. If the inflammation has extended to the intestines, there will be alternations of obstinate constipation and diarrhea, with tenesmus, spontaneous pains, as well as upon pressure over the abdomen, together with the symptoms heretofore named as characterizing inflammation of the stomach and intestines.—The progress of the disease will also give indications, as the symptoms of gastric disturbance are generally limited to several days or weeks, rarely to several months, while those of chronic gastro-intestinal inflammation persist a much longer period.

The causes of these two maladies equally assist in the differential diagnosis. The gastric disorder is produced by a sedentary life, the use of indigestible food, or of bad quality, cold moisture, and generally by any debilitating cause; while gastritis more frequently proceeds from excess of food, spices, alcoholic drinks, constitutional or acquired plethora, drastic purgatives, a sedentary life with succulent food, and generally by excitants.—When there is any doubt regarding the true nature of the disease, or when both elements are combined together, as sometimes happens, we may be obliged to establish the differential diagnosis by observing the effect of treatment, as to whether sedative and demulcent measures produce a better influence than emetics, laxatives, and tonics.

2. *Gastric Cancer*, in its early stage, is difficult if not impossible to determine from gastritis. In cancer, except when located at the cardiac orifice, a tumor is generally present, and may be detected during the progress of the disease, especially if there be considerable emaciation. The presence of the tumor in the epigastrium ; the severe lancinating, radiating pain, scarcely at all affected by food in the stomach ; the frequent vomitings of the alimentary substances ; the coffee-ground looking vomit ; and hemorrhage,—are pretty good indications of cancer of the stomach, a disease that rarely reaches two years, and generally but one. In chronic gastritis there is no tumor ; but pain and soreness at the epigastrium increased by food ; sometimes vomiting, but seldom, if ever, black or coffee-like grounds, but as described heretofore ; and but little hemorrhage, if any ; and the disease may be cured, palliated, or remain for a long time. The presence of gastro-enteritic symptoms, with clammy mouth, loss of appetite, laborious digestions, thirst, severe epigastric pains, colics, diarrhea, feeling of numbness in the limbs, slight febrile attacks without vomiting or tumor, or with frequent vomitings of food,—remaining persistently for a long time in an individual who has passed his forty-fifth year and who has had

up to this period a good stomach, should dispose us to suspect the presence of a cancerous degeneration.

3. *Gastric Ulcer*, the same as cancer, is difficult to diagnose in its early stage from gastritis. In ulcer of the stomach, the symptoms, at the commencement, resemble those of gastritis, but the prominent ones, are, the pain and the vomiting. There is no epigastric tumor; the pain frequently intermits, is greatly increased by the presence of food, but diminishes as this is digested; the pain is not lancinating, but may be a dull soreness, a burning, or a gnawing sensation, and is augmented under pressure; vomiting may or may not be present; profuse hemorrhage from the stomach is common, much more so, than in cancer, with paleness and debility. It may exist for an uncertain period.

4. *Gastro-intestinal Neuroses.* The principal phenomena are dysphagia, cardialgia, flatulency, vomiting, pain, and dyspepsia; these may exist isolated or combined, and may all complicate chronic gastro-enteritis. We must endeavor to determine when they are subordinate to a gastro-intestinal inflammation, for which purpose they will now be considered separately.

a. In *Nervous Dysphagia*, patients experience a great difficulty in making the alimentary bolus descend into the stomach; during the deglutition there is a sense of constriction at the throat, as if there existed a morsel which could not pass down. Usually, the appetite is good, and it seems to the patients as if they could eat considerable, but as soon as they have taken a few mouthfuls the whole is arrested in the throat, the face becomes much colored, a severe pain is felt under the sternum with a sense of oppression, of choking, prostrating the patient as completely as if he had been laboring beyond his strength. In the intervals between meals these phenomena are absent, and the patients affirm that although they can not eat, they feel well. At the same time they are very fearful, it seems to them like eating thorns, they carefully examine their dishes in order to remove the harder substances, limiting themselves to soups and soft articles of food, and, notwithstanding, either while drinking or eating, they will be attacked with a spasm, a sensation so painful that they fear suffocation. They are often such victims to their fears that they eat hardly anything, and become greatly emaciated. Nervous dysphagia often lasts a very long time, and presents frequent alternations of apparent cure and of spasms which prevent nearly all swallowing; it may persist for months or years, and then suddenly disappear without any appreciable cause. It occurs among nervous persons, those disposed to be anxious about their health, and who unnecessarily alarm themselves concerning it.

Dysphagia associated with chronic gastritis is rather seldom to be met with, and has a regular progress; it is not manifested by transient spasms followed by a readiness in swallowing, but by a habitual difficulty of swallowing with a sense of choking as if the food remained in the throat; there is frequently exspuition of mucosities in the morning and at the end of a meal, with rejection of particles of food, especially of bread. This dysphagia is more frequently the result of a true pharyngitis, because the irritating substances which have acted on the stomach, as, liquors, spices, etc., have also exerted an influence upon the pharynx. Sometimes a slight cough will be observed, the voice somewhat changed in quality, with traces of chronic inflammation, and especially granulations of the pharynx. The general constitution is different, instead of a nervous condition with tendency to hysteria and hypochondria, we will notice a plethoric constitution; the patient relates his symptoms without exaggeration and without any particular alarm, simply complaining of a difficulty in swallowing, without thinking of any danger of choking. The disease disappears gradually, but never so suddenly as in nervous dysphagia.

b. Nervous Vomiting. When there exists an obstinate vomiting, unyielding to ordinary measures, the first thing to be done, is to be assured that it is not sympathetic with pregnancy, or with any morbid condition of the uterus, brain, liver, or kidneys, as is frequently the case. These causes being absent, and the vomiting recognized as idiopathic, it must then be ascertained whether it be due to cancer, simple ulcer, or softening of the stomach, or, to poison; or, whether it be nervous and due to chronic gastritis.

Nervous vomiting must then be established by exclusion, that is, when we can recognize no other appreciable cause that will explain it in a satisfactory manner; it is, par excellence, the idiopathic vomiting. It may be considered as due to a morbid exaltation of the nervous system of the stomach, so that this organ rejects as injurious to it, all ingested substances. There are cases in which this morbid exaltation is perfectly appreciable; thus, without any traces of fever, without loss of appetite, the tongue being clean, and the urine clear, the patient experiences great thirst without any heat or burning in the stomach,—and the ingestion of any substance, whether fluid, or solid, instantly provokes the vomiting. There is frequently excessive pain upon pressing over the epigastric region, appearing and disappearing with a singular rapidity. This form of vomiting may last many months, causing great emaciation, and resisting every medicine administered for its removal; and it has likewise been permanently

cured, with a rapid return to health and strength, merely by properly influencing the patient's mind. Quinia, Belladonna, Cimicifuga, Stramonium, Aletris, Scutellaria, epigastric counter-irritation, cold douches to the back, tepid baths, regularity of bowels, attention to the skin, and easily digested food in very small quantities, are the means to be employed.

Nervous vomiting may be distinguished from that produced by gastritis, by observing, in the first, an absence of inflammatory symptoms, a clear and naturally red tongue, and limpid urine; in the latter, the tongue is abnormally red, or with red points, or dry; epigastric pain is more continuous and does not cease abruptly; the vomiting is not so obstinate, it does not occur with all ingested substances; and food or mild medicines are much better supported, and do not determine acute pain. The vomiting ceases gradually, and does not disappear suddenly and without a return, as sometimes occurs in nervous vomiting; besides, diarrhea, febrile action during the night, red and lateritious urine, symptoms which reveal the presence of inflammation, are often observed. Nervous vomiting is more frequent among the young, especially young females; the vomiting of gastritis may occur at any age, and in either sex.

c. Cardialgia; under this name is here meant those pains, usually acute, that are felt in the region of the ensiform cartilage, shooting toward the sternum or one of the sides of the chest, and frequently accompanied with a flatulent or gaseous noise. In ordinary instances, the diagnosis of cardialgia is combined with that of gastralgia; but occasionally the pain is only felt at the moment of swallowing, and is absent during the interval between meals. It seems that each mouthful of food, that each draught of fluid descends with difficulty, is arrested at the region of the ensiform cartilage, and passes onward from this region with severe pains, feeling as if the substances were passing over the surface of a sore. This suffering continues for some time after the meal, then wholly ceases to re-appear at the next meal. These symptoms appear to establish the inflammatory character of the disease; however, they may be nervous or spasmodic, or else be due to a simple congestion and disappear in a few hours or days.

d. Flatulency. In the majority of cases of chronic gastro-intestinal affections, gas is developed in the stomach, often in enormous quantities, and escapes by the mouth with a convulsive singultus over which the patient has no control, and is usually accompanied by a more or less severe burning eructation; sensations of choking, and of difficult respiration, with unpleasant feelings in the limbs,

are likewise experienced, and, sometimes, the flatulency proves extremely annoying to the patient. The flatus is almost always insipid and inodorous, which distinguishes it from the acrid eructations which accidentally occur in cases of indigestion.—When the gas is developed in the intestines, it gives rise to more or less swelling of the abdomen, with dull, noisy rumblings. These abundant secretions of gas may be due to a want of nervous energy, but they may also originate in a chronic inflammation of the digestive canal, as manifested by a very red, pointed tongue, which preserves the impression of the teeth; pain in the epigastric region; good appetite; very difficult digestion; sensation of heat or burning along the œsophagus; and lateritious deposits in the urine.

e. Idiopathic Dyspepsia is more especially the result of sedentary living, of great mental exertions, of a diet not varied enough, and composed of amylaceous articles which do not sufficiently stimulate the stomach; and is frequently cured by a country residence for a month or two, conjoined with exercise and a cessation of mental labors. In these cases, the tongue is usually pale or whitish, often covered with a mucous coat, there is no abnormal thirst, no desire for food, and without any marked distaste, nausea, sometimes vomiting of ingested substances, heaviness of the stomach without acute pain, difficult stools, pulse slow and feeble, skin rather below the natural temperature, heaviness of the head, sometimes headache, general prostration, and an inability to labor constantly without producing extreme weariness.—These symptoms enable us to establish the differential diagnosis between idiopathic dyspepsia and chronic gastritis. In the latter, the tongue is red and dry; there is a distaste for food, or else a very keen appetite; digestion is painful; there is thirst; some febrile action; and the cause of the affection is likewise of a different character.

f. Gastralgia is characterized by acute, lancinating, or dull pains, by cramps, a sense of burning, heat, smarting, twisting, constriction, etc., in the region of the stomach. It often changes its character, giving sensations of twitchings, vacuity, insatiable appetite, or contusion in the epigastric region. With some there is a fearful anxiety which returns every little while, the patients seeming to apprehend that some misfortune is about to happen to them. These peculiar symptoms, their mobility, their rapid succession, are presumptive indications of neuroses, and will serve to distinguish the gastralgia from gastritis, in which the pain is more continuous, less subject to momentary absences, and does not present the changeableness of that of simple gastralgia. Besides, the condition of the

tongue, the pulse, the urine, digestion, and general constitution will aid in confirming the diagnosis.

There is a mild form of chronic gastritis that I have frequently encountered, which is often attributed to indigestion, or to hepatic torpor, and which may continue for many years without its true nature being suspected, finally proving serious. It is more common among corpulent persons, though spare habits are by no means exempt from it; and those who use freely of spices, of articles not readily digestible, of alcoholic drinks, etc., as well as those whose diet is principally of an amylaceous character, and who are of sedentary habits, are more especially subject to it. In most instances, it is associated with an extension of the low grade of inflammation into the intestines. The symptoms are, a redness of the fauces; slightly increased heat of the mouth; lips dry; the patient frequently picking off the dried mucous covering of the under lip; tongue slightly redder than usual, or natural; a sense of heat in the epigastric region, and sometimes along the œsophagus, accompanied with thirst, and which is much relieved by cold drinks; sometimes, stimulants or carminatives will temporarily relieve the heat or pain, should the latter be present; at about the usual meal-time the appetite is frequently very intense, and is accompanied by a sensation of heat and gnawing in the epigastric region, the patient feeling hardly disposed to wait until the meal is fully prepared,—and the first mouthful or two immediately relieves all these urgent sensations; a bad, clammy taste in the mouth in the morning; an indisposition to exercise; slight irregularity of the appetite, and of the bowels; frequent attacks of gastric acidity; flatulency; itching of the surface, especially at night; urine changeable. Certain substances when eaten, either distress the stomach very much, or if the intestines be also affected, cause a sudden attack of diarrhea, the discharge being watery, light yellow, more or less slimy, of a very offensive odor, and frequently accompanied with pain,—this is the case, especially, when eggs, custard, milk, certain fruits, beer, ale, etc., are swallowed. In some cases, the flatus and diarrhea are very annoying and painful, coming on at unexpected and undesirable times, with strong tenesmic pains in the rectum, which are relieved upon the evacuation of the usually fetid flatus, or of the fluid, very offensive fecal matter.

These symptoms, it must be borne in mind, are, at first, often so slight as hardly to attract attention of either the patient or physician, may continue during the whole year, and may persist for many years without being very much increased in severity. Sometimes, they may be present for a few days, then, after a few weeks or

months, re-appear, and so continue, *very gradually* becoming more and more severe and troublesome, and, as a general rule, are attributed to dyspepsia, or biliary derangement,—and I have no doubt but that fatal diarrhea, and even cholera, has resulted from the treatment pursued in these cases, from a mistaken idea of their true character. The symptoms are, however, more apt to manifest themselves, so as to more particularly call the patient's attention to them, during the hot seasons, and especially in the early summer months; the patient finds his bowels to "get out of order," having diarrhea, in some instances, from the most trivial causes, or from the slightest changes in diet, and which diarrhea often obstinately resists the usual treatment, or may, in some cases, be at once checked by a draught of raw brandy and peppermint. When called to cases of this kind, if the practitioner will carefully investigate them, he will ascertain that, in each instance, the patient has been more or less subject to the symptoms heretofore named for one or several previous years.

The *treatment* I have found the most successful in these cases, is an especial attention to diet and regimen. Using nutritious diet, easy of digestion, and in moderate quantities; keeping the bowels regular daily, by diet if possible; frequent bathings of the whole surface of the body; moderate exercise every day in the open air; an avoidance of all stimulants, spices, tea, coffee, etc., also of exposures to cold; or to sudden changes of temperature; as well as of all kinds of excesses. A cold infusion of equal parts of Witch Hazel Bark, Solomon's Seal, and Leptandra, should be taken in tablespoonful doses, four or five times every day; sometimes, the addition of an equal proportion of Quassia to the above, will be of service. Ptelea, Hydrastis, Barberry, Sheep Laurel Leaves, Colombo, Chamomile Flowers, and Sassafras, are agents that may be advantageously employed in various combinations with each other, or with the articles named in the preceding sentence. In a few cases, anodynes with or without Trisnitrate of Bismuth, have been useful. In the warm summer months, when not otherwise contra-indicated, cold water poured upon and along the spinal column, will be of great benefit; it should be repeated every morning, immediately after rising. And this course should be perseveringly pursued for several months, in order to effect a permanent cure.

In forming a diagnosis of chronic gastritis, it must be recollected that, as a general thing, if amylaceous and milky food is better tolerated, or disturbs to a much lesser degree the digestive functions, than a purely animal diet, or even meat soups or broths, it is indicative of irritation or inflammation; if, on the contrary, an animal

diet, or meat soups, are better supported, or produce less gastric disturbance than the amylaceous and lactic diet, it is indicative of gastric atony, or of a dominant atonic element co-existing with the symptoms of the gastritis, and for which mild tonics, stimulants, etc., are proper.

The *prognosis* depends very much upon the circumstances attending each individual case. When the malady is recent and uncomplicated, it may be cured in the course of a few weeks; but if it be of long standing, a year or two may be required for the recovery. In the advanced periods of the disease, the prognosis is unfavorable, especially when aphthous ulcerations appear upon the tongue and inside the lips, indicating approaching dissolution. Sometimes the disease terminates in ulceration, softening, or gangrene of the stomach.

However mild the case may be, if the accompanying diarrhea has existed for several months, or even years, a rapid cure will seldom be obtained. The diarrhea should never be suddenly checked, and especially by means of astringents and opiates, for the patient may thereby be greatly injured; for, when suppressed by proper measures, and with much greater reason when suddenly checked by improper means, it is apt to return either without any appreciable cause, or under the influence of the slightest causes, such as, a cold, a slight error in diet, a moral impression, or the production of more than ordinary fatigue. A resumption of the proper treatment will overcome this recrudescence; generally, however, the patient becomes discouraged after several successive relapses. But, the physician should encourage him to rigidly persevere in the necessary treatment, which is, of course, tedious and not pleasant; for in long-standing cases, perseverance alone will be crowned with success,—the intervals between the relapses become more and more lengthy, until finally the relapses will cease altogether. Each set-back will also be less severe, less durable, than the preceding one, and will yield under the influence of less energetic measures. A cure once effected, the patient will at first be able, with prudence, to adopt a course which otherwise would certainly have resulted in a relapse; he will be able to eat nearly every article of food indifferently, and occasionally to exceed the necessary limits, to fatigue himself, and to resist indulgences, which previously would have proved prejudicial to him. But, if the disease is of very long standing, the derangements well marked, the acquired or congenital constitution bad, and if, as is frequently observed, the patient will not confine himself to the proper regimen and treatment, during the necessary time,—if he will not renounce

the habits which are often the commencing point of the disease,—a cure will be impossible, and the various symptoms common to the malady previous to its fatal termination, will successively manifest themselves.

If the symptoms become greatly aggravated, other morbid phenomena frequently become associated with the gastritis, among which may be named hepatic congestion, hepatitis, changes in the biliary secretion, jaundice, etc. When the chronic inflammation is limited to the stomach, we are more apt to observe complications of the liver manifesting themselves, probably because that when enteritis is conjoined with it, the accompanying diarrhea favors the disgorgement of the hepatic secretion. In case of gastro-hepatitis, occurring after several successive attacks of simple gastritis, the mouth will be found dry, the thirst more intense, the appetite lost, the constipation obstinate, together with swelling of the epigastric region and tenderness on pressure, pain shooting beneath the hypochondriac regions, sometimes quite severe in the sides, at other times, unchangeable, occupying the right hypochondrium, the iliac region, and often the right side of the chest. When the pain increases, the patient becomes agitated, sleepless, uneasy, lies upon his abdomen, but without the sufferings, cries, and violent agitation met with in true hepatic colic, which his condition somewhat resembles. The complexion is wine colored, the circulation calm, the urine scanty, brownish yellow, and turbid. When symptoms due to the liver are manifested, the patient without being confined to his bed will observe that his complexion is yellow. The icterus will attain its maximum of intensity upon the fourth or fifth day; then the more severe pains diminish very sensibly or cease altogether; the jaundice is yellow, approaching a brown color; the stools are scant, at times of a saffron yellow, rarely gray, that is to say, the course of the bile as a general rule is not completely interrupted. These symptoms disappear slowly, sometimes in three or four weeks, at others in several months. The least error in diet readily occasions a relapse. When the termination is about to be fatal, after a certain number of relapses, we frequently observe the patients to gradually decline, while symptoms resembling those of what is called adynamic fever, present themselves. When enteritis is associated with the gastritis, there is a want of assimilation of the food, and a morbid change in that which is absorbed; a deterioration of the elements necessary for a proper hematosis is thus produced, from which results, general emaciation, anemia, loss of strength, dry skin, and more commonly, anasarca, with or without peritonitis.

This complication, or rather, this frequent termination of chronic gastro-enteritis demands especial attention, because it presents one of the most alarming forms of the disease under consideration, and also because, we are seldom called to a case of the kind until these symptoms have manifested themselves, and may then be erroneously led to believe that we have only a case of simple peritonitis to treat, or else, be at a loss to determine the cause of the anasarca. The information that may be elicited will show that the commencing point of the symptoms before us was some derangement of the digestive canal, to which attention was not given, either from negligence, or ignorance of their true value, or, because these symptoms often have their origin in habits of intoxication, or of gluttony, which the patient wishes to conceal.

In cases of this character, the gastric symptoms are very manifest; we find the tongue vividly red, often dry, intense thirst, frequent vomitings, loss of appetite, and very obstinate constipation alternating with diarrhea. This form of gastro-enteritis is chiefly observed among individuals who are given to alcoholic drinks, who have almost wholly lost their appetite, eating salted foods, spices, cheese, etc.,—but nothing really substantial. After a longer or shorter time, sometimes a few months, at others several years, from the constant use of such food, the blood, deprived of a great part of its plastic elements, becomes defibrinized; and it is not rare to observe the blood readily escaping, occasioning sero-sanguineous effusions, or, protracted hemorrhages from the anus, the nose, gums, or bronchi. From the same cause, the serous elements of the blood, being in excess, and no longer retained by the normal plasticity of this fluid, become separated and determine those serous accumulations in the cavities and in the cellular tissue, which form one of the terminations of gastro-enteritis.

In some instances, after having existed a certain time, chronic gastritis becomes complicated with headache, attacks of vertigo, and the patient may perish from an apoplectic attack. The frequent repetition of similar cases, leads to the belief that they are not simple coincidences, but bear the relation of cause and effect, and which is of great value in the prognosis. It may be remarked here, that the same causes that give rise to gastro-enteritis, as, alcoholic drinks, high living, troubles, etc., equally induce cerebral affections, and that, in a number of acute or chronic diseases of the digestive tube there are frequent cerebral complications. And there is reason to believe that, when chronic gastro-enteritis is complicated with persistent headache, or attacks of vertigo; when the patient's ideas flow more slowly, and he is more sensitive to

impressions, some organic change of the brain is to be feared, especially softening.

As heretofore observed, cough, and even a severe bronchitis may complicate simple gastritis. But we must never lose sight of the possibility of a tuberculous element, especially if the parents labored under this affection, or if the general constitution of the patient is weak; because, it is by no means rare, after several years of diarrhea with dyspepsia, or of imperfect digestion with symptoms of gastro-enteritis, to observe symptoms of pulmonary phthisis manifesting themselves to terminate the scene.

Gastro-intestinal neuroses frequently complicate gastro-enteritis, and may persist after the inflammatory symptoms are almost entirely removed, so that it will be difficult to distinguish their origin. This is an embarrassing complication, as the practitioner may be misled by the neuroses and administer nerve remedies, instead of those designed to remove the chronic inflammation. But in doubtful and complex cases, where one class of remedies appears to produce injurious or undesirable effects, the administration of those of the other class will frequently be attended with good results. The removal of the inflammatory symptoms may not always be followed by the disappearance of the gastralgia, in which case, the appropriate nerve remedies will be found efficacious.—Other complications may exist, but it is unnecessary to refer to them here.

The *pathological appearances* of chronic gastritis, are somewhat similar to those observed in the acute form, but less marked. There may be a slight redness of the lining membrane, or it may be very pale. In persons of intemperate habits in eating or drinking, it may present a dark-reddish brown color, a slate gray color, or the villous membrane may be blackish-blue, with thickening, induration, etc.; the hypertrophy, when confined to the follicles gives a warty appearance; when confined to the villi, velvety or fungoid prominences may be observed. The pyloric portion is generally hypertrophied also, and is very apt to be the principal seat of the chronic inflammation. Sometimes, portions of the mucous membrane may be softened, broken down, or wholly destroyed; and occasionally ulcerations may be observed. Instances have occurred, in which no organic changes whatever, had been detected on dissection. Sometimes, atrophy will be present; or, a combination of hypertrophy and atrophy,—thus, the muscular coat of the organ may be atrophied, while the submucous cellular tissue is more or less hypertrophied.

In the *treatment* of chronic gastritis, or gastro-enteritis, there

are three very important points, a neglect of either of which will render a cure doubtful, these are,—perseverance in the proper measures; time, for no cure can be made where there is haste, or attempts to cure quickly; and a correct regulation of diet. Wine, alcohol, coffee, tea, spices, and all acrid, irritating, or indigestible substances, must positively be avoided. As drinks, various articles may be allowed, bearing in mind the degree of inflammatory action present, and the influences resulting from the use of the fluids allowed; thus, gum arabic water, rice water, barley water, toast water, arrow-root, buttermilk, whey, lemonade, made without the peel, acid syrups, as of gooseberry, cherry, strawberry, raspberry, etc., or decoctions of the same fruits, when in season and fresh. The syrups made with glycerin will prove less irritating than those with cane sugar. A drink composed by adding a fluidounce of Lemon Syrup acidulated with Lemon-juice or Citric Acid, to a solution of half a drachm of Bicarbonate of Potassa in two and a half fluidounces of Water, and drank while effervescing, forms a very grateful and useful draught; it may be repeated two or three times a day. When the inflammatory action is less urgent, other more nutritious articles should be permitted, being careful, however, to omit them as soon as any unpleasant results follow their use; thus, oysters, tender venison, animal jellies, tender beefsteaks, poultry, birds, etc. A tea of veal, salted, and flavored with some leguminous plants will be found very mild, and easy of digestion; it generally facilitates regular alvine evacuations, and frequently arrests diarrhea, for which it is ordinarily useful; about an ounce of veal may be used with a quart of water. Should the patient have a craving desire for some article of food not considered proper by the physician, it will sometimes be the case that a gradual and cautious use of it will be followed by permanent benefit; but this does not apply to irritating or indigestible articles. Excessive thirst, or a morbid desire for beer, wine, brandy, etc., may often be overcome by gargling ten or twelve times a day with cold water, or acidulated water, by chewing small pieces of ice, and by the use of warm baths. No solid food should be allowed to pass into the stomach until it has been slowly and thoroughly masticated; and the meals should be held at regular hours. Where there is great debility, and the stomach is very irritable, it will be better to have several meals a day, partaking only of a small amount of nourishment at each. Milk frequently occasions nausea, sensation of weight in the epigastrium, heartburn, diarrhea, etc., and should not then be allowed; among those with whom it agrees, clotted milk will also be found beneficial.

Moderate and gentle exercise is allowable where the strength of the patient will permit, and no unpleasant symptoms result therefrom, as, walking, riding, or sailing, etc.,—but violent or long-continued exercise must be prohibited. The society of cheerful persons is always to be preferred. Frequent bathings of the surface with a stimulating and weak alkaline solution, will be serviceable, especially when considerable friction is employed in drying. The patient should sit and stand erect, keeping his shoulders well backward, so that the inferior extremity of the sternum can not make undue pressure upon the stomach; and this position should also be maintained as much as possible when in the recumbent position.

The therapeutical measures will depend considerably upon the symptoms which present themselves; if there be much epigastric heat, dryness of the mouth, thirst, pain or tenderness either spontaneously, or upon pressure over the epigastrium, an infusion of Marsh Mallow and Peach Leaves may be used, adding to each dose, five or ten drops of Tincture of Sheep Laurel Leaves, so that twenty or thirty drops of this tincture may be taken per day, according to its effects. Or, the following may be used: Take of Trisnitrate of Bismuth two or three grains, Opium one-third of a grain; mix for a dose, and repeat two or three times a day. Sometimes, Sulphate of Iron in doses of half a grain, made into a pill with a grain of Extract of Hyoscyamus, or,—in powder with Sulphate of Morphia one-eighth of a grain, Sugar of Milk five or ten grains, and repeated two or three times a day, will prove decidedly beneficial. At the same time, counter-irritation must be applied to the epigastrium, and continued until all the urgent symptoms are removed; in some cases, sinapisms will answer; in others, the Croton Oil Liniment may be required, the Dermabiotokon, or even the Compound Tar Plaster. Frequent bathings, diaphoresis, and diuresis, will be found very valuable adjuncts to the above measures, especially in plethoric or congested conditions. It may be that the disease will not improve under the use of demulcents, sedatives, and counter-irritants, being due to, or associated with, neuroses, in which case tonics, iron, antispasmodics, etc., will be required.—After the more urgent symptoms have permanently subsided, the above-named measures may be dispensed with, and non-stimulating tonics be employed; as, half-fluidounce doses of an infusion of equal parts of Golden Seal and Solomon's Seal; or, of Ptelea; or, of Solomon's Seal and Witch Hazel, which is especially useful in long-standing cases. These give more vigor and energy to the digestive powers, and restore the mucous membrane

to health; other bitter tonics have been employed with advantage, either alone or in various combinations, as, Colombo, Gentian, Dandelion, Aletris, Small Centaury, Chalybeate draughts, etc. The addition of Bromide of Potassa, or Bromide of Ammonium to these infusions, has proven very useful in many cases of long standing, probably by assisting in more quickly removing thickened and indurated conditions, etc.

In some cases, where there is considerable epigastric heat and tenderness, with a shining, smooth tongue, the following pills have proved very useful: 1. Take of Nitrate of Silver ten grains, Subnitrate of Bismuth ninety grains, pulverized Black Cohosh forty grains, Alcoholic Extract of Conium thirty grains; mix, and divide into forty pills—dose, one, three times a day. 2. Take of Oxide of Silver four grains, Alcoholic Extract of Aletris twelve grains, pulverized Colombo, q. s.; mix, and divide into twelve pills—dose, same as the preceding. 3. Nitrate of Silver has also been injected into the stomach by means of a stomach tube having one-eighth of an inch bore, and a number of small orifices at its gastric extremity, so that the fluid may be thrown outward and upward on the walls of the stomach. A solution of one to four grains of the nitrate in three fluidounces of water, may be injected at one time, repeating it every one, two, or three days according to circumstances. It sometimes causes pricking sensations, pains, or nausea and retching, which soon pass off. While using the injections, the patient should be confined to small and frequent meals of milk, adding tapioca to it as he gets better.

An atonic condition will frequently be found to succeed the inflammatory, there being a deficiency of nervous energy of the stomach, for which a degree of stimulation will be required, and to produce which one or more of the following agents may be used: Copaiva, Oil of Tar, Turpentine, Cubebs, Benzoic Acid, etc.,—and which will be found valuable; but great care must be taken not to employ them at any other time, as they will be apt to augment the symptoms. I have derived considerable benefit in these atonic cases, from the use of the following mixture: Take of Fluid Extract of Cubebs four fluidrachms, Mucilage of Gum Arabic one fluidounce, Essence of Lemon thirty minims, Lupulin, Trisnitrate of Bismuth, each, four scruples; mix. The dose of this is a fluidrachm, to be repeated three or four times a day, shaking the mixture well immediately previous to taking it.

The bowels must be kept regular, but all drastic or irritating cathartics must be carefully avoided, as they will tend to aggravate the symptoms. Rhubarb, in doses of from three to ten or more

grains, as may be found necessary, taken in a little water, and repeated three times a day, will frequently answer; or, in cases of acidity, it may be combined with half its weight of Bicarbonate of Potassa, or Bicarbonate of Soda. One gentle evacuation per day, is sufficient—but never to exceed two. Other laxatives may be used, as, Rhubarb and Manna; Senna and Tamarinds; Citrate of Magnesia; or, a mixture of Bicarbonate of Soda and Magnesia, each, fifteen grains, daily. When nausea and vomiting are also present, fluid Magnesia will frequently prove useful, or, the addition of a drachm or two of Carbonate of Magnesia to a pint of Water highly charged with Carbonic Acid, and taken during the morning, one-fourth at a time, repeated every half hour or hour. The addition of Leptandrin, or Podophyllin, to the laxative medicines, will be very valuable in cases where the liver is also involved in the inflammatory action.—Obstinate vomiting is often relieved by dry cupping over the epigastrium.

Diarrhea may be overcome by an infusion of Epilobium; or, by teaspoonful doses, repeated every hour, of a mixture composed of Compound Syrup of Rhubarb and Potassa four fluidounces, Tincture of Prickly-ash Berries one and a half fluidounces, Elixir Paregoric six fluidrachms; mix. In connection with these agents, injections will prove decidedly useful, as: Take of Compound Tincture of Virginia Snakeroot one fluidrachm, Water one fluidounce; mix for an injection, and repeat every hour or two; or, an infusion of equal parts of Solomon's Seal and Witch Hazle, may be injected. In cases of excessive debility, and where diarrhea occurs upon the least exertion, the following will be found a valuable injection:—Take of Tincture of Prickly-ash Berries one and a half fluidounces, Saturated Tincture of Nux Vomica one fluidrachm; mix. To a tablespoonful of an infusion of Solomon's Seal add a teaspoonful of this preparation for one injection, which should be retained in the bowels as long as possible, and be repeated three or four times a day. (*See Diarrhea in Consumption*, page 666.) When the liver or spleen is involved with the gastro-enteritis, White Liquid Physic administered internally, together with the use of the first above-named injection will prove useful in most instances of accompanying diarrhea.

A troublesome cough may be relieved by one of the cough preparations named under Bronchitis, or Pulmonary Consumption.—Muguet or aphthous patches may be treated by Borax Water, Solution of Borax, with Morphia; infusion of Golden Seal and Blue Cohosh, equal parts, etc.—When the liver or spleen participates in the inflammation, there will be spontaneous pains, or pain upon

palpation or percussion, of one side or of both, which may be relieved by the application of a Belladonna Plaster over the part, or, a plaster composed of Soap Plaster, Extract of Cicuta, and Gum Ammoniac. Sometimes, counter-irritation will answer a better purpose.—Flatulency is frequently very annoying; it will gradually pass away as the chronic inflammation subsides. When troublesome it may be relieved by the use of Anise or Peppermint Water, to each dose of which a grain or two of Dioscorein is added. Or, the following will frequently prove useful: Take of Tincture of Prickly-ash Berries half a fluidounce, Essence of Anise two fluidrachms, Dioscorein fifteen grains; mix, and triturate until the Dioscorein is dissolved. The dose is half a fluidrachm in two fluidrachms of an infusion of Pleurisy Root, and repeated as may be required.

Mucous irritation of the mouth and stomach may frequently be benefited by the following: Take of Tincture of Chloride of Iron one and a half fluidrachms, Chlorate of Potassa one drachm, Tincture of Black Cohosh four fluidrachms, Infusion of Ptelea eight fluidounces; mix. The dose is a tablespoonful repeated three or four times daily.

When the disease occurs in intemperate persons, it sometimes happens that no decided relief can be procured, until we permit them the moderate use of wine, brandy, or ale, etc.; but, in ordinary cases, these are not allowable, except great debility is present, in which I have known brandy to be swallowed several times a day, without resulting in any unpleasant effects; still, it must be borne in mind, that all liquors of a stimulating nature are, as a general rule, contra-indicated, being permitted only in cases of atonic conditions of the stomach, or, where this organ has been habituated to such drinks, and even then using them with very great caution.

In cases where, from an absence or deficiency of secretion of gastric juice, the food swallowed acts as an irritant, the use of Pepsin, or Rennet Wine during the meal, will often prove serviceable, the latter in those cases where wine is not contra-indicated.—(*See Deficient Secretion of Gastric Juice.*)—When other organs are involved in the chronic inflammation, they must be treated as recommended under their respective heads, being careful, however, to avoid all remedies or measures that will augment the gastro-enteritic symptoms. I can not refrain from saying here that I have successfully treated many cases of gastro-enteritis with very minute doses of Croton Oil,—to avoid its irritating and purgative influences. One drop dissolved in two fluidrachms of Ether, the dose of which is

from two to ten drops, in some demulcent, and which may be repeated three times a day.

GASTRIC ULCERATION.

Ulceration of the Stomach presents three varieties, which have been termed, superficial, follicular, and perforating ulcer. But it is very difficult during life to form a differential diagnosis; and the symptoms of either variety are less distinctly marked at the early period of ulceration than at a more advanced stage.

Superficial Ulcer may be the result of a subacute or chronic catarrhal inflammation of the gastric mucous membrane, and is characterized by vomiting, pain in the pit of the stomach, pyrosis, loss of strength or great prostration, and sometimes vomiting of blood. The prostration is generally a marked symptom. Not unfrequently the ulceration is associated with phthisis, renal anasarca, cardiac disease, cirrhosis, and pyæmia, which renders it probable that a general diseased condition of the blood may be a predisposing or exciting cause. Vomiting of a coffee ground looking substance has occurred a few days previous to death, in cases following continued portal congestion.

The *pathological appearances* of this form of ulcer are, a congestion of the mucous membrane, especially at the rugæ; destruction of this membrane near the lesser curvature, or, at the pylorus; one or more ulcers, usually more numerous near the pyloric orifice, of various sizes, extending through the mucous membrane, having irregular or rounded margins, and minutely injected or pale in color. The mucous membrane is thickened when chronic irritation has existed; and the gastric follicles are more or less destroyed by the ulceration.

Follicular Ulceration is usually observed in children, though it may occur in adults. When it occurs in children, diarrhea or cholera infantum is apt to be present, with irritability, restlessness, pinched features, and symptoms of severe gastritis; occasionally, there may be vomiting of blood, or of coffee-grounds substance; and sometimes the vomiting of the last-named substance will be the only indication of diseased stomach manifested.

The *pathological appearances* are, minute ulcers studding over the whole of the mucous membrane; these ulcers have irregular margins, extend into the gastric follicles, to a depth equal with the mucous membrane, and are spread over the greater part of the stomach. The mucous membrane may be more or less intensely congested.

Perforating Ulcer, also called *simple*, and *chronic* ulcer, though sometimes it assumes an acute form. It is a common affection, occurring in about two and a half per cent. of the bodies of persons dying from all causes; occurs more frequently in women than in men, in the proportion of nearly two to one; is rarely observed under sixteen years of age; and is usually met with in persons of middle and advancing life, especially after the fiftieth year. Its more common location being on the lesser curvature, the anterior surface, the posterior surface, and the pyloric pouch. It is a rare affection in this country; but in those parts of Europe where it is common, it occurs much more frequently among the poorer classes. The real causes of the disease are not positively known; by some it has been regarded as the result of prior inflammatory action; by others, as the result of anemia, or a local failure of nutrition, not in any degree necessarily connected with inflammation.

The *symptoms* of chronic ulceration of the stomach are, at first, disturbances of gastric digestion, which may lead the patient to suppose he is laboring under dyspepsia; this is followed by uneasiness and pain in the epigastrium, sour eructations, and then nausea and vomiting. Even at this early period perforation may occur and occasion sudden and unexpected death; if it does not occur, more or less profuse hematemesis manifests itself, with anemia and emaciation, and the disease may continue with great irregularity in the symptoms and in their severity, for a few months or even years. The pain and the vomiting are the more determinate symptoms.—The appetite is often unimpaired, the tongue natural or pallid, and thirst absent; the bowels may be regular, sometimes diarrhea, but constipation is more frequently present; and there may be, in many cases, an absence of heart-burn, pyrosis, acid eructations, and flatulence. The countenance usually presents a worn and suffering appearance, quite different from that of the nervous or fidgety look of simple chronic dyspepsia; and the degree of emaciation is generally dependent upon the extent of the ulceration.

The pain is seldom absent, but varies in severity, from a sense of weight to a dull continuous pain, which ultimately becomes severe, gnawing, or burning. It usually commences increasing in severity about from five to ten minutes after the ingestion of food, and continues during gastric digestion. Sometimes it immediately follows deglutition; or it may not come on for an hour or so after a meal; and, in some rare cases, it is worse when the stomach is empty, being alleviated when food is swallowed. Usually, when the contents of the stomach are ejected by vomiting the pain is at once arrested. The pain is almost invariably located in the epigastrium, commonly

in the median line just below the point of the ensiform cartilage, and sometimes to the right or left of this; it is generally limited to a circular area, not exceeding two inches in diameter, and is accompanied by pain in the lower dorsal vertebræ, which may sometimes radiate into the shoulders or down the spine and legs. Very moderate pressure over the epigastrium, usually augments these pains, while rest and the recumbent position alleviate them. The pains are also increased by active exercise, mental excitement, mental depression, fatigue, and improper food. The pain is usually relieved by one position, and aggravated by the opposite one, thus not only giving a clue to the existence of an ulcer, but also to its situation. Occasionally pain may be absent for a longer or shorter time, during which food may be used without occasioning any unpleasant symptoms.

Vomiting is a dangerous symptom; yet it is not always present in this disease. When it is present, it does not generally come on until many weeks after the manifestation of pain. Ordinarily it is of an easy character, comes on when the pain is most intense, and completely relieves it by emptying the whole of the contents of the stomach, consisting of food more or less digested, with or without a quantity of saliva, or, thin watery or viscid mucus, and at times, blood, or bile, in varying proportions. The vomiting appears to be more intense when the ulcer is of large size and long duration.

Hemorrhage may depend upon various causes independent of ulceration, and can only be considered a valuable symptom when it is grouped with the other symptoms. Habershon, to whom I am considerably indebted in my description of gastric diseases, says: "Unless hemorrhage takes place we can not with any certainty diagnose ulceration of the stomach; sallowness of complexion, pain, and vomiting, all arise without ulceration in cases of gastrodynia, and irritability of the stomach, sympathetic or otherwise." The hemorrhage may be profuse, or it may be so minute as to require the aid of a microscope to detect blood in the matters ejected, or in the stools. Abundant or arterial hemorrhages are more apt to occur after meals, in which cases it is generally preceded and accompanied by faintness and nausea,—and when hemorrhage has once occurred it is very liable to occur again; the blood may be bright-red if vomited at once, or, if retained for a time before being expelled, it may be partially darkened or clotted. Sometimes, a fatal hemorrhage may occur, without vomiting, the whole of the stomach and duodenum being filled by a single enormous clot. Among females, amenorrhea may precede or follow the hemorrhage, but not always. If the hemorrhage be not due to the sup-

pression of a natural discharge, if there be no disease of the heart, spleen, liver, or kidneys present, and if the hemorrhage has been preceded for some weeks or months by pain or soreness of the stomach, especially after meals, we have strong reasons for suspecting gastric ulcer, when the bleeding is associated with pain, vomiting, etc. Hemorrhage does not occur in chronic inflammation of the stomach.

Gastric ulcer may terminate by gradual exhaustion; by hemorrhage; by perforation into the peritoneal cavity, producing acute peritonitis ending life in twenty-four or thirty-six hours; or, by inflammation being produced, and extending to the neighboring organs. Sometimes, the disease may remain in a passive condition for a long time, and the patient die of some other malady. Perforation only occurs in about eight of every ten cases.

The *differential diagnosis* between gastric ulcer and chronic gastritis has been already named in the history of the latter affection; its determination from *gastric cancer* is based principally upon the following points: Cancer seldom occurs under forty years of age, while ulcer may occur at any age, especially among young females; cancer is accompanied with severe lancinating pains, seldom affected by food, while in ulcer the pain may radiate but is never lancinating, and is increased by the presence of food in the stomach; in cancer, we most generally observe vomiting, which may or may not be present in ulcer, and the matters ejected in cancer will often be found to contain cancer cells; in cancer, there is great acidity, with symptoms of indigestion, which may be absent or very slight in ulcer; in cancer, hemorrhage is not so profuse as in ulcer, and occurs at a later period of the disease; in cancer, fever is present, but not in ulcer; in cancer there is a hard, moveable tumor in the epigastrium, which is absent in ulcer, unless there be adhesion; in cancer there is a gradually progressing emaciation and debility, while in ulcer there is extreme paleness and debility almost from the commencement; cancer terminates in one year, rarely extending to two, while ulcer may prove suddenly fatal, or last many months or years, or it may get well. In the early periods of these diseases, it is impossible to discriminate between them.* (*See Chronic Gastritis*, 3, page 696.)

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*Dr. William Brinton, to whom I am also much indebted for material concerning the history of gastric diseases, in speaking of the pain and vomiting, but without hemorrhage, remarks: "But though these symptoms make up the minimum safe basis of diagnosis, to require them, before permitting ourselves to suspect the lesion, would be a grievous error in practice. To say nothing of those doubtful cases on record, in which the symptoms have not been investi-

"The size of the ulcer may be determined by the constancy of the pain and the severity of the other symptoms. If the pain be slight, and of short duration, and the appetite be good, and vomiting occur seldom, and there be no emaciation—the ulcer is small. The location of the ulcer is determined by the spot in which the pain is felt. If there be much tenderness at the *epigastrium* and *no pain in the back*, the ulcer is most probably on the anterior face of the stomach." (*Budd.*)

The *prognosis* of gastric ulcer depends considerably upon the duration of the disease, and the severity of the symptoms; it is not necessarily a fatal disease, though it may destroy life in a few days, and again not for thirty years or more. Spontaneous cure occurs in about half the cases; and when a large ulcer heals, the cicatrix often occasions a contraction which seriously affects the shape, size, or calibre of the organ. When perforation or erosion of large arteries occurs, death almost invariably results,—but these lesions can only be suspected, and not determined until after death. Nausea, or vomiting, faintness, great prostration, livid features, feeble pulse, and coldness of the extremities are very unfavorable symptoms. Vomiting, without great prostration, faintness, feeble pulse, etc., and with or without slight hemorrhage, and followed by an alleviation of pain, is a more favorable symptom.

"When an ulcer has perforated the mucous membrane of the

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gated during life with sufficient exactitude to lay much stress on their alleged obscurities or deficiencies, a careful study of the malady has convinced me that there is no exact limit to the degree in which it may be rendered latent by the absence or the ill-marked characters of some of these symptoms. Indeed, their slow succession in many cases might alone prepare us for the fact, that vomiting may be limited to nausea or regurgitation, and hemorrhage be so scanty and infrequent as to defy the most frequent and sedulous examination of the matters expelled from the stomach by stool or vomit.

"It is in such cases that we must make the pathology of the lesion in general supply any casual deficiencies in the physiognomy, (if we may so speak), of the case in particular; and must remember that suspicions which fall far short of a definite diagnosis may yet be sufficiently important to dictate the whole plan of treatment. Suppose, for example, that we are consulted by a patient for protracted and severe dyspepsia, which has seriously affected the general health; that we find this dyspepsia especially called forth by proteinous substances, and by hot fluids; that it is associated with pain and tenderness in the epigastrium, and pain in the lower dorsal region, much increased after the ingestion of food, and affected as above described by movement, rest, and posture. In such a case, by treating it as ulcer of the stomach, we may often cure what we can not justifiably diagnose; and may witness a triumph of the art over the science of medicine which the most laborious pathologist would scarcely be sorry to see more frequent than modern research generally allows it to be."

stomach, it is very difficult to heal; and when cicatrization does occur, unless the ulcer be very small, a deep depression remains, and the lost substance is very imperfectly restored. This is owing to the frequent changes of volume the stomach undergoes from being empty or filled with food; to the constant churning motion that the organ undergoes during digestion; as well as to irritation of the ulcer by the mechanical or other action of ingested substances; and, probably, also, to the action of the gastric juice upon the exposed tissues beneath the mucous membrane, which dissolves and removes the lymph poured out on the bottom of the ulcer,—for it is only by means of this plastic lymph that the lost substance can be repaired and the ulcer heal." (*Budd.*)

The *pathological appearances* met with in gastric ulcer, vary; in most cases, the stomach presents no marks of disease, except a single deep ulcer on its inner surface. In other cases one or more ulcers may be present, or two ulcers may be fused into one; occasionally, four, five, and six have been found together. The ulcer is usually circular or oval, sometimes elongated, or even zonular so as to encircle the stomach; its size ranges from that of a pea to even four or five inches in diameter. Evidences of slight inflammatory action are observed in the tissues around the ulcer, the membrane forming the margin of the ulcer being swoln, thickened, and indurated, from exudation of lymph into the submucous areolar tissue, as well as into the matrix that surrounds and ensheathes the stomach tubes. The ulcer may extend through the muscular and even through the peritoneal coat of the stomach; its inner aspect is bevelled, or in the shape of a cone, from the opening being large in the mucous membrane, smaller in the muscular, and still smaller in the peritoneal. Sometimes, adhesive inflammation occurs before all the coats of the stomach have been perforated, lymph is poured out, and an adhesion of that part of the organ covering the ulcer takes place with the pancreas, left lobe of the liver, spleen, or other organ in proximity; this may prolong the life of the patient by closing the aperture made by the ulcer, and thus prevent the contents of the stomach from passing into the peritoneal sac. When the ulceration extends deeply, it often perforates a branch of one of the arteries with which the stomach is supplied, occasioning sudden, profuse, and even fatal hemorrhage. Fatal perforation is most common when the ulcer is situated on the anterior wall, or along its lesser curvature. Contraction of the organ is observed in cases of cicatrization of a large ulcer.

The *treatment* of these varieties of gastric ulceration is about the

same; being, at the commencement, or in the milder forms, that which has already been advised for Chronic Gastritis. Two very important points are required in the management of this disease, viz.,—to maintain a state of absolute rest of the stomach, and to nourish and improve the system without irritating or disturbing the gastric malady,—two requirements which it is impossible to fulfill except in a very imperfect manner.

In the fulfillment of these requirements, one of the most important points to be attended to is, the diet. A purely milk diet is undoubtedly the very best that can be adopted, especially where much anemia and debility is present; and great care should be taken that the milk is of good quality, and fresh from the cow, a very difficult, if not impossible thing to obtain in our large cities. Other articles may, however, be used, as Indian meal gruel, oatmeal gruel, tapioca, and other properly selected farinaceous substances, to which there is no repugnance, and which agree with the stomach. In some cases, especially, when the symptoms are not severe, or when a favorable change has taken place, egg-custards, rice-custards, blanc-mange, well-boiled rice, mutton, beef, or fowl broth, finely mashed potatoes and carrots, and similar nutritious forms of food that pass quickly from the stomach, may be permitted.—Rich soups, high-seasoned food, pastries, pickles, salads, and all insoluble, irritating, or indigestible substances must positively be avoided, as well as all alcoholic, vinous, fermented, or other stimulating drinks. The juice of fruits may, however, be used with benefit, as of oranges, lemons, strawberries, raspberries, peaches, blackberries, grapes, etc., to which a small portion of sugar may be added, if desired. In some cases, the juice of musk-melon or of water-melon will quench thirst, and be of service.

The quantity as well as the quality of the food demands attention; the patient should take as much, each time, as he can without causing pain, even though this does not exceed a teaspoonful at first,—and should repeat the small meal as often as compatible with the ease of the stomach, being very careful not to perform any bodily or mental labor during the first hour or two of digestion. As a general rule, but little medicine will be required, if the food be properly regulated. Yet urgent symptoms may be present, or may arise from time to time, that will require some remedial agent, and when this is the case, the medicine should be mixed with the food whenever it can be done without causing a repugnance to the mixture, or, a destruction of the therapeutical virtues of the remedy. And among the medicines that may be thus used, and with advantage during the whole course of the disease, are,

Citrate of Iron and Quinia, and Citrate of Iron and Strychnia. If, notwithstanding all these means and the treatment hereafter named, the vomiting continues, we should allow the stomach to rest for a few days, and rely upon nutritive and slightly stimulating enemata—keeping the patient, in the meantime, in a horizontal position, and as quiet as possible. Sometimes cold food will be better tolerated by the stomach than warm.

If there be considerable irritability of the stomach, this, together with any gastric heat or burning that may be present, may frequently be relieved by the patient chewing and swallowing, every now and then, small lumps of ice. In other instances, the Trisnitrate of Bismuth, Conium, Opium, Morphia, weak Solution of Potassa or Soda, Lime-water, etc., will be found serviceable. The Oxide of Silver has also proved beneficial; as well as a small pill composed of Nitrate of Silver one-fourth or one-half of a grain, mixed with half a grain of Opium, or with one-eighth of a grain of Extract of Belladonna, or, in cases of constipation, with Extract of Hyoscyamus. Yet I must confess that in my own practice, I have not derived so much benefit from Nitrate of Silver administered in this way, as the statements of others concerning its efficacy, would lead one to expect.—In conjunction with these internal means, counter-irritation to the epigastrium, and along the lower dorsal vertebræ, will be of decided benefit in most instances, as, Croton Oil Liniment, sinapisms, hot fomentations, Dermabiotokon, and especially Dry Cupping. And these measures will likewise be found very useful in relieving the pain as well as the vomiting. Not unfrequently the vomiting, in cases of gastric ulcer, can not be checked until some leeches have been applied to the epigastrium; being where much local pain is present, aided by the internal use of opiates.

Acid eructations may be prevented by the use of Magnesia after each meal, to each dose of which five or ten grains of Trisnitrate of Bismuth may be added. In cases where there is fermentative action, or a development of sarcinæ, Sulphite of Soda in twenty-grain doses, or Sulphite of Magnesia, may be administered, alone, or in conjunction with other agents. Pain is best relieved by a pill of Opium, with or without the addition of Trisnitrate of Bismuth; or, a bladder filled with pounded ice, applied over the painful part for a few minutes at a time, will give relief. The latter will likewise be of efficacy in case of hemorrhage.

Hemorrhage or vomiting of blood requires the patient to keep in the horizontal posture for some time, as quiet as possible; fasting for a prolonged period; and trying ice cataplasms, as heretofore

referred to. When severe or obstinate, it may be checked in most instances by ten grains of Gallic Acid dissolved in an ounce of Distilled Water by the aid of ten minims of Dilute Sulphuric Acid. Trisnitrate of Bismuth ten or twenty grains, mixed with Compound Powder of Kino five or ten grains, has also proved useful in checking hemorrhage, as well as diarrhea when this is present. Oil of Turpentine in doses of ten or twenty minims, taken in cold water, and repeated according to the urgency of the symptoms, has also been efficacious; Tannin, Alum, etc., have also been advised, but I have never used them.—Anemia requires the use of Iron; but this agent is contra-indicated when frequent vomiting, or excessive and continuous pain, are present. When Iron is given it should always be in a soluble form.—The bowels may be kept regular by enemata; or, by Aloes, or Compound Colocynth pill, used occasionally, which irritate the stomach less than other purgatives.

When perforation has happened, and even when peritonitis has manifested its early symptoms, there is still a chance of cure, or rather of prolonging life, by keeping the patient perfectly quiet, allowing him no nourishment, save a teaspoonful of water or milk occasionally, to assuage thirst, and administering Opium in grain doses every three or four hours. This course checks peristaltic action, and permits adhesions to occur, when life may be preserved for a longer period.—Excessive prostration may be overcome to a greater or less extent by injections and inhalation of stimulants.—Strong, or continued pressure upon the epigastrium, by lacing, tight clothes, or otherwise, must be carefully avoided in all maladies of the stomach, and especially in ulceration; immoderate or severe exercise, and excessive mental emotions, are, likewise, equally to be avoided.

I cured one case of chronic gastric ulcer by the following course: To a pint of Indian Meal Gruel made of equal parts of Milk and Water, one tablespoonful of Compound Powder of Charcoal was added,—and of this a tablespoonful was taken every hour or two, except during sleep. For drink, the patient used an infusion of equal parts of Spiræa Tomentosa, Adiantum Pedatum, and Althæa Officinalis. Orange-juice was used freely. The patient was perfectly free from all pain, vomiting, and hemorrhage, after six weeks perseverance in this treatment. I saw her several years afterward, and she had continued well.

I see no reason why injections into the stomach, in the manner named under Chronic Gastritis, may not frequently be beneficial in gastric ulcerations; using dilute solutions of Nitrate of Silver;

Chloride of Gold and Soda; Tannin; Alum; infusions of Golden Seal, Blue Cohosh, and Geranium; Golden Seal and Witch Hazel, etc. I merely name this as a suggestion, and shall act upon it, whenever opportunity offers.

GASTRIC CANCER.

With the exception of the uterus, cancer affects the stomach more frequently than any other organ; and from its frequency, its fatality, and its difficulty of diagnosis in many cases, it requires an attentive consideration. It is a specific degeneration, belonging to the class of heterologous formations, and is most ordinarily a primary disease,—the stomach being the part first attacked with it. All the different species of carcinoma are met with in the stomach; the most frequent being the scirrhous or fibrous, next the medullary or encephaloid, and lastly the areolar or colloid. They may occur separately, or in combination, being really mere varieties of the same disease, differing chiefly in the relative amount and arrangement of their cells and fibres. The pyloric extremity is the most frequent seat of the disease, the next most common location is at the cardiac orifice, and then along the smaller curvature between the two orifices. The *causes* of gastric cancer are not known, though there appears to be, with some persons, a hereditary predisposition to it. The malady is met with in all classes of society, being rather more common among males than females, more usually occurring after the thirty-fifth year, and destroying life in from six to fifteen months, rarely extending to two years.

The *symptoms* of gastric cancer are at first obscure, being similar to those of chronic gastritis, or dyspepsia,—pain in the stomach, tenderness, flatulence, cardialgia, vomiting, etc. As the disease progresses the appetite becomes greatly impaired, very acid eructations occur, with sometimes ejections of small quantities of food, emaciation, and lowness of spirits,—but the thirst, the tongue, the pulse, and the skin continue about natural. Finally, the pain in the stomach becomes more severe, and of a gnawing, burning, or lancinating character, sometimes being of a most agonizing nature, and generally radiating. The pain is almost always constant, and may be augmented either by a full or empty condition of the stomach. Sometimes a severe lancinating pain is manifested at an early period of the disease. Vomiting also occurs, and is often a prominent symptom, coming on shortly after a meal, and, in some cases, not until several hours afterward; the matters thrown

up are often frothy and fermenting, containing the *sarcinæ ventriculi*. At other times the vomited matters are very sour, consisting of food partly digested, and partly in a state of acetous fermentation, and this may be of a soot-black, or of a dirty-reddish brown, resembling coffee-grounds, from being intermingled with blood; or, a glairy mucus may be ejected, mixed with black or brown flakes, consisting of blackened and altered blood. But any great amount of unmixed blood is seldom observed, except ulceration has taken place, when the hemorrhage may sometimes be profuse. Should the ulceration destroy the pneumogastric nerve, the vomiting may cease entirely. In connection with the above symptoms, palpation or manipulation will at some period of the disease detect an irregular tumor, in or near the epigastrium, and which is a very important symptom; indeed, without the detection of the tumor, in addition to the gastric disturbances, anemia, gradually increasing debility and emaciation, we can not possibly diagnose cancer.

The other symptoms generally observed in connection with those just named are, extreme flatulency; fetid breath or eructations, though not always present; obstinate constipation; gradual emaciation and debility; despondency; a pale, tired, and faded look, the countenance somewhat resembling that of jaundice, or a mixture of the chlorotic and icteric hues; and, finally, increased pain and vomiting, with more or less irritative fever.

The *diagnosis* of gastric cancer is sometimes very difficult, especially when no tumor can be detected; and even then we must be careful not to mistake an enlarged liver, spleen, or pancreas for the malignant tumor. If the disease occurs after the age of thirty-five, with loss of appetite, harassing pains, vomitings in spite of a low diet, and the matters mixed with darkened blood, the emaciation and debility progressing more rapidly than in chronic gastritis, we may strongly suspect cancer; and our suspicions will be verified by the presence of the tumor. Vomiting of blood rarely occurs in cancer until toward the latter period of the disease. In cancer, most cases die of exhaustion within twelve months, and occasionally within two years; in gastric ulcer the disease may exist for many years. Cancer is not amenable to treatment, ulceration frequently is. (*See Chronic Gastritis*, page 695.)

Scirrhous cancer, when it extends from the stomach, is apt to involve the liver, causing its enlargement, and also occasions much pain and constitutional disturbance. Medullary cancer gives rise to similar symptoms, but is much more rapid in its progress. Colloid cancer is slower in its progress than either of the other varie-

ties, is attended with less pain and less constitutional disturbance, and is apt to involve the mesentery, and not the liver, when it extends from the stomach; ascites is also apt to be present when the disease has extended to the peritoneum or omentum.

When the body of the stomach is the seat of cancer, the cardiac and pyloric orifices remaining unobstructed, vomiting, if it occurs at all, manifests itself shortly after meals, the matters ejected being moderate in quantity, and consisting of the gastric secretions and portions of the food; and frequently the food is altered by digestion, or by some fermentative process. Fetid eructations are common. The tumor will be felt in that place occupied by the diseased part of the stomach.—When the cardiac orifice is the seat of the disease, the passage of food into the stomach is more or less interfered with, from a gradual narrowing of the lower end of the œsophageal tube, causing a sensation of uneasiness or pain at the epigastrium, which passes through to the back; and portions of food are frequently retained in the lower end of the œsophagus, from which they are ejected by eructations. The tumor will be felt at this gastric orifice.—When the pylorus is affected, and obstructive disease set up, the indications of cancer are better marked than when other parts are attacked. The pyloric orifice becoming more or less strictured, vomiting occurs some hours after meals, and the matters ejected are acid and in large quantity, and frequently contain fermented matters, sarcinæ blood, etc. The tumor is usually felt at the place occupied by the diseased portion, but as the stomach gradually enlarges, there will be an unusual resonance on percussion, and the tumor may descend even as far down as the right iliac fossa.

Sometimes cancer of the stomach presents no symptoms, or at least none that would refer to the organ affected. Even a tumor may be felt, and yet not be owing to cancer, but to some other disease. Again, emaciation is not always present; Napoleon Bonaparte, who had gastric cancer, was very fat when he died.

The *prognosis* of cancer of the stomach is always unfavorable; all that art has been able to accomplish is to palliate urgent symptoms. The scirrhous variety, which is the most common form of gastric cancer, is apt to prove fatal before it softens or ulcerates.

The *pathological appearances* met with will be in accordance with the advanced condition of the disease, and with the particular variety of cancer present. The stomach may be enlarged, and contain a dark-colored fluid. According to the seat of the disease, either the cardiac or pyloric orifice may be strictured. The affected part may be hypertrophied, or thickened and indurated, creaking when

cut into, and of a grayish, white, or yellowish appearance, translucent or opaque. The coats of the stomach, with the exception of the peritoneal, are often so deeply involved that they can not be recognized. Tumors are often formed in the submucous cellular tissue, and the walls of the stomach frequently present polypi, fungi, vegetations, etc., with or without ulcers. The diseased part will be, in a greater or less degree, thicker than natural, presenting an irregular internal surface, frequently ulcerated, and containing whitish or blackish fungous matter. When the cardiac orifice is affected, the odor emanating from it is often very offensive; but, if the pyloric orifice be the seat of the disease, an offensive odor is less usual, probably, from the antiseptic agency of the gastric juice on the surface of the ulcer. An examination of the adjacent abdominal organs will usually detect cancerous deposits to a greater or less extent, in some of them, as has been referred to heretofore. Under the microscope, more or less cancer cells may be detected in the diseased tissues, together with portions of fibrous tissue.

In the *treatment* of gastric cancer a proper regulation of the diet is one of the most important features. Milk is the most appropriate article of diet; though arrow-root, tapioca, animal broths, yolk of eggs beaten up with sugar and then with cold arrow-root infusion, cooked pulp of ripe fruits when they do not disagree, etc., may be used in many instances. No solid food should be taken, as it is apt to occasion pain and vomiting; and the quantity of food to be taken at a time, as well as the kind or quality, must depend upon the influence it exerts in giving rise to the above-named symptoms. When much nourishment can not be taken into the stomach, without oppressing this organ or occasioning distressing symptoms, it will have to be administered by enemas frequently repeated; and when stimulants are required, as, wine, brandy, etc., they may be added to the nourishing injections.

In the early period of the disease, occasional advantage may be derived from the following pills: Take of Chloride of Gold and Soda one or two grains, Extract of Conium thirty grains; mix together and divide into twenty pills. One of these may be taken for a dose, repeating it three times a day; it should be taken, each time, when the stomach is empty, and no food should be taken for half an hour or an hour after each dose. As a constant drink, an infusion of Viburnum Dentatum, Rumex Crispus, or Nymphea Odorata, separately or combined, to which Hydrochlorate of Ammonia has been added, may be freely used; or a very dilute solution of Carbolic Acid.

Excessive secretion of gastric juice, or mucus, from irritation

of the stomach, may be frequently alleviated by Trisnitrate of Bismuth and Extract of Conium in pill form. It is better to avoid the preparations of Opium as long as possible on account of the constipation they produce, but when they must be used, the Opium itself will be found usually more beneficial than any of its salts.—Acidity of the stomach may be neutralized by the use of Magnesia, finely-powdered Wood Charcoal, or Lime-water.—Offensive eructations may be overcome by the use of Charcoal, Hyposulphite of Soda, infusion of Wood Soot, or, a drop of Creosote added to a gill of Mint Water, which may be divided into two or three doses.—Constipation may be overcome by purgative enemas, containing Aloes, Colocynth, Podophyllin, etc.; purgatives by mouth should not be administered until it actually becomes necessary, and then those articles should be employed that influence the large intestine only, and exert but little irritation upon the stomach. Sometimes, very dilute Nitro-hydrochloric Acid, rubbed upon the abdomen and thighs, two or three times a day, will occasion alvine evacuations.—Excessive pain, nervous irritability, and wakefulness require sedatives and narcotics, as, Conium, Belladonna, or Stramonium Extracts, or Opium, to which article we will finally be obliged to have recourse in preference to all others, in order to obtain relief. I have found considerable benefit in a few instances, by a combination of Opium and Extract of Scullcap.—I am not aware that hypodermic injections in the region of the epigastrium have been attempted in this disease, but I should judge them to be useful in allaying pain, in many instances.

HÆMATEMESIS.

Hæmatemesis, or Vomiting of Blood from the Stomach, is a symptom of no unfrequent occurrence, but is not usually of a serious nature, when idiopathic. When it occurs as a secondary symptom, its prognosis is associated with that of the primary disease.

The *causes* of gastric hemorrhage are various. It may arise from ulceration of the stomach; from congested or obstructed portal circulation; from vicarious menstruation; from cancerous disease; from a vitiated state of the blood; from aneurism, etc. Primary or idiopathic hæmatemesis is due to the state of the mucous lining membrane of the stomach, or superior portion of the duodenum, the venous capillaries of which are in a congested, enfeebled, or atonic condition.

The predisposing causes of gastric hemorrhage are, hereditary conformation, tendency to hemorrhages, mental irritability, indolence, intemperance in eating or drinking, etc, The hemorrhage may be occasioned by whatever will enfeeble or overexcite the mucous membrane of the organ, or interfere with the return of blood from the organ, as, an abuse of emetics, or cathartics; acrid or poisonous substances; blows upon the stomach; use of intoxicating or highly stimulating liquors; violent and depressing passions; cold; continued pressure on the stomach; or worms, larvæ, etc., in the stomach.

The *symptoms* of gastric hemorhage vary somewhat according to its cause. Ordinarily, it is preceded by a sense of weight and oppression in the stomach, sometimes pain at the epigastrium, nausea, either a loss or increase of appetite, flatulence, acid eructations, anxiety, ringing in the ears, faintness or a sense of sinking at the epigastrium, pain or uneasiness in the left hypochondrium, sometimes a burning sensation, with or without distention and tenderness, sense of constriction about the chest, alternate flashes of heat and chills, cold extremities, pale and contracted countenance, palpitation, depressed pulse, etc. One or several of these symptoms are usually present; in some rare cases, the hemorrhage may come on suddenly without any premonitory symptoms sufficient to attract attention, and may prove suddenly fatal. Where the hemorrhage is secondary, it is preceded and accompanied by the symptoms usual to the malady of which it is symptomatic.—The blood, which is usually vomited up without coughing or hawking, is, dark, clotted, frequently mixed with a portion of the contents of the stomach, and sometimes appears also in the stools. The dark, grumous, or tarry-looking condition of the blood is due to the action of the gastric juice upon the hematine, and the admixture of the discharge with the secretions and contents of the stomach. The quantity raised at a time may be large or small, but, being frequently discharged at short intervals, may exhaust the patient very much; or, it may be very profuse from the first, rapidly reducing the strength of the patient. Occasionally the blood is florid and liquid. If the patient is not destroyed by the bleeding, he generally experiences more or less considerable relief from his previous disagreeable sensations.

Gastric hemorrhage from ulceration of the stomach, or from cancer of the stomach, is generally preceded by the usual symptoms of these maladies, and, in the former disease, is frequently very considerable, amounting to several pints, especially in those cases where the ulceration has extended into one of the arteries of

the stomach. When it is the result of rupture of an aneurism, it is commonly preceded by a pulsating tumor, and pain in the course of the spinal nerves; the blood, in this case, may be florid and fluid, and death occurs quickly.—When due to congested or obstructed portal circulation, it is usually preceded by pain in the right side, impaired appetite, nausea, colic, constipation, furred tongue, sallow complexion, and other signs of engorged liver, and dyspepsia from deficient gastric juice.—When occurring as a vicarious discharge, there will be amenorrhea, slight pain in the side, perhaps neuralgic pains, leucorrhea, hysteria, etc.; the discharge will manifest itself periodically, without occasioning much pallor of countenance, or any constitutional disturbance.—When associated with a vitiated condition of the blood, it is generally preceded by the symptoms common to the peculiar morbid condition, as, typhus, yellow fever, purpura hemorrhagica, scorbutus, exanthemata, etc.

Gastric hemorrhage may be *determined* from hemoptysis, by the blood being vomited and not coughed up, by the absence of cough, tickling in the throat, and bubbling sensation within the thorax, by the discharge being ordinarily larger in quantity than that from the lungs, of a darker color, thicker, and often containing some of the ingesta. In hemoptysis, the blood is frothy, bright red, is coughed or hawked up, and occurs in a succession of mouthfuls. In gastric hemorrhage, dark blood may frequently be observed in the stools. There is usually more pallor, and a greater tendency to syncope in bleeding from the stomach, than from the lungs. In cases of doubt, the lungs and the heart should be physically examined, and the general symptoms present should be carefully considered.—Blood may be swallowed when a hemorrhage from the gums, mouth, or nostrils takes place, and should it be subsequently vomited may lead to the suspicion of gastric hemorrhage; in such cases, the usual symptoms of bleeding from the stomach will be absent, and a careful examination may detect the source of the discharge.

The *prognosis* of gastric hemorrhage, when idiopathic, or vicarious, is ordinarily favorable; for we frequently observe patients who present almost a bloodless appearance, convalesce and recover. It must, however, be remembered that a primary or vicarious hematemesis, may be so profuse as to terminate fatally, and hence, the physician should always bestow attention until the more serious symptoms have been overcome. But, when the hemorrhage is secondary, the prognosis then depends upon the abundance of the

flow, the constitutional symptoms, and the nature of the disease associated with it.

The *pathological appearances* vary according to the cause of the hemorrhage. In idiopathic and vicarious bleeding, the mucous lining membrane of the stomach presents dark-red, purplish, brown, or black spots or patches of ecchymosis; and an enlarged, dilated, or injected condition of its capillaries. Rarely, signs of gastritis may be observed, with scattered patches caused by an infiltration of blood in the submucous cellular tissue. In other cases, again, the stomach will present no morbid appearance, especially when the hemorrhage was due to disease in some adjacent organ. When the hemorrhage has been profuse the whole of the stomach may be in a flaccid, dilated, and pale state. If any blood be remaining in the stomach, it will be more or less coagulated, and dark-colored or grumous. If the hemorrhage be due to ulcer or cancer of the stomach, or aneurism, the usual pathological appearances of these morbid conditions will be present. If it be due to congested portal symptom, etc., abnormal conditions of the liver, spleen, etc., will be observed.

The *treatment* of gastric hemorrhage presents two indications, viz.: to arrest the attack, and to remove, subsequently, the pathological conditions giving rise to the hemorrhage. If the discharge be primary, or, if the exact nature of its cause is not positively determined, the patient should have his feet placed in warm mustard water for some minutes, then have them dried with considerable friction, and, subsequently, if necessary, have sinapisms applied to them; after which he should be placed in a recumbent or semi-recumbent position, and be kept as quiet as possible. Dry cups, followed by a sinapism, to the epigastric region will frequently be serviceable. Internally, various agents have been administered with success, as, ten or fifteen drops of the Oil of Fireweed, or Oil of Fleabane, given on a little sugar or salt every fifteen, twenty, or thirty minutes, according to the urgency of the case; Tincture of Chloride of Iron in doses of twenty drops, in some cold water, as often as required; Solution of Perchloride of Iron; Warren's Styptic Balsam; Oil of Turpentine, etc. All the drinks of the patient must be cold, and much advantage may be derived by permitting small pieces of ice to be swallowed from time to time, until the hemorrhage ceases. In addition to these measures, when there are evident accumulations in the bowels, a purgative must be administered, and repeated, if necessary, every two or three hours; a fluidounce of Castor Oil with twenty or thirty drops of Oil of Turpentine forms an excellent purgative. In some cases, the use of saline purgatives

will be beneficial, as, Sulphate of Magnesia, Potassa, or Soda—these act as astringents and revellents, and remove the black tarry-like blood (*melæna*) that may have accumulated in the intestines.

If the hemorrhage be vicarious, it is better not to endeavor to check it, unless it be very profuse; we should rather endeavor to restore the natural menstrual flow, by all the therapeutical and hygienical means employed for this purpose, as, exercise in the open air, hip baths, uterine tonics, etc. No permanent benefit can be expected until this is affected.

If the hemorrhage arises from hepatic or splenic congestion, a fomentation of Stramonium or Belladonna Leaves may be placed over the congested organ; and, internally, a combination of small doses of Podophyllin with Extract of Conium in form of pill, may be administered as often as required; this course will relieve the congestion and arrest the hemorrhage. In these cases we can hardly expect much relief from styptics, until the congested condition of the affected organs has been removed. Acidity of stomach may be relieved by Charcoal, Magnesia, or Compound Powder of Rhubarb and Potassa. For permanent cure, the hepatic or splenic affection must be properly treated.

When the hemorrhage is due to gastric ulcer or cancer, Gallic Acid, Oil of Turpentine, Solution of Perchloride of Iron, Alum with dilute Sulphuric Acid, Kino, or Catechu, etc., are among the agents that may be used to arrest the flow; adopting the means already advised in the treatment of these affections, whenever the bleeding ceases.—If the hemorrhage be dependent upon a vitiated condition of the blood, in addition to the means employed to check an excessive discharge, the proper agents must be administered to restore this flow to its natural condition, as named under Purpura, Scorbutus, etc. In malarial districts, where there is often a periodical irritability of the stomach, a pill composed of Sulphate of Quinia half a grain, Trisnitrate of Bismuth three grains, Extract of Conium one grain, will be found very useful; it may be repeated, as required, every three or four hours daily.

During the hemorrhage, a total abstinence from food should be enjoined, or, if any be allowed it should be dry, not allowing too much fluid; and thirst may be assuaged by small pieces of ice held in the mouth, or iced orange-juice, or, ice-cold sulphuric lemonade. After the discharge has ceased, beef tea, gruel, rice-water, oyster soup, soft-boiled eggs, custard, buttermilk, etc., may be allowed; and if much debility be present, a careful use of ale, porter, wine whey, etc., together with the Compound Wine of Comfrey, or such other tonic as may be indicated, or suited to the case.

There are several other organic affections of the stomach, as, *Fibroid degeneration of the Pylorus*, *Polypus*, etc., of which, however, there are no certain methods of detecting or treating.

DYSPEPSIA.

Dyspepsia or Indigestion are the terms applied to derangements of the natural functions of the stomach, independent of any organic or inflammatory disease of that organ; though, dyspepsia may precede, and even accompany structural change. It is a very common disease, met with in all classes of society, and in every country; commencing in an insidious manner, and ultimately rendering life a burden. Although young persons may labor under dyspepsia, it is more commonly met with after the thirtieth or thirty-fifth year, or in middle life, and seems to be due chiefly to impairment or derangement of the nervous powers associated with and necessary to the digestive functions. (*See Chronic Gastritis, e*, page 699.)

The *symptoms* of dyspepsia are various, depending upon the stage of the disease, and the peculiar conditions giving rise to it, or associated with it; and, although there are a few symptoms common to all dyspeptic patients, yet, as a general rule, it will be found that scarcely any two individuals experience exactly the same group. The more common symptoms that are presented to the practitioner, are, at first, a sense of fullness, distension, or weight in the epigastrium, and a variable appetite, which is generally feeble, sometimes wholly lost, and at others voracious, or morbidly craving, and a full or hearty meal is followed by a fullness, heaviness, or pain in the epigastrium, which continues for some hours after the meal, and is accompanied with lowness of spirits or despondency. Frequently, there is a morbid desire to eat, after having already finished a meal, and the first mouthful swallowed appeases the hunger. Occasionally there is a loathing of food. With some patients, there is a *constant* uneasy feeling, weight, fullness, or pain in the gastric region. There is frequently a fluttering or sinking sensation experienced at the epigastrium, and, in many cases, pressure on this part, produces tenderness or soreness. Flatulence and acidity of the stomach are very common symptoms; so also are acid or disagreeable eructations, pyrosis, and mental depression. Indeed, it will be found that the conditions of the mind are numerous and diversified, according to the education, surrounding circumstances, and mental peculiarities of the patient, varying in every degree from a simple feeling of discon-

tent or lowness of spirits to intense unhappiness. External objects no longer appear in a state of reality; there may be an apparent inharmoniousness in everything surrounding the patient; frequently there is an undefined sense of fear and apprehension, as, a dread of sleeping alone, or of being alone, or of being from home at night, or imagined dangers from various sources, etc.; again, various diseases are often imagined to exist, as, phthisis, cardiac disease, prostatic disease, impotency, etc.; and in various other ways are these mental aberrations manifested, frequently changing the disposition, habits, and feelings of the patient, driving him into mental and physical indolence; a sense of inability to manage the most ordinary affairs of life; fretfulness and irritability; a sense of dissatisfaction with everything; fanatic extravagancies, religious frenzy, or hypochondria, etc., and very often perpetuating the disease under which he is laboring, in spite of all treatment.

There is, generally, a disagreeable taste in the mouth, especially upon rising in the morning; the tongue is covered with a whitish fur, and sometimes its papillæ are enlarged and prominent, especially toward the base of the organ; sometimes it is clean and polished, or, the center heavily loaded, with polished tip and edges; in other cases, the surface of the tongue will be more or less deeply furrowed; the body of the tongue is usually pale, sometimes natural, and occasionally redder than natural. In all gastric diseases the base of the tongue should be examined particularly. Constipation, high-colored and scalding urine, and nightmare, are also present in many cases; constipation, more especially when the gastric affection is associated with intestinal dyspepsia, or maladies of the spleen. Headache is common, especially after eating, and is frequently preceded or accompanied with chilliness, increased pallor, reduced pulse, and somnolency. Cold or acid drinks are frequently craved. As the disease progresses, cardialgia will be often experienced, also cardiac palpitation, or increased aortic pulsation, and colic pains; the pulse often becomes corded and frequent; colic pains become more violent, and occur more frequently; all the previous symptoms become aggravated; diarrhea, in which the food passes imperfectly digested, is of frequent occurrence; debility and emaciation ensue; the countenance becomes more sallow, with a wild, anxious appearance; the skin is dry and wrinkled; pains in the left side, with an inability to lie on that side, and there is generally a morbid susceptibility to cold. Heat of the stomach, aphthous ulcers of the mouth, and eruptions on the face, are by no means uncommon. Vertigo, tinnitus aurium,

double-vision and other derangements of vision, acute tenderness of the scalp, etc., are often complained of.* Although one patient will scarcely present all the symptoms above enumerated, yet several of them are almost always associated, and, among a num-

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* In a small work, entitled "The Dyspeptic's Monitor," etc., by S. W. Avery, M. D., New York, 1830, are the following remarks, which are as worthy of attention at this time as at the period of their publication. Dr. Avery divides derangements of the digestive organs into three species. He considers the *first* species to "Consist in an enfeebled condition of the stomach, which secretes a preternatural quantity of highly acid fluid, unfit for the process of healthy digestion. The prominent symptoms are, incessant, dull headache, especially aggravated after eating, flatulence, an uneasy gnawing sensation in the stomach when empty, usually mistaken for hunger, heart-burn, acid eructations and belching, especially after eating, profuse flow of saliva into the mouth, tongue lightly coated, and an unpleasant taste in the mouth in the morning. There is sometimes thrown up a short time after eating, especially the breakfast, a considerable quantity of limpid, sour fluid, so acrid as to give a scalded appearance to the tongue and throat; sometimes it is mixed with bitter or oily matters, but rarely with any of the food taken. If indigestible food, as fatty meats, or a considerable quantity of any fluid be taken at meals, for some hours after, the distress is increased, all the symptoms aggravated, and a general feverish condition induced. Notwithstanding all this disturbance in the stomach, the bowels often continue nearly regular, and the action of the liver not seriously deranged, particularly in such as have frequent acid eructations. This species is often attended with a train of symptoms which pass for nervous, and which are only to be overcome by *correcting the acidity of the stomach.* A part of this acid no doubt arises from the ingesta undergoing the acetous fermentation during digestion; but much the greater part of it is a secretion of the stomach,—a vitiated gastric juice, caused by indigestible or improper food being taken into an enfeebled stomach.

"The *second* species is marked by hepatic derangement, combined with imperfect digestion. This form is apt to occur, or become aggravated, during summer, and to remit as cold weather approaches. Its leading features are connected with bilious disorder, as, remarkable depression of strength with languor and listlessness, especially on rising in the morning; bitter, disagreeable taste in the mouth; yellow fur on the tongue; torpid and irregular bowels; high-colored urine; restless, feverish nights, and progressive emaciation. The patient often complains of vague pains shooting in various directions, sometimes in the shoulders, back of the neck, and at other times in the sides or pit of the stomach, and a sense of weariness in all his limbs; almost constant aching in the back and loins, with a numbness of the right side and arm, or a burning sensation at the epigastrium. The complexion is often of a dingy hue, and the eyes occasionally have a yellow tinge. The state of his strength is very uncertain and variable, sometimes he can scarcely lift up his hand, and soon after he will walk a mile without much fatigue. All his complaints are greatly aggravated by eating, and he obtains so much relief from fasting, that he dreads the return of meals, which invariably add to his mental, as well as bodily suffering, by plunging him into gloom and melancholy, till finally his temper is rendered so irritable and impatient that no fortitude can repress its sallies.

"The *third* species depends upon a morbid sensibility or irritability of the inner

ber of patients taken in the aggregate, the greater part of these symptoms, if not all of them, will be encountered.

Usually, there are associated with dyspepsia certain prominent symptoms which should receive particular attention, as they fre-

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surface of the stomach and bowels, with more or less hepatic derangement. It presents itself in two forms, either with or without *marked* symptoms of indigestion. In the former, it often goes to the extent of painful digestion, especially on taking any stimulant article; in some cases, any solid substance, as a crust of bread, will bring it on, so that the patient is obliged to confine himself to light fluid nourishment, in order to avoid the gastric distress, the tormenting headache, the nervous agitations, the palpitations, and finally, the faintness, nausea, and vomiting that is apt to ensue on the least error of diet. When the disease arrives at this stage, the head is seldom free from pain; solid food is rejected without having undergone the least change, after remaining for hours in the stomach; the bowels become torpid; the complexion dingy; the strength and flesh waste rapidly, and the nights are restless, feverish, and disturbed by frightful dreams. The function of the liver is generally much deranged, producing pain in the side, slight, hacking cough, a sense of weariness or pain in the back, loins, and limbs, listlessness, with dejection of mind and gloominess. A most distressing train of nervous symptoms is often connected with this form of the disease. The most trifling occurrence frightens and agitates the patient, produces palpitations, and shows his whole nervous system to be acutely sensible. His bowels also become so morbidly irritable as to be acted on violently by the smallest quantity of cathartic medicine, producing pain and uneasiness, which induces the patient to delay its repetition as long as he possibly can.

"The other form of this species is the most melancholy of all these derangements. It is usually known by the names of low spirits, hypochondriasis, melancholy, etc., and is extremely various in its character and forms. Indigestion seldom forms a prominent feature of the disease; often, indeed, there are few or no symptoms of such derangement present, in which case the true seat and nature of the disease may be wholly overlooked. The persons most subject to this form are generally past the meridian of life, and such as have been engaged in active business, particularly in hot climates. Flatulence, eructations, sense of distension and weight at the stomach after eating, irregular bowels, etc., are present in some cases; in others, there are no indications of bad digestion, or at least very slight ones. When they do exist, however, they are apt to be overlooked in anxiously attending to the sympathetic affections of other parts. In some instances the head is affected with giddiness, and confusion of ideas, ringing in the ears, and indistinct vision. In others, the action of the heart becomes exceedingly irregular, throbbing, and beating violently against the side, now and then intermitting, and occasioning great distress and anxiety. Sometimes there is severe smarting and pain in voiding the urine, which is often scanty, turbid, and high-colored, then again abundant and colorless. But it would be fruitless to attempt to give a description of all the varied forms of this Protean disease; one character, however, is common to them all, and that is the most dreadful mental dejection, and a disposition to magnify every unpleasant feeling, and to look upon their complaints as incurable and fatal. The bile in the worst forms of this species is often greatly altered from its healthy condition; it becomes thick, ropy, and tenacious, like bird-lime, and so acrid as to irritate and excite excessive pain in the parts it passes over."

quently act as indices to the character of treatment that should be pursued. Thus, with some patients an excessive acidity of the stomach, manifested by a thick white coat upon the tongue, unpleasant taste in the mouth in the morning after a night's sleep; again, eructations of a fetid or acid character may be present; or excessive flatulency; severe pain in the epigastric region, and this may be continuous, or manifest itself either shortly before or soon after a meal; constipation of an obstinate character may be a prominent symptom, but this is generally due to intestinal affection. With many patients, the dyspeptic symptoms present themselves only after having partaken of certain articles of food, as, albuminous, saccharine, amylaceous, oily, alcoholic, etc.; or, again, the want of one of these particular articles may give rise to the digestive derangements. I am acquainted with a gentleman with whose stomach every article of diet agrees, save custard; the instant the first teaspoonful reaches his stomach, he is attacked with a diarrhea that almost always requires medical aid before it can be removed. This has proved a source of much annoyance to him, especially when away from home, and when, forgetting himself, he has swallowed a spoonful of custard, he has been invariably compelled to leave the table immediately.

In the examination of patients laboring under the symptoms above named, the physician must be very careful to avoid jumping at conclusions; he must remember that similar symptoms are common to other gastric affections, and that these affections may be complicated with dyspepsia either as a cause or a result. Great care and patience is, therefore, required in these investigations.

Dyspepsia *may arise* from abnormal conditions of the nervous system, as well as of the blood, and, indirectly, by the various conditions that affect the nutritive processes in the body. An unhealthy condition of the nervous system, and especially of those nerves more directly associated with the gastric functions, must, necessarily, impair these functions to a greater or less extent. Unhealthy blood, due to any cause, must necessarily give rise to unhealthy secretions, and impaired nervous power; and, if the stomach be the organ more especially influenced from this cause, some form of indigestion must be the inevitable result. Again, between the stomach and the various organs of the body there exists an intimate sympathetic relation, so that when one or more distant organs become functionally or organically affected, it is by no means uncommon to witness an impairment of the digestive powers. Thus, in asthma, gout, diabetes, several cutaneous maladies, cerebral, cardiac, hepatic, or renal disease, symptoms of indigestion are often observed, and which can

only be removed by the cure of the primary affection,—this imperfection or perversion of the digestive function is not generally included under the head of Indigestion, but has been referred to primary mal-assimilation.—Habershon states that dyspepsia arises, "1. From abnormal condition of the gastric mucous membrane and its secretion; 2. From the muscular movements being impeded; 3. From the state of the vascular supply; 4. From the condition of the nervous system; and, lastly, 5. From the character and changes which take place in the food. Several of these causes of dyspepsia may be combined; some lead to disease of a very transient form, others are irremediable."

Among the causes producing dyspepsia, a very prominent one is, the ingestion of a large amount of food, hastily and imperfectly masticated, and followed by undue mental or physical exertion, as, is apt to be the case with merchants, artists, and others of sedentary occupations. Excessive action either of mind or body, should always be avoided for some time previous to, as well as after a meal; to insure healthy digestion and tone of the stomach, both the mind and the body should be properly and regularly exercised, with appropriate intervals of rest or recreation. Dyspepsia is especially common to those who eat hastily, and in large quantity, as, among merchants, travelers, and hotel-boarders. To witness the major portion of American meals, and especially at public places, one would suppose that it was a matter of no interest how food was eaten, so it became safely lodged in the stomach. A stranger to the habits of this country, on witnessing a meal on a steamboat, or at a hotel, would be led to believe either that the partakers thereof never had a full meal before; that they were in constant dread of a visit from the sheriff; that they were eating on a wager, the first one from the table to be winner; or, that the meal was so obnoxious a task, that every one endeavored to hasten through it as rapidly as possible, pouring soups, fish, meats, custards, pies, liquors, nuts, oranges, raisins, etc., into the stomach, *en masse*, without regard to quantity, quality, or suitableness for the digestive organs.

Dyspepsia may likewise be produced by certain, long-continued habits, as, the use of powerful stimulants, alcoholic liquors, high-seasoned dishes, too frequent use of warm fluids, tobacco, late hours, excess in venery, masturbation, sedentary life more especially when conjoined with excessive brain-work, indolence, mental depression, great anxiety, excessive muscular exertion, and indeed by anything that will impair or destroy the sensibility of the stomach, or diminish its nervous energy. Frequently the disease will depend upon some affection of the spinal cord. And I have no doubt but that the

foundation of the disease is laid, more frequently than is dreamed of, by the constant use of water passing through lead pipes, together with that of the trash so generally sold in our cities under the name of "milk."

As already remarked, in the *diagnosis* of dyspepsia, great care should be taken to ascertain whether the symptoms are due to this affection simply, or to some other gastric malady; also, whether a disease of some other organ or organs exists, that may mask or aggravate the dyspeptic symptoms; and whether the indigestion is independent of such affections, or, is either a cause, or a result of their presence.

The urine of dyspeptic persons usually presents one of three kinds of deposit, that may exist separately, together, or alternately at various intervals. They are, 1. Oxalate of Lime, either in crystals or dumb-bells, and are apt to be associated with flatulency, debility, fatigue on slight exertion, cardiac palpitation more marked and obstinate than in other forms of dyspepsia, tendency to emaciation, sleeplessness, mental depression, irritability, anxiety, uneasiness or pain in the lumbar region, tendency to boils or scaly eruptions, frequent evacuations of the bladder; and a fancied or real deficiency of sexual power; it is a common deposit among those dyspeptics who have been masturbators. 2. Urate of Soda, of Ammonia, or Uric Acid, may be the passing consequence of an excess at table, or may result from habitual high living, a gouty or rheumatic tendency, etc.; when abundant, there is apt to be a grave affection of the liver. The dyspepsia in which these deposits are in excess is usually associated with furred tongue, sallow skin, hepatic torpor, constipation, and heavy or disturbed and unrefreshing sleep. 3. Triple Phosphates are usually present in cases associated with mental despondency, general debility, and a state of depressed nervous energy. A solution to the presence of these deposits may also be found in the character of the food and the manner in which it is acted upon by the digestive process.

In most cases of simple dyspepsia the *prognosis* is favorable; the earlier the case is brought under treatment the greater are the chances for cure, provided the patient will strictly follow directions. In long-standing cases, structural lesions of the digestive organs are apt to occur, and in such instances, as well as in those complicated with other diseases, permanent cures are rarely effected; palliation of urgent symptoms is generally the most that can be promised in such cases.

The *treatment* of dyspepsia in its early stage is a simple matter, requiring no medicine, but merely an attention on the part of

the patient to proper hygienical measures. Unfortunately, however, patients are rarely found who will subject themselves to the necessary hygiene, or deny themselves the pleasures of the table, as long as their symptoms do not compel them to do so, and when they are thus compelled, their disease has usually made such inroads that medicines are more apt to prove palliatives instead of curatives.

Brinton, in remarking upon the use of remedies, and the cure of disease by nature and diet, concludes thus: "Even in dyspepsia, the palliative effects of drugs are far too precious to be dispensed with. While, as regards their less measurable tonic and alterative effects, those who have witnessed their influence among the dyspeptic poor, and against all the terrible concomitants—scanty food, foul air, excessive toil, and intemperance—dyspepsia here possesses, must know that it would be a mockery to restrict this important class of our patients to regimen or *hygiene*. To tell an idle and wealthy dyspeptic that his malady might be cured without drugs, would be a hardy statement, though sometimes a true one. But to recommend dyspeptics in general to dispense with all medicines, would be not only illogical, but absurd; indeed, considering the circumstances of most of our patients, even in the affluent classes, scarcely less foolish or cruel than to withhold a rope from a drowning man, and to advise him to save himself by building a boat."—Yet, notwithstanding these remarks, we must be very careful not to administer active remedies unless they are positively and distinctly indicated; for the injudicious administration of medicines has permanently ruined many dyspeptic stomachs. Administer no active agent, unless with the view of effecting a required indication; and if this indication is not known, omit the medicine and spare the patient's stomach. It is much better to trust to hygiene and the resources of nature than to throw drugs blindly into the stomach. The practice of medicine does not consist in enormous doses of drugs, to ascertain how much a patient may take and recover, but in curing any disease with the least medicine possible. He is the best physician who can cure his patients without medicines; but, strange to say, the public have, unfortunately for themselves, formed a different opinion.

The therapeutical measures to be employed will greatly vary according to the peculiarity of the symptoms and the complications present. The principal object in simple dyspepsia is to impart healthy action to the coats of the stomach, and restore nervous power to this organ, and for this purpose there are numerous agents that may be employed in various combinations, as, Aletri-

din, Hydrastin, Alcoholic Extract of Nux Vomica, Strychnia, Black Alder Bark, Witch Hazle Bark, Solomon's Seal, Colombo, Gentian, Compound Tincture of Tamarac Bark, Compound Pills of Eupurpurin, etc. All other means are merely auxiliary, instituted to meet certain urgent symptoms. We will find, however, according to the condition of follicular atrophy of the gastric mucous membrane, anemia, debility or irritability of the stomach, acidity, etc., that these agents will require to be variously combined in order to meet the great variety of cases that will be encountered,—certain combinations being of great efficacy in some cases, and of no value in others.

Among the combinations that I have found more generally useful are the following: 1. Take of Hydrastin, Ptelein, each, forty-eight grains, Extract of Belladonna six grains, Alcoholic Extract of Nux Vomica four grains, mix thoroughly and divide into forty-eight pills. One of these pills is a dose, and may be repeated three times a day. At the same time, provided no gastric acidity be present, an infusion of equal parts of Solomon's Seal Root and Black Alder Bark may be used freely. 2. Take, of Bromide of Potassium forty grains, Soluble Hydrastin twenty grains, Strychnia one grain, Alcoholic Extract of Aletris twenty grains; mix, and divide into twenty pills, to be taken in the same manner as the preceding. 3. Take of Oxide of Silver eight grains, Alcoholic Extract of Aletris twenty-four grains, powdered Colombo a sufficient quantity, mix, and divide into twenty-four pills, to be taken as the preceding. 4. Take of Citrate of Iron and Strychnia forty grains, Extract of Quassia, Alcoholic Extract of Aletris, Soluble Hydrastin, each, twenty grains; mix, and divide into twenty-four pills to be taken as the preceding. As a general rule these pills will be found efficacious either with or without auxiliary measures, according to urgent symptoms or complications.

Instead of the infusion of Solomon's Seal and Black Alder referred to above, I frequently employ, and with most excellent results, the following: Take of White Indian Hemp Root, Colombo, Sassafras, each, three ounces, Quassia one and a half ounces, Prickly-ash berries six drachms; mix, and form an infusion. It may be taken in half tablespoonful doses three or four times a day, and will be found useful in cases with thick white coat on the tongue, body of the tongue pale, and epigastric pain. In advanced life, or in cases where there is great enfeeblement of the digestive powers, with loss of appetite, constipation, enfeebled pulse, paleness of the body of the tongue, as well as in anemic cases, spiced Wine Bitters, Compound Tincture of Tamarac, moderate use of stimu-

lants, with some preparation of iron and very nutritious diet, are among the agents that may be employed; being very careful, however, not to advise alcoholic stimulants among reformed inebriates.

In long-standing cases, or in strumous habits, I have found my original Iodine Pill to be very useful, thus: Take of Iodine twelve grains, Sulphate of Morphia three grains, Burnt Sponge, (or Leptandrin) twenty-four grains, Extract of Liquorice (or Alcoholic Extract of Aletris) a sufficient quantity to form into a pill mass; mix, and divide into twenty-four pills, of which one may be given every night and morning. In similar cases, attended with hepatic disease, constipation, nervous debility, etc., I have found the following very useful: Take of Strychnia one grain, Iodine seven grains, Podophyllin five grains, Extract of Belladonna two grains, Alcoholic Extract of Black Cohosh twenty grains; mix, and divide into twenty pills, of which one may be taken three times a day.—In atonic dyspepsia, attended with much nervous debility, Strychnia, Citrate of Iron and Strychnia, Phlorydzine, Sulphate of Quinia, Salicin, Lactate of Iron, and Ammonio-citrate of Iron, have been variously employed with advantage; the iron preparations are, however, contra-indicated in plethoric conditions of the system, and where there is an excess of uric acid or urates in the urine. The following will be found very useful: Take of Phlorydzine one drachm, Soluble Pyrophosphate of Iron one scruple, Glycerin four fluidounces, Aromatic Spirit of Ammonia two or three fluidrachms; mix. The dose is a tablespoonful three times a day.—Several cases of dyspepsia with hypochondria have been cured by tablesponful doses, three times a day, of a mixture composed of Fluid Extract of Leptandra, Fluid Extract of Ptelea, Fluid Extract of Black Cohosh, each, half a fluid ounce, Fluid Extract of Poke, two fluidrachms, Brandy one pint.*

In nearly all cases, counter-irritation along the upper half of the spinal column, or even along its whole length, will be found exceedingly useful. And for this purpose I prefer the Compound Tincture of Camphor; it must be gently rubbed upon the part once or twice a day, so as to produce a moderate burning sensation, and which sensation will be present during the day or whenever the patient exercises or becomes warm. If too severe, it should not be applied so frequently. Unless this sensation is produced the article will be of no benefit. It may also be employed

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* In cases where Fluid Extracts are named, it must be remembered that Essential or Concentrated Tinctures, are all identical, being only different names for similar preparations.

in cases associated with irritation of the spinal cord. Sometimes, dry cupping, firing, etc., will be useful where there is tenderness along the spinal column,—applying these over the tender points.—Emetics are rarely necessary in dyspepsia, except for the purpose of removing offending matters, excess of food, etc., from the stomach, to arouse a torpid liver, or, occasionally, to give a shock to the nervous system, and render the action of other medicines more effectual; but, as a general rule, I am opposed to the exhibition of emetics in this disease.

An attention to hygiene is always necessary, maintaining the skin, bowels, and kidneys in a normal condition, by the means heretofore referred to in the Introduction. Frequent bathings will be found very important. Moderate exercise daily, should be advised; and as to diet, the patient should be allowed to eat moderately of *anything that agrees with his digestive organs*, or, that is of easy digestion, and will not produce uneasiness or pain in the stomach, acidity, flatulency, constipation or looseness, etc., being careful to *masticate the food well before allowing it to pass into the stomach.* Indeed, I have cured many cases of dyspepsia by simply placing the patients upon a meat diet, directing them not to swallow any of it, but to continue the mastication of each mouthful until it has disappeared; in this manner the food becomes thoroughly masticated and, as it were, spontaneously passes into the stomach.* It is necessary that the patient should refrain from any kind of bodily or severe mental exercise for at least half an hour before meal-time, especially before dinner or the principal meal,—even walking should be avoided as much as possible—he should compose and thus, as it were, prepare his stomach for the meal. And after the meal, no bodily or mental exercise should be attempted for at least one hour afterward; this course will favor digestion, give tone to the stomach, impart strength to the system, and eventually obviate dyspeptic costiveness. Dyspeptics should always stand, sit and lie down in an erect position,

*I have known several instances where dyspeptic and other invalids were positively cured by the following course: for breakfast a cracker or two and some pure milk; the same for dinner, with, perhaps, a similar lunch between these meals,—the object being to avoid placing much food into the stomach during the hours when physical or mental labor is required. After finishing the business of the day, a hearty meal is made at supper, and in three or four hours after, the person retires to sleep. Making the last meal of the day, the principal one, is not exactly in accordance with the views generally entertained upon this matter, yet I have, nevertheless, known it to be productive of immense benefit; one gentleman of my acquaintance has pursued it for years; he is engaged in active business, and finds great advantage from it in every respect.

so as not to confine the stomach too much by pressure from the surrounding parts Cheerfulness and cheerful society during exercise, at meals, etc., are important accompaniments to the dyspeptic. Great or constant mental labors must be avoided.

In those instances where the dyspepsia is the result of other diseases, or is complicated with them, they must be treated the same as if the dyspepsia were absent. But we must be very careful in our diagnosis, as, hysteria, hypochondria, cardiac palpitations, and apparent lung maladies, are often the result of a sympathetic re-action of the stomach disease upon other organs. Again, the urine should be carefully examined in all cases of dyspepsia, as it is frequently the case that the stomach symptoms are wholly due to disease of the kidney.

When dyspepsia has advanced somewhat, it is usual to find it associated with certain unpleasant symptoms, which are often so prominent as to demand special treatment; as these symptoms may also exist where there is no dyspepsia, I will now refer to them separately, giving the measures that may be employed for their removal or palliation, according to circumstances. And although many symptoms are referred to, and many remedies named, it must be remembered *that the superiority and success of the practitioner depends upon a skillful selection and combination of these agents, calculated to benefit at the same time, the dyspepsia and its prominent symptoms, without rendering them bulky, offensive to the taste, unpleasant in action, and without keeping the stomach constantly loaded with drugs.*

Excessive secretion of mucus is usually the result of a diseased state of the mucous follicles, which pour out an abundance of mucus, often combined with an excess of gastric juice. Should vomiting be associated with the symptoms indicating this condition, the neutral mucus, and the acid gastric juice may be determined by the usual chemical and microscopical tests. The principal *symptoms* in this form of dyspepsia are, deficient appetite or anorexia, a feeling of weight and distension immediately after taking the smallest amount of food, pain between the shoulders, tongue coated with a thick white layer of mucus, a constant bad taste in the mouth, flatulency, acrid eructations, and cold feet. The breath is usually fetid, sometimes there is nausea, constipation is common, though the bowels in some rare cases may be regular, and occasionally diarrhea may be present. Vomiting may also exist, and, when not mixed with gastric juice, the fluid ejected is insipid, clear, and glairy, somewhat resembling white of egg; it may be

mixed with the food, but more generally is discharged alone, and especially in the morning before breakfast. The disease is commonly met with among persons whose nervous systems are greatly impaired, as, drunkards, overworked and poorly fed persons, hard students, etc. This catarrhal state of the stomach is usually associated with an inflamed or congested condition of the gastric mucous membrane, which is frequently caused by a similar state of the portal system.

The *treatment* consists in pursuing a regular and nutritious diet, avoiding all active stimulants, bathing the surface frequently, and keeping the bowels and kidneys in as healthy a condition as possible. To lessen the congested or inflamed state of the stomach, various means may be employed, some of which will be found more beneficial in certain cases than others; among these, the following have been very efficacious: 1. Take of Soluble Hydrastin one scruple, Geraniin two scruples, Nitrate of Bismuth four scruples; mix, and divide into twenty powders, of which one may be taken for a dose, shortly previous to each meal.—2. Take of Soluble Hydrastin one scruple, Geraniin two scruples, Fluid Extract of Wild Cherry, Tincture of Cannabis Indica, each, ten fluidrachms, mix. The dose is one teaspoonful to be taken before each meal.—3. Take of Inspissated juice of Oxgall one drachm, Leptandrin half a drachm, Oleo-resin of Iris Versicolor ten grains, Extract of Quassia, a sufficient quantity to make into a pill mass; mix, and divide into thirty pills, one of which may be taken before each meal. This will be found especially useful in cases where there is hepatic congestion, with flatulence, constipation, and eructations.—Other agents will also be found beneficial, as, White Indian Hemp, Black Cohosh, Alum, Capsicum, Xanthoxylin, Opium, Chlorate of Potassa especially in offensive breath, Tincture of Muriate of Iron, and Oxide of Zinc, which agents may be combined to suit each particular case. If there be acid with the mucus, adopt the means hereafter named under Gastric Acidity. Vomiting will also be referred to hereafter.

Excessive gastric acidity is one of the symptoms of dyspepsia, the most difficult, in many cases, to overcome. It may be associated with an excess, deficiency, or normal quantity of the secretion of mucus, and may consist either of an excess of the gastric juice, (hydrochloric acid), or of lactic, acetic, carbonic, butyric, or oxalic acid, which last named acids are frequently the result of decomposition and fermentation of the food detained in the stomach; some-

times one, and sometimes the other being present, according to the composition of the food. It may be remarked, however, that it is rarely the case that there is an excess of gastric juice. The character of the acids, if vomited up, should be carefully examined in order to gain information that will aid in the treatment. If the acid be hydrochloric, it may be due to a secretion of the gastric juice at other times than when food is in the stomach; to imperfect digestion, and to direct as well as reflex irritation. Acetic acid is seldom observed, but may, the same as the lactic, butyric, carbonic, and oxalic acids, be due to imperfect digestion and fermentation of the food. The *symptoms* of gastric acidity vary somewhat with different individuals, although, generally well marked. There may be a deficient or voracious appetite, or, a perfect disgust for food; the tongue will be coated white, the thickness of this coat indicating the intensity and obstinacy of removal of the acid; some cases will present a cracked or deeply-fissured tongue, and the papillæ at its base will be very much elevated; there will often be acid regurgitations, sometimes excoriating the fauces, tongue, mouth, lips, and even gradually decomposing the teeth; a sensation of burning along the œsophagus, frequently attended with epigastric pain, (*see Heart-burn*); a dry, parched condition of the mouth, with more or less thirst, is usually present; the urine is scanty, high colored, scalding, and depositing uric acid or urates. Constipation is generally present, occasionally diarrhea; more or less nervousness, and in the more severe cases hypochondria, hysteria, epileptiform symptoms, headache, cough, etc.

It might be supposed that an excess of acid could be readily removed and a further tendency to its formation arrested, but experience has proven that this is by no means an easy matter, and that various and even opposite remedies are required for the different cases. Thus, among some patients, the following powder will be found sufficient to regulate the bowels, neutralize acidity, arouse hepatic action, and impart tone to the whole alimentary canal: Take of good Turkey Rhubarb in powder two ounces, Bicarbonate of Soda, or of Potassa, one ounce; mix, and administer a sufficient quantity, three times a day, say from five to twenty grains, in a little water or glycerin, to produce one, but never more than two, alvine evacuations daily, approaching as nearly as possible to those of health. The soda, in the above mixture, is to be used when the liver is torpid, the tongue is furred or coated, and uric acid or urates are deposited in the urine; the potash when the kidneys are torpid and there is an abundance of uric acid and urates.

Should there be much gastric irritability, magnesia will answer a better purpose than the soda or potash.

It must be recollected that a long-continued use of alkalies injures the tone of the stomach, and favors increased acidity, consequently, their use should be supended as soon as the symptoms of acidity have disappeared, or when phosphatic deposits occur in the urine. Magnesia and Bismuth are useful where gastrodynia, and epigastric tenderness are also present; and Lime-water will be found useful in cases of acid vomiting with excessive gastric irritability. Prepared Charcoal is useful in most instances; it may be used alone in teaspoonful doses in water or glycerin, three or four times a day, or, it may be used in one of the following combinations, viz.: 1. Take of Guaiac, Rhubarb, and Prepared Charcoal, each, in powder, equal parts; mix. The dose is a teaspoonful in milk, yolk of egg, or Indian meal gruel, and which may be repeated three or four times a day. 2. Take of Prepared Charcoal sixteen parts, Bicarbonate of Soda, (or Potassa) two parts, Rhubarb one part; mix. The dose is a teaspoonful in water, to be repeated three times a day, or enough to keep the bowels regular. If there is hepatic torpor or obstinate constipation, Mandrake one part may be added; and if there is much flatulence, good African Ginger one part, may also be added. These preparations are not as agreeable as could be desired, but pleasant remedies rarely succeed in obstinate gastric acidity. Great attention must be paid to diet and exercise.

It must be recollected that the use of fluids during meals, dilutes the gastric juice, thereby favoring imperfect digestion and acidity; consequently, but little, if any, fluid should be taken during a meal, or, for an hour or two afterward.—In cases where there was a white coat on the tongue, with bad taste in the mouth and unpleasant breath, obstinately persisting and unyielding to other remedies, I have effected permanent cures, by teaspoonful doses, repeated four times a day, of a mixture of Fluid Extract of Mandrake two fluidrachms, Fluid Extract of Leptandra four fluidounces, Fluid Extract of Golden Seal one fluidounce, Compound Syrup of Rhubarb and Potassa one pint.

In anemic cases, where the body of the tongue is pale and flabby, digestion slow, and oxalate of lime crystals are deposited in the urine, mineral acids will be found very efficacious in improving the condition of the stomach and overcoming the acidity; the Nitro-hydrochloric Acid in doses of four or five drops, added to a cold infusion of Colombo and Golden Seal, and repeated every four hours will be found especially beneficial; in some cases the

Tincture of Chloride of Iron, or, Elixir Vitriol will prove useful.—The following will also be of service in many instances: 1. Take of Aqua Ammonia one drachm, Calcined Magnesia two drachms, Cinnamon Water two fluidounces, Water six fluidounces; mix. This may be employed to restore the tone of the stomach, in delicate females, as well as in drunkards. The dose is a tablespoonful as often as required. Or, pure Liquor Potassa may be substituted for the Aq. Ammonia.—Bismuth, either alone, or with Magnesia or Chalk, has also been highly recommended in gastric acidity.—In all cases of acidity where there is an irritable condition of the stomach, with heat, and pain on pressure at the epigastrium, sedatives should be given, as, Hyoscyamus, Belladonna, Conium, and, in cases of diarrhea, Opium: at the same time counter-irritation should be applied over the epigastric region.—In cases where there is a thick white coat upon the tongue, its body pale, papillæ enlarged, constipation, and pain in the region of the liver and stomach, much benefit will frequently follow the exhibition of tablespoonful doses, repeated three or four times a day, of a mixture composed of Salicin ten grains, Tincture of Mandrake four fluidrachms, Catawba Wine five and a half fluid ounces.

Heart-burn or *Cardialgia* is commonly due to acid in the stomach, and may be removed by the means that will neutralize the acidity and restore the tone of this organ.—When heart-burn is only a symptom of gastrodynia, not being attended with disordered secretion, the Trisnitrate of Bismuth, Alcoholic Extract of Aletris, Dioscorein, Oxide of Zinc, Extract of Chamomile, or of Scullcap, etc., will be found appropriate remedies. Painful digestion accompanied with heart-burn and pyrosis, has been greatly benefited by Cod Liver Oil. (*See Chronic Gastritis*, *c*, page 698.)

Deficient secretion of the gastric juice is attended with various symptoms, the principal of which, are, impairment, or loss of appetite; tongue furred, though sometimes not furred but slimy, with a brown streak along its center; digestion is slow and imperfect, even a moderate meal causing a sensation of weight, uneasiness, and distress at the epigastrium, and especially after partaking of albuminoid substances; there is a general feeling of languor, indolence, mental and physical inactivity; and in many instances, nausea, vomiting, flatulence, fetid eructations, headache, cold extremities, depression of spirits, impaired sleep, unpleasant dreams, constipation, pains or cramps, sallow complexion, emaciation, etc., are, one or more of them, also present. This form of dyspepsia,

atonic, may be due to several causes, as, the habitual ingestion of an excess of food, indolent and sedentary habits, habitual use of stimulants, congestion of the stomach, weak digestive power from overexertion of the brain, masturbation, or impaired nervous power, whether congenital or acquired.

The *treatment* consists in restoring the nervous power of the stomach, which will, of course, improve its muscular and secretory functions. Stimulating and tonic alcoholic bitters, Lactate of Iron, Citrate of Iron and Strychnia, Strychnia, Hydrastin, Ipecacuanha, Xanthoxylin, Aletridin, Ammonia, are the agents that will be found useful. Thus, a very excellent pill may be formed of Citrate of Iron and Strychnia two scruples, Soluble Hydrastin, Capsicum, Alcoholic Extract of Aletris, each, one scruple; mix, and divide into twenty pills. One of these pills may be taken shortly before each meal. If there be hepatic disease also present, Podophyllin and Leptandrin may be added to these pills; or, the Compound Tincture of Tamarac Bark may be advantageously employed. A very good pill consists of Ipecacuanha ten grains, Xanthoxylin, Leptandrin, and Extract of Quassia, one scruple; mix, and divide into twenty pills, to be taken the same as the preceding. A mixture of Leptandrin two grains, Hydrastin one grain, Lactate of Iron three grains, Dried Oxgall, five grains, given for a dose, and repeated two or three times a day, will be found useful in many long-standing and obstinate cases; and if much gastric debility be present, a few grains of Capsicum may also be added to each dose.

In this form of dyspepsia, emetics as well as purgatives are injurious, as they exhaust and enfeeble the stomach. But the bowels must be kept regular by food or mild agents; and as to the food, the same rules are applicable here, as in other forms of indigestion,—it must be digestible, agree with the digestive organs, be used with moderation, eaten slowly, and masticated thoroughly.—Fetid eructations may be checked by avoiding eating too much, and using Wine of Pepsin, Tincture of Chloride of Iron, Hypophosphite of Soda, or, a mixture of Charcoal thirty grains, Trisnitrate of Bismuth ten grains. A few drops of Nitro-hydrochloric Acid, diluted; or, Diluted Acetic Acid with half a drop or a drop of Creosote added,—taken shortly before meals, have also been recommended.

Pyrosis, or *Water-brash*, is by no means an unfrequent symptom; it consists in the vomiting or regurgitation of a thin watery fluid

or mucus from the stomach, sometimes as much as a pint at a time, and which may be insipid, or extremely acid. It more commonly occurs when the stomach is empty, and is usually preceded or accompanied by a sense of burning and pain, especially at the epigastric region. Females are more liable to it than males, particularly those laboring under leucorrhea, and among the poorer classes; and it may not only be present in dyspepsia, but also in other gastric maladies. Whatever exhausts the system, or deranges the gastric functions, may give rise to it, as well as innutritious food, without there being any serious symptoms of stomach disease. Various views have been entertained regarding the nature of the fluid of pyrosis; at one time it was considered as a secretion from the pancreas; Chambers and others consider it to come from the glands at the inferior part of the œsophagus. At present, it is presumed to be saliva, which, from some cause, is secreted in abundance and carried into the stomach, as it possesses all the chemical and microscopical qualities of this fluid from the mouth,—producing sugar from starch, containing sulpho-cyanide of potassium, and presenting pavement epithelial scales. Its acidity is due to the presence of some of the acids of the stomach; occasionally, bile has been observed in it.

The *treatment* of pyrosis consists principally in the use of sedatives to allay irritation and relieve pain, and astringents to check the excess of fluid secreted; as, 1. Trisnitrate of Bismuth five grains, Sulphate of Morphia one-tenth to one-fourth of a grain; mix for a dose, and repeat three times a day; half a grain of Sulphate of Quinia may frequently be advantageously added to each dose. 2. Oxide of Silver one-fourth grain, Extract of Logwood (or of Rhatany) two grains; mix for a dose, and repeat three times a day. 3. Kino, Alum, Geraniin, each, in powder, one grain, Opium half a grain; mix for a dose, and repeat three times a day. Other agents have been found efficacious, as, Sulphate of Iron, in anemic cases; Strychnia or Nux Vomica in cases of nervous debility; Catechu; Nitrate of Silver; and, as sedatives, Hyoscyamus, medicinal Hydrocyanic Acid, Conium, Gelseminum, etc. I have known cases cured by an illiterate practitioner, who administered a powder composed as follows: Take of equal parts of the inner skin of chickens' gizzards, dried and pulverized, sulphur, resin, and alum; mix. The dose is from five to fifteen grains three times a day. In many cases, cures have been performed by tablespoonful doses of a mixture of equal parts of Compound Tincture of Senna, and Tincture of Tolu; also by teaspoonful doses of the mixture of Tincture of Tolu, Gum Hemlock, etc., in *Am. Disp.*, *6th ed.*, 1864,

page 16. Gallic Acid has also been found highly efficacious, when ulceration, organic malignant gastric disease, and hepatic disease are absent; it increases the appetite, gives tone to the stomach, and frequently removes constipation.

Nausea and *vomiting* may occur separately or combined, and are common with most of the diseases of the stomach, though it must not be forgotten that they, especially vomiting, may arise from causes independent of this organ, as, from morbid states of the brain, liver, intestines, kidneys, etc. The same causes that occasion nausea may also produce vomiting.

Some persons vomit from the slightest causes, while others never vomit. If the stomach be empty when vomiting occurs, it is usually due to other than stomach disease, as, from diseased heart, abdominal tumor, pregnancy, etc. "If the vomiting occurs soon after eating, the smaller the quantity of food, and the sooner it takes place after eating, the nearer to the mouth is the injury. Disease of the œsophagus causes rejection of the food before it has got down; of the cardia, or smaller curvature, very soon after it has got down; and disease of the pylorus, pancreas, or liver, after an interval, sometimes, of as much as several hours. When it is due to congestion of the brain, it is increased by the horizontal posture; when to a deficient supply of blood, that position relieves it, as, in anemia, fainting, etc." The matters vomited up may be food or liquid, sarcinæ, mucus, a thin fluid resembling saliva, bile, blood, pus, or fecal matters, depending upon the cause producing the emesis. The expulsion of food or liquid is usually due to irritation or mechanical obstruction; sarcinæ, to a process of fermentation; mucus, to a catarrhal inflammation of the mucous membrane; the salival fluid, to some functional or organic disease of the stomach, not yet fully determined; bile, to regurgitation from excessive and protracted retchings; blood, to organic disease of the stomach, to a morbid condition of the blood, to an obstruction in the portal system, to ulceration or injury of the stomach, or, it may be vicarious; if the blood be in considerable quantities, containing black clots, it comes probably from an open vessel perforated by an ulcer; pus, to ulcers or abscesses occurring in or near the stomach; and fecal matters, to an obstruction to the passage of feces, to a fistulous communication between the stomach and colon, or, to paralysis of some part of the intestinal tube. (*See Chronic Gastritis, b*, page 697.)

Acidity may occasion vomiting, requiring the treatment heretofore named. If constipation is the cause, pursue the measures

named under this head. If irritability of the stomach, sedatives, and counter-irritation over the epigastric region will be required; as, 1. Muriate of Morphia half a grain, Dilute Hydrocyanic Acid five minims; mix for a dose, to be repeated every four hours. 2. Chloroform ten to twenty drops, Tincture of Camphor five or ten drops, Sulphate of Morphia one-eighth or one-fourth grain; mix for a dose, to be taken in water, or in equal parts of glycerin and water, and repeated every four hours. 3. Dilute Hydrocyanic Acid two or three drops, Creosote from one to three drops, Solution of Sulphate of Morphia twenty to thirty drops, Bicarbonate of Soda one scruple, Water one and a half fluidounces; mix for a dose, to be repeated as desired. This must not be administered if there is any suspicion of ulceration or abrasion of the gastric mucous membrane, and, the soda may be omitted if there exists no acidity. 4. An infusion of Parched Corn, or of Roasted Oatmeal Cake, will answer in many cases. 5. A mixture of Trisnitrate of Bismuth five or ten grains, Sulphate of Morphia one-eighth of a grain, will frequently answer an admirable purpose. 6. And occasionally, half-drachm doses, in an infusion of Spearmint, of equal parts of Tincture of Laudanum, Essence of Peppermint, and Tincture of Camphor, will prove efficacious. 7. A mixture of Tincture of Cyanide of Potassium and Laudanum will also be found efficacious in cases of vomiting, especially when accompanied with diarrhea. Hydrocyanic Acid, or Cyanide of Potassium, is especially useful in those cases where the vomiting is not due to any disease of the stomach, but to the secondary condition of the nervous system, as, in heart disease, peritonitis, phthisis, etc. Opiates are useful when the vomiting is accompanied by much local pain. Chloroform is useful in nervous vomiting, or where there is much gastric excitability; it may be taken internally, or be applied to the epigastrium, on a cloth, and then covered with oil-cloth. Charcoal, Carbonate of Magnesia, etc., are useful in vomiting with excessive acidity. It is often the case that chronic vomiting can only be checked by a diet solely of milk and lime-water, aided by complete rest and absence from excitement.

If the vomiting appears to be occasioned by the presence of food, occurring soon after its ingestion, the very lightest food must be used in very small quantities, and at lengthy intervals; counter-irritation must be applied over the epigastric region and along the dorsal spinal region; and internally, Bismuth, Dioscorein, infusion of Witch Hazle, Oatmeal Coffee, etc. In some very obstinate cases, I have found the following useful in vomiting from the last two named causes, viz.: Take of Strychnia one grain, Essence of

Monarda Punctata two and a half fluidrachms, Chloroform, Laudanum, each, five fluidrachms; mix. The dose is from ten to twenty-five drops in mucilage, or glycerin, and repeated every four or five hours.

Vomiting may also occur from a stricture of the pylorus, in which case there is an enlargement of the stomach, and the vomiting occurs some hours after the meal; this may be overcome to a greater or less extent by making use chiefly of a liquid diet, but it is not curable.—The vomiting due to cerebral, renal, hepatic, or intestinal, etc., disorders, although frequently relieved by the use of sedatives and counter-irritants, can only have a permanent cessation effected by the removal of the particular cause giving rise to it.—Vomiting in gastric ulceration, or cancer, etc., has already been referred to under these heads. It must be remembered that the presence of bile in the matters vomited is not always an indication that the case is one of "biliousness," as, severe retching or vomiting will often cause a regurgitation of bile into the stomach.

In all cases of severe and obstinate vomiting the bowels should be kept regular either by mild laxatives, administered by mouth, or, by injections; and the patient should be kept in the horizontal position as much as possible.

Not unfrequently the matters vomited up are of a frothy character, or become so after standing for a few hours, presenting a peculiar blackish or brownish, yeasty appearance, and frequently having a very fetid odor. The liquid is ordinarily in large quantities, from two pints to a gallon or two, has an acid odor, and an acid reaction. Upon a microscopic examination of this fluid, it will be found to contain, besides half-digested food, and other matters, numerous minute, square, oblong, or even irregular masses, of considerable consistence, and composed of four, eight, sixteen, sixty-four, or more squarish cells, having a slight brownish color, each cell being about the $\frac{1}{1\,6\,0\,0\,0}$ of an inch in diameter; they somewhat resemble small pockets bound with cords crossing each other at right angles; they are termed *Sarcinæ Ventriculi*. Yeast fungi (*Torula Cerevisiæ*) are also observed; and these microscopic vegetable formations, which appear to be the result of a process of fermentation, may exist together, or alone. These bodies may be present, either in functional or structural lesion of the stomach, and especially in dilatation of the organ, hypertrophy, pyloric disease, etc.; and they have been found where no symptoms of gastric disorder were manifest. More commonly these fungi are attended with pain, heartburn, flatulence, distension of the stomach, disturbed sleep, loss of flesh, and frequently, voracious appetite.

The *treatment* consists in preventing the fermentation of food in the stomach, and destroying the fungi. The means that may be employed to restrain the vomiting and check fermentation, are as follows: 1. Take of Creosote one or two drops, Extract of Opium one-fourth of a grain, Alcoholic Extract of Aletridin a sufficient quantity to form a pill; one of these pills may be taken before each meal. 2. Take of Solution of Chloride of Calcium one fluidrachm, Mint Water seven fluidrachms; mix. This draught to be taken for a dose, and repeated three times daily, before each meal. 3. Sulphite, or Hyposulphite of Soda in doses of from fifteen grains to a drachm, dissolved in water, and repeated two or three times a day, soon after meals. This agent will also destroy these parasitic formations; and its virtues are due to the fact that the soda salt is decomposed by almost any vegetable acid, as well as by the hydrochloric acid of the stomach, and that this decomposition liberates the sulphurous acid of the salt, which has great power to prevent alcoholic and acetous fermentation, and is at the same time a poison to the sarcinæ. Dilute Carbolic Acid, used for a number of days or weeks, will likewise be found an agent destructive to these fungus vegetations.

Vegetable bitter tonics will also destroy these fungi, as well as give tone to the stomach; the following will be found useful: Take of Quassia, Aletris, Ptelea, each, pulverized, three drachms, Water twelve fluidounces. Mix, and make a strong infusion, of which a tablespoonful may be given three times daily. Or, the Sulphite or Hyposulphite of Soda may be added to the infusion, say from four to six drachms. Prepared Charcoal, as well as Tincture of Chloride of Iron, have also proved of service. A sense of distension and spasmodic pain, accompanying this condition, may be relieved by Chloroform and Laudanum. The diet should be mild and unirritating, and the bowels be kept regular.

Pain in the stomach may vary in intensity from a sense of soreness, or, tenderness on pressure upon the epigastrium, to most severe agony and suffering. When the pain is of a spasmodic character, it is termed *gastrodynia*, and is frequently so violent as to demand immediate relief; it is due to the presence of indigestible food, acrid and abundant disordered secretions, functional or structural lesions, etc. When it partakes of a neuralgic character, it is termed *gastralgia*, and may exist independent of any disorder of digestion, requiring treatment similar to that already named under Neuralgia. When due to acidity with accompanying heart-burn, the

pain and the heart-burn together are termed *cardialgia*. (*See Chronic Gastritis, f*, page 699.) Some writers, however, employ these terms indiscriminately, and as referring merely to pain. Gastric pain is common to both functional and organic disorders of the digestive organ, and it is sometimes very difficult to determine with which of these conditions it is associated; it may also exist sympathetically as a symptom of disease of distant organs, as, the lungs, pleura, liver, spleen, kidneys, intestines, etc.

The pain is usually seated in the epigastrium, just beneath the ensiform cartilage, it may be increased or relieved by pressure, and may extend in various directions. The pain is serious in proportion to its severity, its continuousness, and its fixedness constantly at one spot; when seated in or near the median line, it is also more unfavorable; and is the most serious when associated with pains in the spinal column located between the interscapular and lumbar regions, as is usually the case with gastric ulcer, gastric cancer, etc. It may be sudden and temporary; or it may continue more or less severe for a longer or shorter time, with intervals of quiet; and, when violent, is attended with a slow pulse, coldness of the surface, a sense of prostration, and frequently nausea or vomiting.

As a general rule, pain and soreness when attending organic diseases, or a morbidly irritable condition of the stomach, are more severe shortly after meals, or when the stomach is full, and especially so after a heavy meal of animal food and fermented drinks than after a light one of farinaceous food and milk. Pain coming on when the stomach is empty, and relieved by food, may be considered an indication of functional disorder. If the pain does not manifest itself for two, three, or four hours after a meal, it is due to morbid irritability of the mucous membrane of the duodenum, and is often accompanied by pain and soreness on pressure, in the right hypochondrium. If the pain is very violent, coming on in paroxysms at irregular intervals, with a sense of distension, anxiety, and great restlessness, it may be due to over-distension of the stomach, or, it may be seated in the arch of the colon. The history of the case, the appearance of the patient, the irregularity of the attacks of pain, being often quite independent of food or drink taken into the stomach, and the absence of vomiting blood or coffee-ground matters, will aid in determining whether gastric ulcer be present or not. In gastric cancer there is a peculiar cachexia, emaciation, tumor, and coffee-ground vomiting. In chronic gastritis there is no pain nor aggravation of pain on pressure, the course of the disease is irregular, the urine is changeable being rather anemic than inflammatory. In calculus in the gall bladder, hepatic or

cystic ducts, the pain is associated with severe nausea and vomiting.

The *treatment* of pain in the stomach in chronic organic lesions has already been referred to; I will now attend to that more especially connected with dyspepsia. If the pain be due to acidity, or flatulency, it may be relieved by the means named for removing these conditions. The pain attending vomiting, heart-burn and pyrosis may also be removed by the measures advised for these symptoms.

When, however, a sensation of distress or pain occurs, independent of the above symptoms, or, associated with them but not removed by the means referred to, the following will frequently be found a prompt and efficacious remedy: Take of Alcoholic Extract of Aletris one scruple, add to this as much Capsicum as will not destroy its pilular consistency, and divide into ten pills, of which, one or two may be taken for a dose, either shortly before or after a meal, according to the period when the pain occurs; these pills will also be found to relieve the nausea and sinking sensation experienced by some dyspeptics in the gastric region. Sometimes, half a grain or a grain of Alcoholic Extract of Nux Vomica may be advantageously added to the above. If there be considerable gastric irritation, the Capsicum should be omitted and Sulphate of Morphia in proper quantity, be substituted; at the same time counter-irritation to the epigastric region will be of service. If vesication is produced, great relief may be obtained by dressing it with Morphia.—A warm cataplasm of bruised Stramonium Leaves placed upon the epigastrium has been found very efficacious in many instances. Perhaps, anodyne hypodermic injections would afford relief. Occasionally, equal parts of Alcoholic Extract of Aletris, Hydrastin, and Capsicum will be useful. Again, Assafœtida, Opium, and dried Oxgall made into a pill, has been of value. When the distress, or pain is accompanied with, or, is owing to flatulency, five or ten grains of a mixture composed of equal parts of Hydrastin, Caulophylin, Dioscorein, and Ginger, will be beneficial.

If the pain be of a *neuralgic* character, dilute Hydrocyanic Acid, Extract of Belladonna, Sulphate of Quinia, Oxide of Zinc, Tincture of Sheep Laurel, etc., are among the proper remedies.—If it be of a *spasmodic* character, a few drops of Chloroform and Laudanum in an infusion of Scullcap, will be of service; or the Compound Tincture of Virginia Snakeroot; or the Compound Tincture of Lobelia and Capsicum. Relaxation should be effected by placing cloths moistened with hot water (but not hot enough to scald) over the gastric region, changing them frequently; and the bowels should be speedily

evacuated by a warm active laxative injection. Equal parts of Tinctures of Gelseminum, Dioscorea, and Skunk Cabbage, will also prove useful, in doses of a teaspoonful every twenty, thirty, or fifty minutes. In many instances, Chloroform, or, a mixture of Chloroform and Opium, or, a Belladonna Plaster, applied over the epigastrium, will promptly relieve pain; the chloroform should be prevented from evaporating by covering it with a dry cloth or oil silk. Ointment of Veratria, or, of Aconitia, rubbed over the pit of the stomach until a pricking sensation is produced, and repeated every two or three days, will often prove invaluable in obstinate and severe cases. These external measures, when applied alternately to the epigastrium, and to the sensitive region of the spinal column, will be very effectual in many difficult cases.

Aqua Ammonia, Aromatic Spirits of Ammonia, or Carbonate of Ammonia, has been highly recommended in dyspepsia accompanied with painful spasmodic affections of the stomach.—If the pain be due to too much food in the stomach, or to indigestible diet, an emetic may be given; but emetics are rarely required for this purpose, except when the patient has been careless or neglectful of what his diet consists.

Gastric pain may also be frequently relieved by stimulating applications along the dorsal vertebræ.

Headache has already been treated upon; *see* page 322.—*Hiccough* may be removed by inhaling Chloroform, and repeating it as often as the symptom returns; if the hiccough be intermittent the following will prove useful: Take of Sulphate of Quinia one grain, Opium half a grain, Supercarbonate of Soda three grains; mix, for a dose; to be repeated as required.—*Nightmare* can be removed by partaking moderately of food, keeping the bowels regular, avoiding flatulent diet, as well as that which is indigestible, neutralizing gastric acidity, and avoiding suppers. Persons subject to nightmare should also refrain from lying upon their backs while sleeping. An attack may be prevented by the following draught taken before retiring to bed: Take of Essence of Peppermint ten drops, Carbonate of Potassa ten grains, Tincture of Capsicum five drops, Water one fluidounce; mix.

Flatulency is a very common condition accompanying dyspepsia, as well as other affections of the stomach, and also of the intestines, and frequently occasions severe pain not only at the point where the gas accumulates, but likewise in distant parts; the pain being stationary or shifting. Flatulency may be due to several

causes, viz.: to air, swallowed with food, or otherwise; to decomposition of food in the digestive tube, especially that which is crude, and indigestible, saccharine, or amylaceous; to irritation and diminished tone of the gastric mucous membrane; or to gases evolved during the decomposition of fluids derived from the organism itself. Some authors have also attributed it to a secretion of gas from the blood-vessels, but there is no evidence to my mind that this ever occurs. Flatulency may be a constant symptom, rarely increasing, unless from an error in diet, or, it may appear and disappear suddenly, and in such large quantity as to greatly distend the part occupied by it. When it passes by belching, eructation, or from the rectum, it seldom proves serious, and such exit affords relief to any unpleasant symptoms produced by it. The gases usually formed in the alimentary canal, are, carbonic acid, nitrogen, hydrogen, sulphureted hydrogen, carbureted hydrogen, and ammonia; those which give rise to gastric distension are, principally, the carbonic acid, and nitrogen. Gases in the stomach often give rise to borborygmi, severe pains, sense of distension, or of cramp, or colic; in many instances, the source of annoyance is the presence of a fetid gas, which is required to be more or less constantly passed by belching or per rectum. Pain from gas may be constant, or intermittent, but is not increased on pressure, unless inflammation be likewise present.

In the *treatment* of flatulency, we must first ascertain whether any inflammatory action be present; if there be, it may be overcome by the use of sedatives, demulcents, and swallowing small pieces of ice, together with counter-irritation over the gastric region. If there be no inflammation, but an excess of acidity, the means named under this head may be pursued. If there be a torpid condition of the liver, or constipation, a cholagogue, or purgative will afford relief. An emetic, followed by a cathartic will be of service in those instances, where severe pain and distress, owing to an accumulation of gas, occur shortly after a meal, or, after eating crude substances; a dose of Castor Oil, with ten or twenty drops of Oil of Turpentine, and half a fluidrachm of Essence of Peppermint added, will be found a valuable cathartic in these cases. Sometimes, and especially when the gas collects in the intestines, much benefit will follow the use of stimulating cathartic injections.

Ordinarily, carminatives will relieve flatulency, as, Compound Spirits of Lavender, Oil of Cajuput, Hunn's Drops, etc. But, the gas will continue to collect until the digestive organs have been restored to their tone by the means heretofore named. In many

instances, the following will be found an excellent tonic and carminative: Take of Alcoholic Extract of Aletris forty grains, Alcohol two fluidrachms; rub thoroughly together until the extract is dissolved, and then add Tincture of Prickly-ash Berries, Glycerin, of each, two fluidounces. To this mixture add Strychnia one grain, thoroughly dissolved in one fluidounce of Glycerin and three fluid ounces of Essence of Cinnamon, or, of Ginger. The dose of this preparation is one or two fluidrachms, repeated two or three times daily.—Dioscorein; Fluid Extract of Pleurisy Root; Ginger; Charcoal; a drop or two of Creosote taken at meal-time; or Bisulphite of Soda, taken an hour or two after meals, or as soon as the evolution of gas in the digestive tube begins to be felt,—are among the remedies that have been of service in flatulency.—Suppositories worn in the rectum, one every night, in cases where there is excessive flatus of the lower bowels, are very serviceable; I have found one containing Soluble Hydrastin two grains, Dioscorein two grains, and Oil of Prickly-ash Berries four drops, to be of much benefit.

Persons who are subject to flatulency should always masticate their food thoroughly, should carefully avoid all articles of diet which produce or augment the flatus, should never eat immediately after mental or physical exercise or fatigue, and should never fast too long at a time. A scant diet must be used in cases where there is fermentation or putrefactive decomposition.

The secretion of *urine* is very changeable in dyspepsia; sometimes it is quite scanty, of a deep-red color, extremely acid, and depositing uric acid, or urates, and for which alkalies will be found serviceable, as, Bicarbonate of Soda or Potassa, taken an hour or two after each meal. An infusion of equal parts of Marsh Mallow Root and Spearmint, or, the use of Compound Infusion of Trailing Arbutus, will also be found of much efficacy. At other times, the urine will be very clear, acid, of an amber color, depositing a slight cloud of mucus and crystals of oxalate of lime, for which Nitrohydrochloric Acid may be used, in combination with tonic bitters. In cases of irritative dyspepsia, although high-colored, yet instead of urates, phosphates are deposited, indicating the use of Compound Balsam of Sulphur, nutritious diet, mild stimulants, and tonics; or, the free use of an infusion of equal parts of Dioscorea Villosa, Eupatorium Purpureum and Aralia Hispida.—When the urine is pale, alkaline, or becomes so shortly after being passed, and deposits triple phosphates with phosphate of lime, or with an iridescent pellicle on its surface, the same measures may be pursued as in the

preceding case; or, Fluid Extract of Hydrangea; Elixir of Cinchona and Iron; or, a pill composed of Eupurpurin three grains, Alcoholic Extract of Nux Vomica one-tenth of a grain, to be administered three or four times a day, may be used as required. The same course may likewise be pursued in cases where there is much nervous excitement, the urine being passed frequently, in abundance, and pale, with phosphatic deposits.

If *disease of the kidneys* be associated with the dyspepsia, or, has been its cause, the treatment will be the same as referred to hereafter, when treating upon renal diseases.

If there exists any *blood disease* as a cause or an effect of the dyspepsia, it must be treated, according to its nature, by the means already pointed out. *Affections of the brain, spinal marrow*, or *nerves* will require the treatment heretofore laid down for them.

Constipation is a common attendant of dyspepsia, and may exist as a mere habit, or as the result of an intestinal disorder; it may be due to a deficient contraction of the abdominal muscles; impaired peristaltic action; sedentary, inactive life; morbid alteration of the secretions of the large intestine; intemperance; hepatic torpor; anemia; improper and injudicious use of purgatives; working in lead; use of tobacco; lesions of the spinal cord; tumors or growths pressing upon the intestines; overmental exertion, etc. In all cases of constipation the practitioner should endeavor by every means of investigation possible, to determine its true cause, so that if it be owing to certain habits, improper food, tobacco, lead, etc., these may be avoided; or, if to spinal lesions, tumors, etc., the appropriate means may be applied to remove these causes.

In dyspepsia, constipation is generally due to a deficiency of the nervous power distributed to the intestines, to an accompanying hepatic torpor, or to duodenal dyspepsia. It is apt to give rise to pain in various parts of the head, vertigo, disturbance of vision, muscæ volitantes, ringing in the ears, and physical and mental languor, besides uneasy sensations in one or more parts of the abdomen. Nausea and vomiting, and anorexia, are also produced by it, as well as loss of sleep, flatulence, bad dreams, apoplexy, etc. Constipation, although not always fatal, is nevertheless always a serious difficulty, and too much attention, or too much perseverance, can not be bestowed upon the efforts made to remove it.

Independently of the hygienic means recommended, which, of themselves, will frequently overcome constipation, we will often require therapeutical remedies. In a great many cases, a mixture of

powdered Turkey Rhubarb two parts, with Bicarbonate of Potassa or Soda one part, will have the desired effect. The dose varies from two to twelve grains, to be taken in a little water, about an hour after a meal, and to be repeated three times a day; the doses must be large enough to produce one, but never exceeding two evacuations daily, resembling in quantity and consistence, as nearly as possible, those of healthy stools. When larger doses of this powder are required, or when it causes gripings, etc., other remedies must be employed.

If there be much acidity or flatulence, the Compound Powder of Rhubarb and Charcoal, referred to under Excessive Gastric Acidity, No. 2, page 743, will be of benefit. In other instances, one of the following preparations may be administered: 1. Take of Alcoholic Extract of Aletris twenty grains, Alcoholic Extract of Nux Vomica one or two grains, Podophyllin five grains; mix, and divide into twenty pills, one of which may be taken for a dose, repeating it three times a day. If anemia be present, Protoxide of Iron twelve grains may be added to the above.—2. Take of Tincture of Mandrake, Tincture of Blue Cohosh, each, six fluidrachms, Saturated Tincture of Nux Vomica three fluidrachms; mix. The dose is ten or fifteen drops three times a day, in glycerin, or mucilage.—3. Take of Podophyllin, Apocynin, each, one drachm, Leptandrin three drachms, Alcoholic Extract of Nux Vomica twelve grains, Castile Soap, a sufficient quantity to make the whole into a pill mass; divide into three grain pills, of which one may be taken every night, or, every other night.—4. The Compound Pills of Leptandrin, as well as the Compound Powder of Leptandrin, will also be found useful. The use of purgatives creates a necessity for their repetition, which impairs the energy of the intestinal action, hence, it is better in all cases to solicit natural evacuations, than to become habituated to cathartic medicines.

In many cases of obstinate constipation, with or without hepatic torpor, the following will be found of great service in maintaining regularity of the bowels: Take of Hydrochloric Acid three fluidounces, Nitric Acid two fluidounces, Water five fluidounces; mix. Add three fluidounces of this mixture to half a pint of water; with which bathe across the bowels, over the region of the liver, and along the inside of the thighs, every night and morning; in a a day or two alvine evacuations will occur, often abundant at first, and of a dark color.

Diarrhea is frequently an annoying symptom to both the patient

and physician; it may be of a bilious character, requiring cholagogues and astringents; or, it may be accompanied with griping pains in the lower part of the abdomen and across the region of the arch of the colon, with or without diarrhea and tenesmus, all of which symptoms are aggravated soon after eating; this may be promptly relieved by the following: Take of Alcoholic Extract of Aletris one drachm, Dioscorein two drachms, Nux Vomica, rasped, one drachm, Bruised Prickly-ash Berries two drachms, Alcohol half a pint; mix, and form a tincture. The dose is one fluidrachm in a glass of water, to be repeated three times a day, about an hour before meals.

In ordinary cases of diarrhea with acidity of the alimentary canal, two parts of the Compound Syrup of Rhubarb and Potassa mixed with one part of Fluid Extract of Wild Cherry, will be found very useful, when given, every hour or two, in tablespoonful doses. In obstinate cases, equal parts of Laudanum, Chloroform, and Fluid Extract of Wild Cherry, may be given every one, two, or four hours, in doses of twenty or thirty drops. (*See Chronic Diarrhea.*)

Duodenal Dyspepsia is often met with, and may be confounded with gastric dyspepsia, certain hepatic disorders, as well as certain lesions of the colon. In this form of dyspepsia, the tongue will be coated toward its root, as well as in the center, with a yellowish or brownish fur; vertigo, severe pain in the occipital or superior portion of the head, and derangement of vision, are frequently present; slight palpitations; strong aortic pulsations; dyspnœa; cough; yellow or leaden appearance of the skin; nervous irritability; capricious appetite; sense of oppression an hour or two after a meal; troublesome flatulence; colic; borborygmi; epigastric distension; crampy pains; fullness, distension, or a dull aching pain in the right hypochondrium, down the arms, between the shoulders, or across the loins, with or without numbness; bowels torpid with light colored stools, or liquid and extremely offensive; and urine clear, or dark, often depositing urates, or phosphates,—are among the symptoms.

When the *Pancreas* is involved, there will be a disagreeable feeling of oppression; a dull pain, deep in the epigastric region, which is increased when the stomach is full, on full inspiration, and when strong pressure is made. The epigastric region is sometimes swoln; more or less anorexia or want of appetite; vomiting of fluid having the appearance of saliva or albumen; aortic pulsation

is powerful, and felt particularly when the hand is placed on the epigastrium; sinking turns as if the patient were dying; rapid emaciation; anemia; great mental depression; pain in the back; head-ache; chyme passes away undigested, etc. The diseases of these organs are generally complicated with gastric, or hepatic lesion, or both.

The *treatment* is similar to that which is advised for gastric dyspepsia; in addition to which, the use of the Iodine Pill, counter-irritation over the epigastrium, and Nitro-Hydrochloric Acid internally, will frequently be found valuable. Sinking sensations may be relieved by stimuli; and rapid emaciation be checked by nutritious and easily digested diet, and the employment of Xanthoxylin, Geraniin, and Alcoholic Extract of Nux Vomica, combined in appropriate doses. Dry cupping, firing, and active counter irritation along the spinal column, and upon the abdomen over the diseased organs, may likewise be used with advantage.

Dyspepsia is sometimes associated with *tuberculous disease*, and especially with *phthisis*, either as a cause or an effect, more commonly the latter. A careful examination of the patient will enable the practitioner to detect any tendency to tuberculous disease. This form of dyspepsia is best treated by the Iodine Pill, and Cod Liver Oil, as the principal agents; urgent or annoying symptoms may be relieved by the means already named.

CIRRHOSIS OF THE STOMACH.

Also termed Plastic Linitis, and Fibroid Degeneration of the Pylorus. This condition of the stomach has been viewed by some as a cancerous malady, and by others as a hypertrophy of the parts involved, but upon a minute examination of the diseased structure, it has been found to differ considerably from either of these affections. The *causes* giving rise to gastric cirrhosis are not known, though supposed to be a long-continued irritation of the parts, or an obstinate dyspepsia. All persons and ages are equally liable to it; though it is only occasionally met with in practice.

The *symptoms* vary greatly; in many instances the presence of this malady is not even suspected, and its existence is only discovered after death from some other disease, under a post-mortem examination. In most cases, however, there is local pain and tenderness, anorexia, vomiting, febrile reaction, and other symptoms of severe gastric disorder. These symptoms appear and disappear

at regular or irregular intervals, probably being influenced in this respect by the greater or less rapidity of the peculiar deposit forming the disease; they usually come on suddenly, and pass off gradually, being often more severe each time of their re-appearance. As the disease advances, other symptoms will manifest themselves, according to the abnormal changes effected in the parts by its advance. A contracted as well as a dilated condition of the stomach may result from the presence of the deposit occasioning the disease; and in almost all cases the pylorus is contracted from thickening of its tissues. In such instances, there will be, in addition to the previous symptoms, a sense of tightness in the epigastric region, with, as it were a suffocative feeling; insatiable hunger; frequent and excessive vomiting, the matters ejected being in abundance, and fermented or partially decomposed; sarcinæ ventriculi; constipation; gradual exhaustion; and the patient dies from inanition.—When gastric cirrhosis results in suppuration, (*suppuration of the areolar tissue, or, suppurative linitis*), the pain and vomiting becomes more and more severe, with high febrile reaction, and a tympanitic condition of the epigastrium, which are followed by jaundice, prostration, delirium, and death by coma. In these cases death may occur in forty-eight hours from the first symptoms of increased severity of the disease.—If the disease results in ulceration, or cancer, which is sometimes the case, the symptoms peculiar to these lesions will be manifested.

Cirrhosis of the stomach may be *diagnosed* from *cancer*, by its longer duration, less frequent vomiting and hemorrhage, absence of secondary cancer, in the uniform gastric thickening (rather than tumor) which careful manipulation finds in the epigastrium, in the great anorexia, and intense headache usually present, and, the little or no pain or tenderness in the epigastrium under pressure. Its *sequelæ* may be determined by the peculiar symptoms common to each.*

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* Dr. W. Brinton observes of this disease:—"As regards its morbid anatomy, it is evidently an exsudation, occupying the areolar tissue of the stomach, and gradually undergoing a change, in which its development into a low grade of fibrous tissue (like that of a fibroid tumor) is accompanied by a constant decrease of its bulk, and increase of its density. The contraction and hardening thus brought about not only seriously damage the function of an organ to which mobility is essential; but they obstruct its circulation, and probably its innervation also; and they inaugurate grave lesions of its mucous and serous coats. Even in the muscular tunic a similar effect sometimes obtains. And though incidentally, the obstacle formed by the exsudation often evokes, in this powerful organ, a change which diminishes and defers its disorganization, and even exalts its nutrition for the time; still in the long run, this salutary effect generally

The *prognosis* is unfavorable; the obstruction can not be removed, though much relief may be afforded if the disease has not advanced too far.

The *post-mortem appearances* are peculiar; the disease appears to begin in the submucous cellular tissue, which undergoes a kind of fibrous thickening, the mucous coat frequently remaining intact. There is an increase in the weight and density of the stomach, it is hard and gristly, or cartilaginous, and an incision through its coats exhibits a vast increase of thickness, although the coats may be detected from each other. The parts affected by the interstitial deposit are opaque and of a pearly white appearance, and creak under the scalpel; the mucous membrane, as well as other parts, are comparatively bloodless. The mucous and submucous coats sometimes present a kind of folding or plaiting, to a greater or less extent, causing elevations above the surrounding gastric surface, and which appears to be owing to the deposit, which, filling and obliterating the meshes of the normal rugæ, destroys their functions, renders them ineffaceable, and often distorts and obliterates the minute stomach tubes. This abnormal condition, when present, is always to be found more greatly developed at the pyloric valve, from whence it extends to a portion or even to the whole of the stomach, gradually diminishing in thickness, however, as it advances beyond the pylorus.—In the advanced cases, where ulceration suppuration, or cancer, etc., have occurred the necropsy will reveal the conditions peculiar to these lesions, together with more or less of the appearances belonging to the cirrhosis, above referred to.—Under the *microscope*, the white deposit is observed to consist of a tough, somewhat elastic, imperfectly fibrous mass, consisting of elongated or wavy fibres, less distinct but similar to those of a fibroid tumor, having, however, very few vessels, no yellow or elastic fibres, and presenting, when acted upon by acetic acid, numerous elongated nuclei, or small fusiform cells. The fibres are very irregularly interwoven.—Ulceration, cancer, etc., will present their usual appearances under the microscope.

The *treatment* consists, in the early stage, of fluid and unirritating food; alteratives, as, Chloride of Gold and Soda, Muriate of Ammonia, Bromide of Ammonium, etc.; counter-irritants to epigastrium, as, Compound Tar Plaster; sedatives to allay pain; injec-

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yields to the interference produced by the slower but surer agent—to the contracting and hardening of the interstitial deposit. The physical effect transcends the physiological effort; the hare is caught by the tortoise, and then distanced in the race."

tions, to keep the bowels regular; and an entire prohibition of all stimulating food and drink. Every means, that will not augment the gastric disease, must be used to give strength and nourishment to the patient's system. Ulceration, or Cancer, when present, will require the treatment named under these heads.

CHRONIC DUODENITIS.

Chronic Inflammation of the Duodenum, including under this head, irritation, congestion, or inflammation, is most usually due to an extension of similar conditions of the stomach, intestines, and neighboring organs, to the duodenum. Sometimes, however, the disease may commence in this organ, and be propagated to those in its vicinity. The *causes* of this affection, are the same as those producing chronic gastritis, dyspepsia, gastric ulcer, etc.

The *symptoms* are like those common to a similar affection of the stomach, and are very difficult to distinguish from them. Pressure along the fourth, fifth, and sixth dorsal vertebræ, will frequently occasion pain or soreness. The *diagnosis* can only be satisfactorily made by being well versed in the position and structure of the organ, and in a knowledge of its functions, and morbid relations. But we can not, even then, determine whether this organ is the sole, or chief seat of the disorder, as it is most usually associated with lesions of the stomach, pancreas, intestines, or biliary organs. Among the symptoms that may lead us to locate disease in the duodenum, have been named, a sense of uneasiness, fullness, and weight, or even pain, occurring two, three, or four hours after a meal, with, frequently, similar sensations extending to the right hypochondrium, and to the right scapular region; nausea and vomiting accompanying these symptoms, or pain when firm pressure is made toward the organ, render, it is stated, the diagnosis still more positive. In addition to these, a tongue much furred at its base, with the papillæ elevated, a gnawing sensation at the stomach, capricious appetite, irregular, unhealthy, and offensive alvine evacuations, dry or harsh skin, and more or less dejection of spirits, tend still further to confirm the diagnosis. Notwithstanding, cases have been observed, in which no such indications were present, and we should not rely too exclusively upon them as a basis for our diagnosis.

Duodenal disease is often associated with urticaria, and other cutaneous affections,—a recession of which greatly aggravates it.—It frequently accompanies jaundice, giving rise to furred tongue, vomiting, or nausea, pain in the right hypochondrium, disgust for

food, and diarrhea.—The *sequelæ* of congested, or inflamed states of the duodenum, when long continued, are, thickening of its coats, softening, ulceration, etc. Cancer may also attack this organ. The symptoms of these several abnormal organic conditions are similar to those encountered in like states of the stomach, and are extremely difficult to satisfactorily diagnose from those of this latter organ, from chronic disease of the liver, or, from disease of the gall bladder.

The principal *post-mortem appearances* in duodenal disease, are, a gray discoloration of the membrane, from deposition of irregular pigment grains in its substance; thickening of the coats of the duodenum; vascular injection; enlargement of the mucous glands; and, sometimes, softening of the inner coats, ulceration, or perforation. Disease of adjacent organs, cancer of the duodenum, and adhesions of the duodenum to the neighboring organs, may also be observed; yet none of these imply that the disease commenced in this organ.

The *prognosis*, and the *treatment* of duodenitis, or its sequelæ, are the same as in like conditions of the stomach. If we can satisfactorily determine that the origin of the disease was in the liver, intestines, etc., or, if these organs are complicated with the duodenal malady, the proper treatment for the disease of these organs must be pursued. (*See Duodenal Dyspepsia*, page 758.)

A few remarks may here be made relative to the *Pancreas*, an organ concerning the diseases of which but little is known. The functions usually assigned to the fluid secreted from this gland, are, 1, to convert amylaceous matter into sugar or glucose during the process of assimilation; 2, to form an emulsion or very fine division of neutral fatty matters, that they may be absorbed into the lacteal system; this decomposition and digestion of fatty substances, does not belong exclusively to the pancreatic fluid, but is, to a certain extent, also effected by the fluids of the intestine alone, though the pancreatic is undoubtedly the most important and direct agent in this chylification of fat; and 3, the digestion of the albuminous or nitrogenous substances that have not been acted upon by the stomach, assisted by the presence of bile. Frerichs states in addition, that the pancreatic fluid converts the bile into an insoluble compound, thus preventing its resorption into the system, and its expulsion.

The pancreas is liable to chronic inflammation, enlargement, induration, atrophy, hypertrophy, softening, and malignant dis-

eases, all of which are of very obscure diagnosis, and, with the exception of the first named, unyielding to treatment, requiring to be treated upon general principles, and limited, chiefly, to palliation of urgent symptoms only.

In addition to the symptoms of disease of the pancreas, named under Dyspepsia, page 758, there is one which was observed by Dr. Richard Bright as early as in 1832, and that is, more or less oily or fatty discharges from the bowels, in cases where malignant disease of the pancreas existed. As to this being an indication of pancreatic disease, there has been considerable dispute, and the question has not even yet been positively settled. But, in the solution of the diagnosis of pancreatic diseases, it would be an important matter to determine whether this organ, or the duodenum, is in any way involved with what is usually termed "dyspepsia," and whether the indigestion of proteinous, saccharine, starchy, or oily articles of food, are wholly due to gastric disease, or to duodenal or pancreatic affections, either isolated, or in combination. Sometimes, in disease of the pancreas, there will be a ravenous appetite; pyrosis; obstinate jaundice; and clayey stools, instead of fatty.

CHRONIC ENTERITIS.

Chronic Inflammation of the Small Intestines, may be limited to a part or to the whole of their mucous lining membrane, constituting *chronic muco-enteritis;* it may attack the glands of the intestines, constituting a *chronic follicular* or *glandular enteritis;* or, very rarely, it may partially or wholly involve all the intestinal coats, producing a *chronic sero-enteritis*, which is usually associated with chronic peritonitis, or intestinal ulceration. These various inflammatory conditions very frequently extend to the large intestine, occasioning dysentery, or, to the stomach, giving rise to dyspeptic symptoms.

These several varieties of chronic enteritis may follow the acute form of the disease, or, may be due to irritation from crude and indigestible food, or other irritating substances; to continued exposure to cold and damp; and especially to the improper use of drastic cathartics.

The *symptoms* of *chronic muco-enteritis*, may be very slight; no unpleasant sensations being experienced until some hours after a meal, when there will be uneasiness, heat, pain, flatulence, or distension, manifested in some part of the abdomen. Not unfrequently

firm pressure made on the external surface over the diseased part, will give rise to tenderness or pain; coughing or sneezing will often produce the same result—but, in such cases, the mucous coat is not the only one affected, as, purely chronic mucous inflammation seldom gives pain on pressure, coughing, etc. When the disease has been of long duration, and, sometimes, even from the commencement, especially when it follows the acute form, the symptoms will be more severe, as thirst; dryness of the lips and mouth, and frequently, cracked lips with exfoliation of their epithelium; sallowness, harshness and dryness of the skin; languor and weakness; coldness of hands and feet; small and weak, or corded pulse; slight febrile exacerbations toward evening; impaired appetite; emaciation; nervous irritability; headache; and, in the latter stages, night sweats. There may be constipation or diarrhea; or these may occur alternately. More commonly, however, diarrhea is a constant attendant, the discharges being either pale, clay-colored, greenish, brownish, reddish, or watery, and also slimy, yeasty, mixed with more or less feces; purulent and bloody; or containing shreds of lymph, undigested particles of food, etc. Among children, with whom the disease is of more frequent occurrence, the abdomen becomes enlarged and tympanitic, contrasting strongly with the emaciation observed in other parts; the mesenteric glands are also enlarged and obstructed.

Chronic follicular enteritis presents symptoms similar to the preceding variety, so that it is with difficulty distinguished from muco-enteritis, with which it is frequently associated. It is more generally accompanied by diarrhea, and the stools are mucous, muco-puriform, and more offensive than in the preceding form, in many cases. The tongue is frequently paler than natural, slightly coated, and, perhaps, aphthous ulcerations may also be present. It is very frequently associated with, or consequent upon, phthisis, in which cases, not only the small intestines, but also the cæcum and colon are apt to be implicated. Its progress is usually slower and of longer duration than that of muco-enteritis, and, like the latter, it frequently occurs among children, and may terminate in perforation of the intestines, or in peritonitis.

Chronic sero-enteritis, the enteritis of most authors, may follow the acute form of the disease, or may occur gradually from extension of muco-enteritis to the connecting cellular tissue, and thence to the external intestinal coats. It may also commence simultaneously in these several tissues, or, originating in the serous coat, it may be propagated to the others. There is more or less pain in the abdomen, increased somewhat on pressure, or, no pain may be felt at all

except under pressure, cough, etc.; sudden jolts, and full meals will also give rise to pain, often of a colicky-character, and which, in the latter instance, does not occur for some hours after the meals. If the peritoneal coat is much affected, there will be a distended, tympanitic condition of the abdomen; otherwise, it will be flat and concave. The tip and edges of the tongue are unnaturally red, and, sometimes, the whole tongue and mouth; the appetite is more or less impaired; thirst considerable; skin dry and husky; extremities colder than natural; sometimes nausea; deficient and high-colored urine; great depression of spirits; small, frequent pulse; emaciation and debility. Constipation is apt to be present, unless the disease has extended into the colon, forming an ileo-colitis, in which case, either obstinate diarrhea or dysentery may be present; frequently the former, and which is by no means an uncommon symptom. Pressure along the ninth, tenth, and eleventh dorsal vertebræ, will frequently give rise to more or less tenderness or pain. In many instances, the only symptoms complained of, are, emaciation, debility, and diarrhea. If a harassing cough be present, it may be due to implication of the lungs, or to an extension of the disease upward, inducing what is known as a "stomach cough." The disease may terminate in ulceration, thickening, contraction, or dilatation of the intestinal coats, fatal exhaustion, sphacelation, or peritonitis.

In the *diagnosis* of these several varieties of enteritis, it is of importance to determine the seat and character of the malady, a point not always easily attainable. (*See Chronic Gastritis.*) If the pain or tenderness exists around the umbilicus, or between it and the right ilium, the ileum is the part affected; if it be near the duodenum, in the neighborhood of the transverse arch of the colon, or just below it, and deeply seated, or between the umbilicus and left ilium, and no diarrhea or dysentery be present, the jejunum is probably affected; if the pain be of a griping or colicky character, and be located in the region of the cæcum, or along the course of the colon, and increased in severity some hours after a meal, diarrhea or dysentery being also present, the cæcum, colon, or both, may be affected. The stomach is seldom affected when only the inferior part of the ileum, and the colon are diseased, unless constipation be present. If there be a sense of fullness and pain in the right iliac region while standing, or after a walk, with dullness on percussion, constipation being present, it is probably due to abnormal distension of the cæcum from accumulated feces, in which case pressure on the last dorsal or genito-crural will cause pain in the region of the hip, groin, testicle, etc. But inflammation of the cæcum is gen-

erally accompanied with diarrhea or dysentery, with pain, and also with great exhaustion if all the coats are affected. But, it must be remembered that, severe pain in this region may arise from simple distension of the cæcum, and that diseased spine or renal calculus may also occasion pain in the regions heretofore named. *Percussion* may also be employed to aid in determining the seat of the disease, as well as in determining the parts most distended or obstructed by flatus, adhesion or thickening of the intestinal coats, fecal accumulations, etc.; much pain, upon percussion or pressure, is an indication that the outer coats of the bowels are affected.

If the stools are mucus, or muco-puriform, the mucous membrane alone may be affected, or, the follicular glands may also be involved. If flakes of albuminous matter, or shreds of lymph are present, with a serous condition of the discharges, the serous membranes are diseased. If the fecal matters consist of imperfectly digested food, the upper portion of the intestines are disordered; and, if the peculiar natural odor of the stools is absent, it may be due to disease of the large intestine. A thickened, contracted, dilated, ulcerated, perforated, or cancerous condition of any portion of the intestines, is very difficult, and, in most cases, impossible, to detect during life; and there are no symptoms belonging to either of these conditions that can positively be asserted as peculiar to it.

Grumous or muco-puriform stools are indications of ulceration; considerable pure blood may proceed from the large intestines. Of course, in connection with these various indications, which, although of great aid in the diagnosis, can not be absolutely relied upon, we must take into consideration the anterior conditions of the patient, the causes to which he has been exposed, the anatomical location of the chief symptoms, together with the character, severity, etc., of all the symptoms present,—requiring on the part of the examiner, patience, carefulness, and a proper knowledge of the physiology, pathology, and anatomy of the parts interested.

The *prognosis* of enteritis is more favorable when the disease is of recent origin, and occurs as a sequelæ of acute inflammation, than when it has been of long duration, or, has gradually manifested itself without any anterior acute disease. When the general system becomes greatly disturbed, when there is much emaciation, debility, nervous irritability, and irregular condition of the digestive powers and of the bowels, or, when there has been a long-continued muco-purulent, or bloody discharge, the prognosis is unfavorable. However, an amelioration of these symptoms under treatment, with increase of strength, is favorable, and much more so when it continues permanently advancing. Under any circum-

stances, when curable, from one to two years will be required to effect a thorough cure. (*See Diagnosis* and *Prognosis*, under Chronic Gastritis.)

The *pathological appearances* met with in chronic enteritis will be found to vary according to the location, severity and extent of the disease, the coats affected, and the morbid alterations produced by it. Numerous red patches may be observed upon the mucous membrane, with or without elevations; or, this membrane may be thickened, indurated, or ulcerated. The villi frequently present a blackish tint; the follicles and glands become enlarged and prominent; and a granular and thickened condition of the mucous membrane often prevails to a greater or less extent. Gray discoloration is frequently observed as minute zones around the solitary glands. Ulceration and perforation of the mucous coat only, or of all the intestinal coats is often observed; and, in some rare instances, cancer, in some one of its forms, may be present. Sometimes false membranes, and abnormal adhesions of the intestines will be observed; and, in other cases, a dilated, or contracted condition of the affected part of the intestine. Most generally, other organs, as, the liver, stomach, lungs, kidneys, or mesentery, etc., will also be found more or less seriously diseased, and especially when the enteritis is not confined to the mucous intestinal coat.—The appendix cæci will frequently be found affected, either increased in length, atrophied, or dilated, and it may contain various indigestible substances that have been swallowed at a previous period, some of which may have developed very serious disorder during life, and perhaps have been the commencement of the enteritic malady. The muscular, as well as the submucous intestinal coat, is sometimes hypertrophied or thickened. And when the peritoneal coat is affected, it will present some of the appearances named under Chronic Peritonitis.

The *treatment* of chronic enteritis is about the same as that laid down for Chronic Gastritis, *which see*, and which it is unnecessary to repeat here; being very careful to avoid the use of all irritating or drastic cathartics. Bismuth, Citrate of Iron and Strychnia in small doses, Sheep Laurel, dilute Hydrocyanic Acid, Cimicifugin, Opium, Hyoscyamus, etc., with demulcent drinks, counter-irritation, diaphoretics, and diuretics, are among the agents to be employed at first; and, as the more active symptoms pass away, we may have recourse to a careful employment of vegetable tonics, alteratives, and diuretics, together with a proper attention to hygiene. Counter-irritation or stimulating liniments along the dorsal and lumbar regions of the spinal column, so as to produce a more

or less constant burning sensation, are of very great utility, and should never be omitted. Should flatulency, nausea, or vomiting be present, treat as named under Dyspepsia. Diarrhea is frequently met with in enteritis, and sometimes dysentery; these affections will be separately treated upon hereafter, and the reader is referred to them; under Chronic Diarrhea will also be mentioned the treatment which I have found the most successful among children laboring under diarrhea from chronic follicular enteritis. When the disease partakes more of the character of disease of the peritoneal coat (sero-enteritis) it will require a careful combination of the methods of treatment adapted to both chronic gastritis and chronic peritonitis; or, if the peritoneal symptoms predominate, the treatment for the last named affection may alone be pursued.

CHRONIC PERITONITIS.

Chronic Inflammation of the Peritoneum may follow the acute form of peritoneal inflammation, or, it may gradually manifest itself without any previous acute attack, in which case it is very apt to be associated with a tendency to tuberculous or cancerous formations in some part of the thoracic or abdominal cavity. Sometimes it supervenes on continued remittent fevers, exanthema, acute dysentery, etc. The disease may be partial or general. All ages are liable to it.

When chronic peritonitis follows the acute form, or is due to metastasis of disease, to suppression of cutaneous affections, or, to any previous inflammation of the viscera, the exsudations into the peritoneal cavity remain, either in an organized or inorganized form. The usual *symptoms* are, deep-seated pain or soreness across the abdomen, which often intermits, and is increased by motion, fatigue, contraction of the abdominal muscles, or, upon pressure being made over the affected part. In connection with this there may be nausea or vomiting, difficult digestion, thirst, sleeplessness, want of appetite, a rather quick, full pulse, globus hystericus, oppression after eating, and some hours after the meal an increase of pain,—together with constipation, which may alternate with diarrhea; but these symptoms are not present in every case. If these symptoms do not pass away under treatment, or after a few weeks or months, the abdomen gradually enlarges more or less, according to the amount of effused fluid present, and which enlargement is usually the greatest toward evening; percussion will detect the existence of fluid, and will also often augment or produce pain. (*See Ascites,*

page 480.) If there be no fluid in the abdominal cavity, the abdomen will frequently appear diminished, or flat, or, a slight enlargement and hardness about the umbilicus may be observed, which is due to agglutination of the small intestines. As the chronic disease advances, the features become sharp and contracted, and the countenance is sunk, anxious, pale, sallow, and doughy. Debility and emaciation become more and more marked; the skin presents a dry, unhealthy appearance; obstinate constipation usually prevails, but it may, as in the earlier stage, alternate with diarrhea, and, in some cases, especially toward the latter period of the disease, diarrhea will be constantly present. Cough; difficult breathing; and frequent pulse, particularly during the latter part of the day, are often added to the other symptoms. Finally, exhaustion comes on, with hectic fever, and an œdematous condition of the legs, and death ensues from extreme prostration, inanition, or from the fatal character of the lesions caused by the disease.

In many instances, the disease may continue for an indefinite period, with a swoln and hard abdomen, but little pain or uneasiness, and the constipation may be constant, or, alternate with diarrhea.

Chronic peritonitis following the acute attack may be partial or general, according to the character of the active disease in this respect. When it occurs after enteritis, colitis, hepatitis, dysentery, or chronic gastric ulceration and perforation, it is more apt to be partial, and may, in robust habits, continue for years, without giving rise to any very troublesome symptoms, but in debilitated and scrofulous systems, it frequently becomes general, and is more liable to present the symptoms above named.

The disease may terminate in recovery, the effused fluid being gradually absorbed, discharged through neighboring organs, or transformed into tissue. Or, it may result in the formation of adhesions and false membranes, thickening of the peritoneum, suppuration and ulceration, etc.

When chronic peritonitis is associated with a tubercular or cancerous cachexia, it may present many of the symptoms just named for the non-cachectic affection; but most generally, it comes on so insidiously and gradually, that the patient is not aware that anything serious is the matter with him, until the symptoms indicate an advanced state of the disease. Perhaps the first noticeable symptoms are a slight acceleration of the pulse, loss of strength, inability to exercise long at a time, gradual loss of weight, emaciation, variable appetite, irregularity of the bowels, and morbid and offensive stools. Pain is rarely present at an early period, though a sense of fullness or uneasiness in the abdomen is complained of,

and deep pressure not only detects an unnatural hardness, but also occasions uneasiness, tenderness, or pain; sometimes there will be colicky or griping pains, or a sense of heat in the abdominal cavity, especially around the umbilicus.

In an advanced state of the disease, the symptoms are more marked, the tongue is red, glazed, and often irregularly fissured; the pulse is quick, small, and weak; a hectic flush upon the cheeks manifests itself; there is more or less night perspiration; debility much increased; frequently nausea or vomiting; and a scanty, high-colored urine depositing a reddish sediment. Pain is also experienced, usually at irregular intervals; certain parts of the abdomen become very sensitive to pressure, or motion; the abdomen becomes very much enlarged, while the body and limbs are greatly emaciated; the countenance presents an anxious appearance; the eyes are sunken; and diarrhea becomes more persistent and obstinate. The patient may die from exhaustion, from acute inflammation suddenly supervening, or, from ulceration, perforation, etc.—If there be considerable effusion into the peritoneal cavity, the only symptoms observed may be emaciation, anemia, enlargement of the abdomen, and fluctuation. When children are attacked by the disease, pain and diarrhea usually attend from the commencement.

Both forms of chronic peritonitis are apt to be complicated with disease of other organs; the non-tubercular form with chronic enteritis, colitis, inflammation of the cæcum, gastritis, duodenitis, or hepatitis, etc. The tubercular, with strumous disease of the mesenteric glands and other portions of the alimentary canal, phthisis, tubercles in the cerebral membranes, ovarian, renal, and uterine disease, etc. Children are very liable to the latter form.

The *diagnosis* of chronic peritonitis is not always readily made out, except in cases, immediately preceded by the acute form of the disease, or, where the chronic form is general. A constant tenderness or pain in the abdomen, with or without pressure, and especially when confined to one location, a tendency to constipation, and a slight acceleration of the pulse, conjoined with, either, an evident accumulation of fluid in the peritoneal cavity, a full, rather tense, and tympanitic condition of the abdomen, or, a hardness felt in a particular location, are pretty certain evidences of peritoneal disease; and especially when emaciation and debility are also present. The strumous or cachectic form of the disease, is more gradual and insidious in it approaches, and pain may be wholly absent; the debility and emaciation are greater, as well as the abdominal enlargement, and the tendency to diarrhea, and

there are almost always evidences of a strumous disposition of the system. If the disease be associated with cancer, it generally occurs during, or after middle age, and, in addition to the debility and emaciation, the face presents the peculiar sallow hue of malignant disease. Severe transient lancinating pains may be occasionally experienced; and careful pressure may detect tenderness, as well as the rounded nodules of cancer under the muscles of the abdominal walls.

When there is no enlargement of the abdomen, nor hardness, and diarrhea is present, it must be remembered that these conditions also accompany intestinal ulceration. (*See Ascites, Diagnosis*, etc., page 480.)

The *prognosis* of chronic peritonitis is favorable when the disease occurs in young persons of good constitution, and has been placed under proper treatment at an early period; in persons somewhat advanced in life, or when the disease has been allowed to progress, it is less favorable. Slight attacks, or cases where the peritonitis is partial, are much more favorable than when the disease is general. When associated with cachexia, chronic peritonitis is rarely, if ever, curable.

The *pathological appearances* vary considerably in this disease. In the non-tubercular variety, more or less effusion of serous fluid, of a clear and yellowish character, or, turbid, grayish, brownish, or even sanguineous, will be observed, and which may be mingled with pus, shreds of coagulable lymph, or, pieces of solid matter. When the abdomen is distended by this accumulation of fluid, the intestines will be found forced toward the spinal column. The peritoneum covering the different viscera presents appearances of inflammation which may be partial or general; this membrane will also be found thickened, and roughened, or covered with granulations, of a lardaceous aspect, and grayish color, with streaks of blood and red spots. Numerous bands or false membranes will be seen, which agglutinate the intestines to each other, or form various adhesions between the peritoneum, omentum, etc., but this is not always the case. Frequently the false membranes are organized, sometimes so much so as to be identified with the peritoneum, and rendering it difficult to determine their exact limits. In many instances considerable gas will be discovered in the intestines, and sometimes in the peritoneal cavity. The omentum is greatly thickened, frequently as thick as a person's hand, red, fleshy, and often occupied with small cysts. Sacs containing a fluid are often formed by the false membranes. Sometimes, there will be no effusion, but the whole surface of the peritoneum

will be coated with lymph. Numerous black patches, resembling a gangrenous condition, are sometimes present, and which have been considered melanotic deposits. Erosions, or ulceration and perforation of the intestines may also be observed, through which openings, either the contents of the alimentary tube may pass in to the peritoneal cavity, causing sudden death, or, pus may find its way to be discharged externally through the abdominal walls. Other coats of the intestines may become involved in the disease, whether the peritonitis be primary, or consecutive upon mucous enteritis, etc., and the disease may be found to extend to various parts of the alimentary canal, either as a partial or general affection, and may even be complicated with hepatitis, nephritis, cystitis, splenitis, etc. Gangrene very seldom happens in chronic peritonitis.

When the peritonitis is associated with cachexia, in addition to the presence of organized or inorganized false membranes, formed by coagulated lymph thrown out from the effused surface; adhesions, etc.; tubercles will be present, covering more or less of the peritoneal surface, and which may contain a hard cheesy substance, be softened, or have proceeded to more or less extensive ulceration and perforation. These tubercles will vary in size from that of a small pin's head to that of a pea. More or less serous effusion may also be present, constituting dropsy, or, it may be wholly absent. The mesentery and its glands are almost always involved, presenting strumous infiltration or tubercles; and it is not uncommon to find tubercles on the peritoneal surface of the stomach and alimentary canal, either in a crude, softened, or ulcerated condition. Frequently a tympanitic condition will be observed, due to loss of the contractile power of the intestinal muscular fibre. More commonly tuberculous affections will also be found to exist in other organs, as, the brain, throat, lungs, etc.—Cancer, cartilaginous indurations, ossification, and calcareous or ossific deposits, are occasionally associated with the disease, either as a cause or as a result.

The *treatment* of chronic peritonitis following the acute form, will consist in adopting measures that will divert irritation from the peritoneum, as, attentions to the bowels, kidneys, and skin, by means of gentle laxatives, diuretics, frequent bathings, and counter-irritants to the dorsal and lumbar spinal region, and across the abdomen. But in those cases that are usually presented to the chronist, and which are generally of long standing, the means pursued should be the same as for the tubercular form of the disease. Daily evacuations must be procured by means of mild

aperients, as, for instance, the Powder of Rhubarb and Bicarbonate of Potassa, heretofore referred to. The surface of the body and limbs should be bathed daily, or every other day, with a weak alkaline solution, or with salt water; and the Spirit Vapor Bath should be administered every one, two, or three weeks, according to the strength of the patient. Internally, those alteratives should be given that are known to be beneficial in tuberculous affections, and that will promote the activity of the absorbents, and remove or prevent effusion, as, Compound Syrup of Yellow Dock, Solution of Iodide of Potassium, of Iodide of Ammonium, of Bromide of Potassium, or of Bromide of Ammonium, etc.; frequently changing the alterative, or alternating it with others, whenever it appears to have lost its original promptness of action. In many instances, I have derived much advantage from the Iodine Pill. If the patient be pale and anemic, some iron preparation will prove useful, as, Carbonate of Iron, Citrate of Iron and Quinia, Citrate of Iron and Strychnia, etc. The following will be found a very valuable agent in this and all other diseases, where it is desired to combat struma, debility, constipation, flatulency, and anemia, and excite activity of the absorbents: Take of Blue Flag Root, Black Cohosh Root, each, in coarse powder, two ounces; Yellow Dock Root, Bark of Bittersweet Root, Peruvian Bark, Sassafras Bark, Prickly-ash Berries, each, in coarse powder, one ounce, Soluble Pyrophosphate of Iron five drachms; Glycerin, No. 2, forty-two fluidounces, Water twenty-two fluidounces; mix the articles, and form a syrup by percolating with heat. The dose is from a fluidrachm to half a fluidounce, three or four times a day. This is a preparation that I prize very highly, and now make known for the first time. Sometimes, instead of the above proportions of fluid, I prepare it by adding to the coarsely bruised articles, Whisky sixteen fluidounces, Glycerin, Water, of each, twenty-four fluidounces.

Stimulating diuretics should also be given, in which one of the above-named Iodide or Bromide Salts may be dissolved, as, infusion of Queen of the Meadow, Thimble Weed, Mountain Pink, Parsley, Juniper Berries, Spearmint, Pipsissiway, etc.; the Acetate of Potassa added to an infusion of Juniper Berries and Water-melon Seed, will be found exceedingly efficacious in many instances. The Compound Infusion of Parsley, as well as the Compound Infusion of Trailing Arbutus, have also proved of service. Counter-irritation along the dorsal and lumbar spinal region should be persevered in by means of active rubefacient liniments, dry cupping, and firing, applied alternately. And, in obstinate cases, a constant purulent

discharge should be maintained from the whole abdominal surface, by means of the Compound Tar Plaster; where this occasions great irritability or debility, it should then be used intermittingly. And where it can not be borne at all, terebinthinate liniments, freely applied over the abdomen, may be substituted; but they will not be so prompt nor as efficacious.—With many persons, and especially among children laboring under strumous disease of the alimentary canal, the following, rubbed freely over the abdomen every day, will be found valuable: To Oil of Juniper two fluidounces, gradually add, in a mortar, one drachm of Iodine; triturate until the Iodine is dissolved. This does not discolor the skin.—Cod Liver Oil has been advised internally, but I know nothing of its effects in this disease; it will, no doubt, prove useful in cases where strumous disease exists, and especially among children. Rubbed freely over the whole surface of the body, every night and morning, it will be found very useful in strumous disease of the alimentary canal, among children.

If there is but little or no effusion, and diarrhea or dysentery is present, treat as named under these affections. But if considerable effusion has occurred, and the above-named treatment does not, after a reasonable length of time, effect any favorable influence upon the disease, it should then be treated the same as advised for Dropsy of the Abdomen, page 480.—Any painful or distressing symptoms that may arise must be treated on general principles. When other organs are also affected, we should endeavor to select and combine our remedies in such a manner that, without rendering them too disagreeable or repeating them too frequently, a simultaneous sanitary influence may be experienced by all the diseased organs.

A nutritious diet should be used, carefully avoiding all articles that disagree with the patient, or that give rise to unpleasant symptoms. Regular moderate exercise is of service, except in cases where fluid is present, when passive exercise, and such as will not cause much increased movement of the abdominal organs, will alone be sufficient. Active purgation must be especially avoided in this disease, except when ascites is the principal symptom.

CHRONIC DIARRHEA.

Chronic Diarrhea is a malady frequently met with by the practitioner, and is sometimes apt to be very obstinate, and even unyielding to treatment. It is generally the result of a previous acute

diarrhea, and may be due to morbid excitability of the intestines remaining after the acute attack has passed away, to a morbid condition of the liver, or, to intestinal ulceration. Very frequently, it is an attendant of chronic enteritis. Dissipated habits, abuse of purgatives, and overworking, frequently give rise to it; as well as uncleanliness, exposures to cold and moisture, to malaria, etc. With some persons there is a tendency to diarrhea whenever certain articles of food are swallowed, and which can only be prevented by avoiding the use of such articles.—There are several varieties of diarrhea that have been noticed by authors, as, *diarrhea crapulosa*, where the evacuations are healthy, but too large in quantity, or of too fluid a nature, and frequently discharged. *D. serosa*, where the discharges are of various colors, and consist of thin feces mixed with a watery or serous fluid, albuminous shreds, etc. *D. mucosa*, or catarrhal diarrhea, in which the stools contain a large amount of thin gelatinous mucus, sometimes inodorous, and at other times very offensive. *D. biliosa*, in which more or less bile is mixed with the stools. *D. dysenterica*, in which more or less blood is mixed with the stools.—All these varieties may pass into the chronic form of the disease, more especially the last three.—It must, however, be remembered that obstinate and long-standing diarrhea is not always an idiopathic malady; many cases of alvine looseness occur, in which the discharge is one of the attendant symptoms of an intestinal tuberculous affection, pyemia, scurvy, Bright's disease, etc., and will only permanently disappear after the original malady has been cured.

The *symptoms* of chronic diarrhea are, more or less frequent discharges from the bowels, and which may or may not be attended with tenesmus. The character of the discharges vary very much, being similar in color, quantity, and quality, to what has already been described under Chronic Enteritis. They are usually of a dark color, and quite offensive; and sometimes the diarrhea will alternate with a constipated condition, but without any amelioration of the intestinal irritability. In addition to the looseness, there may be more or less pain or griping, restlessness, thirst, impaired appetite, debility, and gradual emaciation; the skin becomes dry and rough, and of a sallow hue; the tongue dry, and often dark-colored; the abdomen flat or sunken; and great nervous irritability and peevishness. Mesenteric disease, emaciation, and exhaustion, which usually attend chronic diarrhea, will, after a longer or shorter period, occasion death.

The *diagnosis* of chronic diarrhea is very readily made out; but it is not so easy to determine the portion of the intestinal canal from whence the disease proceeds, nor its peculiar pathological

condition. When the stools are whitish or grayish, like mucilage, containing considerable mucus, or muco-puriform fluid, occasionally streaked with blood, or presenting long whitish filaments or shreds, we may generally diagnose the diarrhea as mucous, or muco-purulent. If these products be separate and unmixed with the feces, the disease is probably located in the inferior portion of the colon, in the rectum, or in both,—when in the rectum, tenesmus is apt to be present. If they are mixed up with an abnormal amount of a watery or serous fluid, that coagulates by heat, the mucous membrane of the ileum is probably the part affected, or the superior portion of the colon. The fluid in this form of diarrhea is generally of an alkaline reaction, containing crystals of triple phosphates. It is not uncommon for this disease to alternate occasionally with constipation, as is frequently observed when the looseness is the result of chronic enteritis; in which affection, there may also exist a hepatic disease, causing what may be termed a muco-bilious diarrhea.

When blood is mixed with the discharges, in clots or fibrinous, it is an indication of ulceration, and more especially, if pus be mixed with it. The higher up in the alimentary canal the source from whence the blood proceeds, the more will it be dark and semi-digested; when of a black, pitchy character, it has been acted upon by the gastric juice.—In bilious diarrhea, the stools exhibit various shades of yellow, brown, or olive-green, according to the absorption of oxygen by the bile, and its mixture with the feces; the peculiar odor of bile will also be detected to a greater or less extent,—and the more bile present, the less offensive will be the discharges. It must, however, be borne in mind, that a grass-green discharge, of a putrid or cadaverous odor, without any smell of bile, is due to altered blood in cases of congestive inflammation of the mucous membrane, and is always accompanied by symptoms of febrile reaction.—If there is a large amount of watery fluid present, it may be due to a want of nervous power of the alimentary mucous membrane.—When the diarrheic discharges are putrid, it indicates an imperfect quantity of bile in them.—When ropy, or slimy, with a dark dirty-green color by reflected light, and greenish yellow by transmitted light, it will often be found to consist of algoid cells and filaments, in small gelatinous masses, and is very apt to be accompanied with pain or tenderness, involuntary stools, dryness of skin, emaciation, an increasing enervation of mind and body, and other symptoms of nervous prostration and a peculiar saccharine or fermentative tendency of the secretions. The urine is apt to be scant, and loaded with

urates and oxalates; and considerable flatus is present. This form of chronic diarrhea is common among soldiers in active service, and requires the avoidance of amylaceous and saccharine diet, and a free use of antiscorbutic.

The *prognosis* of chronic diarrhea will differ according to its cause and character. When the result of a muco-enteritis, and of not too long standing, it may be considered favorable; in this case, if the stools become yellow, opaque, evolve the odor of bile, and lose their putridity, the indications are good; on the other hand, they are bad, if the discharges continue white, or tinged with blood, putrid, and alkaline. When the stools are very fetid, and consist of a large amount of watery or serous fluid, presenting matters like the washings of macerated flesh, with progressive emaciation and debility, the indications are very unfavorable. A diminution in the frequency and quantity of the discharges, together with an improvement in strength and appetite, are favorable symptoms. Bilious diarrhea in connection with dyspepsia is not very favorable, though cures have been occasionally effected. Chronic diarrhea from intemperance, or accompanying obstinate dyspepsia, organic disease of the liver, kidneys, lungs, spleen, or a strumous disease of the alimentary canal, intestinal ulceration, or cancerous disease, purpura, scurvy, uræmia, pyæmia, or other depraved conditions of the blood, is always of a serious character. The more the diarrhea assumes a dysenteric character, the more unfavorable is its prognosis.

The *pathological appearances* observed in chronic diarrhea, are various. In mild cases, the intestinal mucous coat may be found pale, or of a dingy-slate color, and bloodless; in some cases, this membrane may be covered by a thick layer of brownish, grayish, or puriform mucus, or, it may present patches of hyperemia scattered here and there, more especially in the neighborhood of the ilec-cæcal valve. Again, the only abnormal condition present, may be an unnatural development of the follicles and villi. In severe, and more advanced cases, there may be an inflamed and congested condition of the mucous membrane, with vascular discoloration in streaks and patches, presenting a variety of tints, from a rose, to a brownish or purplish. The mucous membrane, as well as the submucous tissue may be œdematous, thickened, and very much softened; and the mucous folds are often obliterated, the intestine presenting a smooth internal surface, due probably to flatulent distension. Sometimes, a diminished or contracted diameter of that portion of the canal affected will be observed, due to the irritable condition of the part. Ulcerations may be observed in the ileum, but

more commonly in the colon; either a minute ulceration distributed nearly the whole length of this intestine, and frequently at its lower part; or these ulcers may become confluent, and be attended with a thickening of the mucous membrane. These ulcerations are almost always follicular, and have a dark zone encircling each of them. More or less destruction of the mucous membrane may be present in very severe cases, with a thickening of it, and a very irregular appearance of its surface. Occasionally, perforation will be present, and, still more rarely, peritonitis. In many instances, the appearances are similar to those observed in chronic enteritis, of which disease, indeed, the diarrhea is often only a symptom. Sometimes the mucous membrane of the rectum may present a state of hyperæmia, or thickening, or enlargement of the follicles and villi, and in some instances, an abraded or ulcerated condition of one or more parts of it may be observed, especially in the vicinity of the anus; but these appearances are by no means common except in severe and obstinate cases.—When diarrhea is associated with, or is due to a strumous disease of the intestinal mucous membrane or of the mesentery, tubercles, in some one or more of their stages, will also be present. A tendency to fatty degeneration of the liver is by no means uncommon in obstinate and long-standing cases of chronic diarrhea.

One of the most important points in the *treatment* of chronic diarrhea is a rigid attention to diet, making use of the least irritating and most easily digestible kinds of nourishment, as, milk, rice, toast-bread, arrow-root, sago, or tapioca, good beef or mutton tea or broth, oyster soup, plain chicken broth, soft-boiled eggs, etc. Articles, whatever may be their character, that irritate the alimentary canal, or increase the diarrhea, must especially be avoided; and it will sometimes be found that nearly or quite all articles belonging to a certain class will have to be relinquished on account of their augmenting the disease, as, albuminous or proteinous; fats or hydro-carbons; hydrates of carbon, as, starchy or saccharine substances, especially; salines; aqueous articles, etc.; frequently, it will become necessary to wholly omit the use of all articles containing yeast or fermenting agents. For drinks, barley-water, rice-water, thin gruel, and similar fluids may be used; and, sometimes, benefit will follow the addition of a little wine or brandy, with grated nutmeg or loaf-sugar to flavor; but great care must be had in allowing such additions. In many cases a diet solely of milk and lime-water, will of itself effect a cure, when the diarrhea is not due to a permanent chronic cause; where there is feverish excitement present it may be iced, and, occasionally, a solu-

tion of bicarbonate of soda may be substituted for the lime-water. Well-boiled rice, flavored with cinnamon, or, boiled milk with powdered cinnamon added to it, will often be of service as articles of diet, in cases where they agree, or are not contra-indicated. Not unfrequently the careful use of antiscorbutics, as, boiled cabbage, boiled onions, boiled carrots, ripe acid fruits, etc., will be of service, especially in those cases where the original cause of the diarrhea is the too exclusive use of an amylaceous or saccharine diet. But it must be borne in mind, that in very obstinate cases of diarrhea, it often happens that any article whatever, fluid or solid, that is introduced into the stomach acts mischievously, and it then becomes necessary to allow only a few spoonfuls of warm fluid nourishment at a time, and, perhaps, to suspend the use of all food by mouth until the alimentary canal becomes enabled to endure its presence.

An attention to the surface of the body, is also an important point; the whole surface should be frequently bathed with a warm, slightly acidulated water, and, if the strength of the patient will permit, a moderately acting Spirit Vapor Bath should be administered once in every two or three weeks. Active stimulating liniments should be applied twice a day over the whole of the abdomen, and along the dorso-lumbar region, applying them with considerable friction each time. The feet, chest, and back, should be especially kept warm, and protected from cold. Exercise may in some cases be permitted, where it exerts no mischievous influence,—it should always be of a passive character; but, in very severe and obstinate cases it must be dispensed with, and quiet and rest be substituted.

When the cause of the diarrhea is known, we must endeavor, if possible, to remove it. If the patient be residing in an impure, unhealthy atmosphere, he must change to one of an opposite character. If the alimentary canal is kept in an irritable condition by indigestible food, retained secretions, or scybala, Linseed Oil, Castor Oil, or Compound Syrup of Rhubarb and Potassa, with or without some opiate may be given; and the irritability of the rectum, as well as the removal of its contents, may be facilitated by a laxative enema to which some Laudanum is added. Opiates are especially useful in cases of pain, tenesmus, and dysenteric diarrhea. If the diarrhea be a symptom of chronic enteritis, the successful treatment of the latter affection will be followed by a cessation of the discharges. If it be due to strumous disease of the alimentary canal, the result will be similar to that of the preceding case, by a successful treatment of the tuberculous malady.

If the diarrhea be due to the use of certain articles of food, or active exercise, these must be rigidly avoided. If it be dependent upon other diseases than that of the alimentary canal, the correct measures for removing or relieving such diseases must be pursued. If it arise from disordered secretions, we must endeavor to restore them to a normal condition; and so on, of other causes that may originate the chronic diarrhea.

But, it is not always the case, that the removal of the cause will remove the diarrhea; the disease may have been so severe, or may have continued for so long a time, that certain changes have occurred in the tissues of the alimentary canal, rendering the malady, as it were, independent of its primary cause, and requiring entirely different means to subdue it. We can not always positively determine what these changes are, nor what is their true remedy, so that, to a great extent, the treatment in such cases is more of an empirical character.

Astringents occupy a high rank in the treatment of chronic diarrhea, from their sanative influence upon diseased or ulcerated mucous tissues, and are usually associated with cholagogues, stimulants, carminatives, or anodynes, etc., according to the indications. Various preparations have been successfully employed; as, 1. Take of Leptandrin, Geraniin, Kino, Camphor, each, twenty grains; mix, and divide into twenty powders, of which one is to be taken for a dose, and repeated every two, three, or four hours.—2. Take of Catechu ten grains, Opium one grain, Sulphate of Quinia two grains; mix, and divide into one or two powders according to the urgency of the case; this will also be found of service in the diarrhea of malarial districts.—3. Take of Sulphate of Bebeerine twelve grains, Elixir Vitriol one fluidrachm, Cinnamon Water six fluidounces; mix. The dose is a tablespoonful every two hours.—4. Dr. A. Clark recommends: Take of Elixir Vitriol twenty minims, Paregoric one fluidrachm, Chloric Ether ten minims, Essence of Peppermint half a fluidrachm, Syrup of Red Poppy one fluidrachm, Decoction of Logwood one fluidounce; mix for a dose, to be repeated every four, five, or six hours, according to the urgency of the case. This is not useful in phthisical or dysenteric diarrhea, but is especially useful to correct fecal fermentation.—5. Take of Geraniin five grains, Compound Powder of Ipecacuanha five grains; mix for a dose, to be repeated four or five times a day.—6. Take of Elixir Vitriol half a fluidounce, Compound Spirits of Lavender, (or Tincture of Prickly-ash Berries), Syrup of Ginger, each, one fluidounce; mix. The dose is a tablespoonful every hour. Useful in cases accompanied with much

flatus.—7. Take of Carbazotate of Ammonia, Gallic Acid, each, one grain, Opium one-sixth of a grain; mix for a dose, to be repeated three or four times a day.

Many other articles have also been found useful, as, Decoction of Blackberry Root, Beth Root, Rock Brake, Galium Tinctorium, or Epilobium, etc. The Trisnitrate of Bismuth is very frequently useful, especially in diarrhea from chronic muco-enteritis; it may be given in water, mucilage, or glycerin, or, if much acid be present, in association with calcined magnesia. Tincture of Muriate of Iron, in doses of twenty drops in a gill of water, repeated three or four time a day, and persisted in for some time, will often effect a permanent cure.

When it is necessary to stimulate the liver, and correct the secretions, it will become necessary to employ other agents, as, White Liquid Physic; or, Podophyllin, Leptandrin, etc., may be combined with the other remedies employed.—If much acidity be present, the Compound Powder of Charcoal, (*see* page 743, No. 2), will prove serviceable; Calcined Magnesia may also be used with advantage.—If ulceration be suspected, in addition to the other measures employed, the following will be found of great service: Take of Bugle-weed, Beth Root, Prim Leaf, and Geranium Root, equal parts; make a strong infusion, and use freely.—If much intestinal irritation is present, it may frequently be allayed by the free use of an infusion of equal parts of White Indian Hemp, Solomon's Seal, Sassafras, and Golden Seal.—In cases of strumous disease of the intestines, or in strumous habits, whether among adults or children, the following will be found useful: Take of Iodine thirty grains, Sulphate of Morphia six grains, mix thoroughly together, and then add Sulphate of Quinia thirty grains, Geraniin ninety grains, Alcoholic Extract of Black Cohosh, a sufficient quantity; mix, and divide into sixty pills, of which one is a dose, to be repeated twice a day. I generally use in combination with this, the above infusion of Bugle-weed, Beth Root, etc. For children, the pill may be divided into two, three, or four parts, as required, and be rubbed up with a little burnt brandy. Or: Take of Bromide of Ammonium one drachm, Water two and a half fluid-ounces, Solution of Perchloride of Iron one hundred minims; mix. The dose is a teaspoonful, to be repeated three times a day; this is invaluable in many instances. I now publish it, having used it with considerable success, in conjunction with the above-named infusion of White Indian Hemp, Solomon's Seal, etc. It will also be found valuable in anemia of strumous persons.—Where there is tenesmus, griping pains, or dysenteric diarrhea,

injections will prove of service. A very useful one is composed of Tannic Acid five or ten grains, Water or Port Wine a fluidounce, Compound Tincture of Virginia Snakeroot half a fluidrachm; this injection should be repeated several times a day, according to the severity of the case, and be retained as long as possible, each time. Or, the introduction of suppositories into the rectum, every night, or every night and morning, composed each of Butter of Cacao nine grains, Opium from half a grain to two or four grains, will allay the excessive irritability of the rectum and colon. In dysenteric diarrhea, injections of a weak solution of Perchloride of Iron, or of Nitrate of Silver, will be found very useful.—In the catarrhal diarrhea of children the following may be used: Take of Borax four drachms, Infusion of Golden Seal three fluidounces, Glycerin, No. 2, one fluidounce; mix for an injection.—In cases where there is great exhaustion or paralysis, the stools passing involuntarily, the following has proved useful: Take of Tincture of Prickly-ash Berries four fluidounces, Tincture of Nux Vomica half a fluidounce; mix; add a fluidrachm of the mixture to a fluidrachm or two of infusion of Solomon's Seal, inject into the rectum, and retain as long as possible. This may be repeated three or four times a day.

When there is great prostration and anemia, Nux Vomica may be administered as follows: Take of Alcoholic Extract of Nux Vomica ten grains, Podophyllin four grains, Carbonate of Iron twenty grains, Alcoholic Extract of Black Cohosh, a sufficient quantity; mix, and divide into twenty pills, of which one is a dose, to be repeated every four hours. Or, the following: Take of Bromide of Potassium a drachm, Bromine ten minims, Extract of Nux Vomica three grains, Water half a pint; mix. The dose is a tablespoonful every three, four, or six hours; this will be found useful in cases of chronic diarrhea due to excess of amylaceous food, where there is a torpid condition of the alimentary epithelial surfaces, congestion of the intestinal capillaries, and an obstructed condition of the portal system. Or, the following may be used: Take of Citrate of Iron and Strychnia forty grains, Bromide of Potassium forty grains, Infusion of Sassafras, or of Cinnamon, two and a half fluidounces; mix. The dose is a teaspoonful, to be repeated three times a day. Or, where ulceration is also suspected, the following pill has been of benefit; take of Nitrate of Silver three grains, Extract of Nux Vomica twenty-two grains, Extract of Hyoscyamus twelve grains; mix, and divide into twelve pills, of which one is a dose, to be repeated morning and night. In conjunction with which the preceding infusion of Bugle, Beth, etc., may be used.

Where fermentation continues, as known by the greenish algoid cellules in the stools, Elixir Vitriol, Hyposulphite of Soda, or dilute Nitro-hydrochloric Acid may be given two or three times a day. Pulverized Nutmeg will also be of service in doses of ten grains two or three times a day. Phenol Sodique has also proved useful.

Where the urine is scant, Acetate, Citrate, or Bitartrate of Soda should be administered to increase the flow; if oxalates be present, dilute Nitric, or Nitro-hydrochloric Acid should be given.

In chronic mucous diarrhea, the balsams and terebinthinates will frequently prove serviceable. Four or five drops of Oil of Turpentine may be taken in a teaspoonful of Syrup or of Glycerin, and be repeated every three or four hours; or, a tablespoonful of the following may be administered three times a day: Take of Olive Oil one fluidounce, Oil of Turpentine one fluidrachm, Gum Arabic, Water, each, four ounces; mix, and make an emulsion. But I rarely employ these agents.

CHRONIC DYSENTERY.

Chronic Dysentery or Colitis* may be a sequel to the acute form of the disease; may be the result of a diarrhea, or be complicated with a chronic enteritis; it may also take place from irritating substances in the intestines, indigestible food, suppressed perspiration, exposures to cold and dampness, and especially when these are conjoined with malarial influences; or, it may also be associated with an abnormal condition of the blood, as met with in chronic hepatitis, or splenitis. All ages and sexes are subject to it.

The *symptoms* of chronic dysentery resemble those of the acute form, but in a less marked degree. There is less fever, perhaps, no appreciable febrile action; tenesmus is absent, or else is very slight; the stools vary in number from three to forty per day, and consist of blood and mucus mixed with pus, and, in some instances, of nearly pure blood. Diarrheic evacuations, without any admixture of blood, are by no means uncommon, and may vary in consistence, color, and character; and, in such cases, great intestinal irritability is apt to exist. The discharges are almost invariably fetid, and are very apt to be preceded by sharp, griping pains in the course of the colon, or, by obscure pain and flatulency. Occasionally, the dysen-

*It must be recollected that colitis may exist without dysentery; and that dysentery instead of being a mere colitis, may be due to some abnormal condition of the blood.

teric discharges alternate with constipation. Feculent matter may also be discharged either in a fluid form, or in scybalous masses.

In addition to these symptoms, the general system will suffer more or less; manifested by some acceleration of pulse toward evening; increased redness of the body of the tongue; dry and parched skin; pallid or sallow, and often a bloated appearance of the countenance; debility, irregular appetite; hard and tumid abdomen, but not very painful on pressure, except about the cæcum or sigmoid flexure of the colon; gradual emaciation; impaired action of the kidneys; headache; and sleeplessness. These symptoms will be more marked in some cases than in others; and may be so severe as to confine the patient to his room or bed. As the disease approaches a fatal termination, the extremities become œdematous, the features shrunken and pallid, and not unfrequently, before death closes the scene, jaundice, or ascites may supervene.

Chronic dysentery may be complicated with hepatic disease, chronic enteritis, intermittent fever, scorbutus, rheumatism, disease of the pancreas, or of the mesenteric glands, etc., which are often difficult to detect, requiring considerable care and attention on the part of the examiner. After a person has once had the disease, he will be very liable to relapses, especially upon exposing himself to the exciting causes. Death usually occurs from exhaustion, sometimes from ulceration and perforation of the intestine, and not unfrequently from pulmonary, cerebral, or hepatic disease induced by the asthenic influences of the dysentery upon the system.

The *diagnosis* of chronic dysentery is based principally upon the presence of more or less blood, or bloody mucus in the discharges, offensiveness of the stools, and the griping, or tenesmic pains. However, the practitioner should endeavor to ascertain whether the blood comes from some local disease of the rectum, as, hemorrhoids, cancerous or fungoid growths, etc.; also, whether in connection with the dysentery there exists any abnormal condition of the blood, or any complication with lesions of adjacent or distant organs,—conditions not always easy to determine.

The *prognosis* of chronic dysentery can not be said to be favorable, as we can not determine accurately the extent and character of the local morbid conditions that occasion it. Recent cases, of a not very severe character, in which there has not been much involvement of the general system are, as a general rule, curable; but, severe or long-standing cases, in which the general health is more or less affected, with complications or structural changes, are, to say the least of them, of very uncertain prognosis.—In cold climates the prognosis of dysentery is more favorable than in hot; and when

dysentery occurs in connection with malarial fevers, or is due to malarial influences, the danger is much greater than under opposite circumstances. Under the most favorable conditions, and on account of the great amount of mischief that has to be repaired, the cure of chronic dysentery is very protracted, frequently requiring six, ten, or even eighteen months.

The *pathological appearances* observed in chronic dysentery are often of such a moderate character as not to account for the severity of the phenomena observed during the life of the patient, and such as would lead to the supposition that the dysentery was not wholly due to a colitis. In instances, however, where the reverse of this obtains, more or less extensive inflammation of the mucous membrane of the colon will be observed, presenting reddish, brownish, or ash-gray discolorations; sometimes contraction of some portion of the colon will be present, with a dilated condition just above the strictured part; the texture of the mucous membrane may be altered, thickened, or divested of its epithelium wholly or partially; or, there may be a softening of the internal coats of the colon; or, perhaps, ulcerations, small and numerous, or large and few, and of a sloughy character. Occasionally, a laceration or perforation of the coats will be observed, allowing the contents of the intestine to enter the peritoneal cavity, and give rise to a fatal peritonitis. In most cases, an inflammatory or disorganized condition of adjacent organs will be observed, as, of the cæcum, the appendix vermiformis, the small intestines, the rectum, mesentery, liver, spleen, etc. When the disease has been of a scorbutic character, the mucous membrane will present a dark or livid color, with ecchymosed spots, excoriation, ulceration, and sphacelation; and the liver, spleen, heart, etc., will generally be found more or less disorganized, soft, and spongy.

In the *treatment* of chronic dysentery, and more especially in severe or obstinate cases, rest in the recumbent position is a highly important condition, and must positively be insisted upon. The intestines are not efficiently supported while sitting or standing; and in walking, not only is there an increased peristaltic action induced, but likewise direct intestinal irritation from the action of the abdominal muscles. The recumbent posture alone supports the intestines the most efficiently, and keeps them quiet.

Another very important consideration is diet. Those articles only should be allowed that are easy of digestion, that give the least work to the bowels, that induce the least peristaltic action, and that are more readily assimilated. Bland and unirritating articles, as, milk, boiled milk, farinaceous articles, buttermilk when it

agrees, mucilaginous fluids, etc., only, should be allowed in any case. But more especially when ulceration is present must a rigid attention to the diet be observed; in these cases meats, and irritating or not easily digestible articles, produce or aggravate the griping, irritation, and other symptoms, retard the progress of cicatrization, and either develop ulcers, or, when already present, render them more extensive.

As regards the therapeutical treatment, this will vary much according to the degree and character of the disease. In many instances, the treatment advised for chronic enteritis will prove successful; in others, that for chronic diarrhea; and in others, again, that named for chronic peritonitis; while a fourth class will only yield to a persevering use of astringents. In most cases the cure is effected slowly, with frequent relapses, and requiring on the part both of the patient and practitioner great care, patience, and perseverance. However discouraging a case may appear, its treatment must not be given up prematurely; for it must be borne in mind that remedies which at first were followed by beneficial results, are very apt to lose their sanative influence after having been employed for a short time, and that consequently, and particularly in severe and obstinate cases, the greatest advantages are to be derived from a change of remedies, instead of constantly persevering in the use of any one. The rule to follow is, to continue a remedy as long as it proves efficacious, and as soon as its efficacy begins to wane, then commence immediately with some other remedy, and so on.

Among the agents administered internally, from which I have derived the greatest amount of benefit, are the following: 1. Take of Rhubarb two ounces, Black Cohosh, Wild Cherry, Geranium, each, one ounce, good French Brandy, Water, each, two pints, White Sugar a sufficient quantity; mix, and form a cordial, the dose of which is a tablespoonful every hour or two.—2. Take of Beth Root, Geranium, Blackberry Root, Wild Cherry, Cinnamon, each, one ounce, Brandy, Water, each, one pint and a half, White Sugar a sufficient quantity; mix, form a cordial, and use the same as the preceding. Other astringent tonics have been found valuable in this disease, as, Tannic Acid, Statice Caroliniana, Pteris Atropurpurea, Cerastium Vulgatum, Heuchera Americana, etc.—3. In many instances, and especially when the disease is associated with a malarial influence, the White Liquid Physic, given every day in tablespoonful doses, repeated every hour or two until an alvine evacuation occurs, has proven of great value. Indeed, it will always be found useful to remove feculent matter and putrid secretions in the treatment of this disease; such accumulations in contact with an

irritated or ulcerated part, not only tend to keep up irritation, but likewise interferes with the sanative influences of astringents and other agents upon the irritated or ulcerated surfaces.

4. Take of Ipecacuanha twenty grains, Sulphate of Morphia one grain, Leptandrin ten grains, Geraniin twenty grains; mix, and divide into ten doses, one of which may be repeated every three or four hours.—Other agents have been recommended, and may prove occasionally useful, as, the Compound Tincture of Benzoin twenty drops on sugar, repeated three times a day; Trisnitrate of Bismuth eight to ten grains, mixed with Sulphate of Morphia one-fourth to one-half grain, for a dose, to be repeated three times a day; Creosote Mixture, both internally and by injection, one part of the mixture to six of glycerin, or, of whatever other enema is to be used,—this is said to be especially useful to allay irritability, tenderness on pressure in both iliac regions and tenesmus. I must not omit to state here that the Compound Powder of Charcoal has frequently proved a valuable auxiliary to the other treatment.

In strumous habits of body, I have derived considerable benefit from the following preparations: 1. Take of Iodine half a drachm, Sulphate of Morphia six grains; mix thoroughly together, and then add, Sulphate of Quinia half a drachm, Geraniin one drachm, Alcoholic Extract of Black Cohosh a sufficient quantity; mix, and form into sixty pills, of which the dose is one, to be repeated three or four times a day. In connection with this, inject into the rectum a dilute solution of Perchloride of Iron, repeating it two or three times daily.—2. Dissolve an ounce of Bromide of Potassium in a pint of Water, and give a fluidrachm of the solution for a dose, repeating it three times a day, about an hour before meal-time. Also administer twenty drops of the Tincture of Chloride of Iron, in water, for a dose, repeating it three times a day about an hour after meal-time. In conjunction with this, inject into the rectum, three or four times a day, the following mixture: Take of Bromide of Potassium six grains, Perchloride of Iron, in solution, five to ten drops, Water a fluidounce; mix for one injection.—Balsam Capaiba has been lauded in strumous cases, and in intestinal ulceration, but I have never used it; it is given every four hours in doses of fifteen minims, associated with some pleasant oleaginous mixture.

Where much prostration is present, wine, or other stimulants should be administered; and where anemia exists, preparations of iron, especially the astringent salts, are indicated. In strumous cases, and where there is much debility and emaciation, Cod Liver Oil, Hypophosphites, Elixir of Wine and Iron, or, the preparation named under treatment of Chronic Peritonitis, page 774, contain-

ing Soluble Pyrophosphate of Iron, will be found of benefit. If symptoms of scorbutus be present, Citric Acid, Lime-juice, Lemon-juice, or other antiscorbutics must be used in addition to the other remedies. If the patient has been subject to erysipelas, which is apt to render the disease very unyielding, the Tincture of Chloride of Iron will be found useful; or, in conjunction with the other treatment, the patient may drink freely of an infusion of equal parts of Maiden-hair, Elder Blows, Burdock Seed, and White Indian Hemp.

In all cases of dysentery, injections into the rectum must be used, once, twice, or thrice a day, according to the indications, and the effects upon the patient; they should be carried as high up into the rectum as possible, for which purpose, I usually take a number 12 or 14 bougie, make a sufficiently large orifice in its closed extremity, pass it up into the rectum, and inject through it. I have already named some of the articles I use for this purpose. Nitrate of Silver, ten to twenty grains to the fluidounce of Water, may also be advantageously used; but it is more troublesome than the others, requiring the mucous membrane to be previously cleansed by an injection of warm water; and, subsequently, to neutralize an excess of the nitrate by injecting a solution of common salt, to which, if much pain be present, ten or twenty grains of laudanum may be added. A very excellent injection for some cases, is formed of Compound Tincture of Virginia Snakeroot one fluidrachm, Tincture of Chloride of Iron half a fluidrachm, Tannic Acid five or ten grains, Water one fluidounce; mix for an injection. As already remarked, the addition of Creosote to these injections often increase their efficacy. Prof. J. M. Scudder, in his Manual of Practice, refers to a case of seven years duration, in which the disease seemed to be confined to the sigmoid flexure and rectum, and which was cured in about four weeks, by injections, repeated three times a day, a pint being used each time, of a decoction of Alnus, Rumex and Quercus Rubra.—Some patients can bear injections only once a day, or every other day, a matter to which the practitioner should pay especial attention.

When there is pain or tenderness on pressure along the course of the colon, it may often be relieved by rubbing the iliac and hypogastric regions gently with a liniment composed of Laudanum three drachms, Camphorated Soap Liniment two fluidounces and a half, Oil of Turpentine one fluidounce; mix. But in very obstinate and long-standing cases, either the Croton Oil Liniment, or the Compound Tar Plaster, should be applied over the tender part, to produce either pustulation or suppuration, which should be

kept up continuously or intermittently, according to the effect produced.

In addition to the other means pursued, it is of the utmost importance to keep up healthy action of the skin, kidneys, stomach, and liver, by the measures heretofore so frequently named. Bathing the inside of the thighs, along the course of the colon, and over the region of the liver, with the diluted Nitro-muriatic Acid, named under Constipation, on page 757, will be found beneficial in many instances.

Sometimes, the disease will prove intractable, owing to the presence of hemorrhoids, a fissure or prolapsus ani, which keeps up the irritation and discharges; consequently, in all obstinate cases, the parts around the anus, externally and internally should be carefully examined. If one of the conditions named be found to exist, it must be specially treated, either by the application of strong astringent decoctions, nitrate of silver, or nitric acid to the hemorrhoids, and also to the thickened and relaxed portion of prolapsed mucous membrane, or, by removing hypertrophied portions with the knife or scissors, etc.

I have recently cured a very bad case of chronic dysentery by the use of the following preparation, aided by injections of Perchloride of Iron, attentions to the skin, diet, rest, etc.; Take of Podophyllin one grain, Leptandrin ten grains, Ipecacuanha twenty grains, Myricin twenty grains, Sugar of Milk one hundred grains; triturate thoroughly together, and divide into ten powders, one of which may be administered every four hours, in some Blackberry-jelly, or Mucilage flavored with Cinnamon.

Before entering into an examination of the diseases of the liver and the spleen, I will briefly notice two conditions more especially with regard to their treatment, and which are often associated with many other affections, either as a cause or as a result, and in either case increasing the severity of the co-existing malady.

Worms, (*Vermes*). The worms that usually infest the intestinal canal, are: 1. The *ascaris lumbricoides*, or long round-worm, and the *tænia solium*, or long tape-worm, each of which generally inhabits the small intestines, and the former of which frequently wind their way out through the mouth and nostrils. 2. The *tricocephalus dispar*, or long thread-worm, and the *oxyuris vermicularis*, or small thread-worm, occupying the large intestine; the first is also frequently found in the small intestines; and the latter chiefly confines itself to the rectum.

The *symptoms* of intestinal worms are very equivocal, and the

only certain evidence of their existence is their presence in the stools; the tape-worm usually passes away in jointed portions of greater or less length, or in isolated parts or articulations, resembling melon or cucumber seeds.

The symptoms attributed to the presence of tape-worm, are, irregular appetite, but usually voracious, gnawing pain in the region of the stomach, deficient nutrition and emaciation, though these are not invariably present, a hard, convulsive cough, headache, vertigo, nervous affections, great thirst, etc.

The symptoms of thread-worms are an intolerable itching in the anus, and more or less nervous irritability; tenesmus and prolapsus ani are sometimes occasioned by these worms. The more constant and less uncertain symptoms of intestinal worms are: offensive breath; unhealthy condition of the gums; capricious and irregular appetite; irregular colics; mucous stools; abdominal gripings; great thirst; ptyalism; short, dry cough; pale, whitish, and frothy urine; desire for salt, salted meats, and salted fish; peculiar pale, unhealthy, and bloated countenance, with a dark hollow circle around the eyes; though these symptoms may be present with other abnormal conditions, where no worms are present. Sometimes a slow fever, swoonings, drowsiness, cardiac palpitations, cold sweats, convulsions, and many unaccountable nervous symptoms.

If, during the existence of any malady, worms are discovered, we must not suppose that they are necessarily the cause of the malady, as they may not have been at all instrumental in its production. They may have been in existence long previous to the appearance of the malady, and may have been compelled to change their location in consequence of the conditions and circumstances attending the malady. Their presence, however, is due to a debilitated condition of the intestinal mucous membrane, with, in most instances, an augmented secretion of mucus, probably, due to irritation of the mucous membrane by the parasites. Yet, whenever worms are observed, the better course is to remove them as promptly as possible, because their presence not only aggravates, but often renders serious, a disease, in the production of which they had no creative agency, but which has caused them to migrate, and occasion more or less irritation, which, through sympathetic or reflex action, aggravates the existing symptoms of the co-existing disease.

The *treatment* of worms consists in first removing them, and then making use of tonics to impart tone and vigor to the intestinal mucous membrane, in order to prevent their future reproduction. The best vermifuge remedies that I know of are, the Compound Powder of Spigelia, the Compound Fluid Extract of Spigelia, or,

the Vermifuge Cordial named in the American Dispensatory, sixth edition, page 534, under Properties and Uses of Juniperus Virginiana; this latter preparation is a very pleasant and efficacious one, and I have been surprised that our practitioners have not made greater use of it. With me, it has always been a favorite vermifuge, especially among children; and may be used as a tonic, in strumous habits, by the addition of Tincture of Black Cohosh. Thread-worms in the rectum can only be removed by injections of bitter vermifuge infusions, to which some Tincture of Assafetida must be added. Tape-worm may be removed by decoction of Pomegranate Bark of Root; Oleo-resinous Extract of Male Shield Fern; or, the free use of an infusion of Pumpkin seeds.

Numerous other agents have been advised for the removal of worms, as, Oil of Turpentine, Santonine, Oil of Wormseed, etc., but those named above are the ones I almost invariably employ.—After the removal of worms, not only should some tonic preparation be employed for sometime, but particular attention should be bestowed upon the diet, avoiding fats and acids, and allowing salted meats, salt, onions, garlic, ginger, cloves, mustard, etc.

Hemorrhoids, or *Piles* are a very common affection among both sexes, and may be *caused* by anything that will irritate the large intestine, or produce a determination of blood to it, as well as by anything which prevents the healthy return of the blood from the vessels of the rectum. Among these may be named, the use of drastic cathartics, habitual constipation, straining at stool, congestion or other obstructive disease of the liver, tight stays or corsets, violent horseback exercise, use of heating, irritating food, sexual excesses, sedentary habits, pregnancy, standing long in certain positions, etc. When the piles are external to the rectum and around the anus, they are called *external piles;* when seated within the rectum they are termed *internal;* when they discharge blood they are called *bleeding piles;* and when no blood appears, *blind piles.* External piles are always dry and cuticular, have a light uniform bluish tinge, rarely bleed, and are dilated hemorrhoidal veins; they may be cut or snipped off with impunity, while to ligature them would risk phlebitis and purulent absorption.—Internal piles are moist and slimy, have a bright florid color, or more or less livid or purple, according to the intensity of their congestion, almost always bleed, very rarely consist of dilated veins, but are, as a general rule, prolapsed folds of the mucous membrane lining the sphincter, extremely vascular, and hypertrophied and thickened by long con-

striction; they may be ligatured with safety, while to excise or cut across them is to risk fearful, perhaps fatal, arterial hemorrhage.

External hemorrhoids consist of one or more external swellings or tumors of various sizes, located at the verge of the anus, outside the sphincter, are covered with the skin, and may at first give rise to no unpleasant symptoms, but ultimately occasion irritation, pain during stool, bearing-down sensation, and itching about the anus. When the tumor becomes inflamed, it occasions most excruciating pain all the time, and, defecation, or attempts to push the tumor up, which affords relief under ordinary circumstances, causes so much pain as to oblige the patient to desist. The suffering may be so great as to confine him to his bed for several days with considerable sympathetic fever, and great restlessness.

Internal piles consist of one or more tumors, are usually within the sphincter, and covered by mucous membrane, and, like the preceding variety, may exist for some time without occasioning any very annoying symptoms. Generally, more or less profuse hemorrhage occurs, which may continue for a considerable time, and may not recur for some weeks or months. More or less weight and uneasiness are experienced at the anus, pain during defecation, pain and uneasiness in the loins and down the thighs, and a sense of weight and obscure tenderness in the back and hypogastric region, sometimes inducing a supposition of disease of the kidneys or neighboring organs. The hemorrhoidal swellings often increase in size, rendering defecation more difficult and more painful, causing considerable straining, with external protrusion of the tumor. At first this may be returned without difficulty or pain, but eventually becomes both difficult and painful; and frequently the tumors will protrude externally whenever the patient stands for a length of time, or takes some walking exercise. If from any cause, internal hemorrhoids become inflamed, it gives rise to violent pains in the pelvic region, more or less constitutional disturbance, and even mortification of the hemorrhoidal masses. Long-standing internal piles affect the general health, giving rise to pallor, flatulency, indigestion, and indolence; hence, their cure should always be undertaken at an early period. Prolapse of the rectum, anal fistula, etc., and even fatal hemorrhage, have followed this variety of piles.

The *treatment* of external piles consists in keeping the bowels regular, removing any derangement of the liver or digestive organs, together with a rigid avoidance of all those habits, which produce and keep up the disease. When the tumors are painful or inflamed, a poultice of Elm Bark and Lobelia Leaves, equal

parts; or, of Stramonium Leaves; or, of Poke Leaves, will be found efficacious. In obstinate cases, relief will be procured by exposing the part to the steam arising from a hot decoction of bitter herbs. In some instances the application of cold will be found to answer a better purpose. A very painful, blue, distended, circumscribed external tumor, that occasions much suffering from the accumulation and coagulation of the blood, and that is not relieved by the measures just named, may be punctured freely with a lancet, and, after the escape of the semi-fluid blood, ice-cold water may be applied.

After the inflammatory symptoms have passed away, local applications will frequently remove the disease, as: Take of Tannic Acid one scruple, Cerate of Acetate of Lead one ounce, Extract of Stramonium one drachm—rub thoroughly together. Or, other asringent preparations may be applied, as, Solution of Perchloride of Iron, or, Persulphate of Iron thirty grains to an ounce of Simple Cerate, etc. When the swellings form distinct tumors around the anus, more or less pendulous, they should be removed, especially if they are liable to become swoln and inflamed. For this purpose, the parts may first be benumbed with applications of ice and salt, then seize each tumor with a hooked forceps, and excise them with the scissors placed flat upon the skin; but little bleeding will occur, unless some of the mucous membrane has been cut. Great care must be taken not to snip any of the mucous membrane, and also not to take away too much of the lax skin or natural folds around the anus, else, when cicatrization occurs a severe contraction of the anus may follow.

Internal hemorrhoids in their early stage may often be readily cured by a strict attention to diet, avoiding all acrid, stimulating, or indigestible articles, and keeping the bowels regular, either by diet, injections, or laxatives. Straining at stool should especially be avoided. When the tumors protrude externally, they should be carefully returned by the patient. In cases of bleeding piles I have met with much success from the internal administration of the following preparation, in tablespoonful doses, repeated every one, two, or four hours, according to the urgency of the case: Take of Turkey Rhubarb, Rosin, of each, in very fine powder, two and a half drachms, finely-powdered Alum one and a half drachms, Molasses or Glycerin four fluidounces; mix. In conjunction with this, the following ointment should be applied within the rectum, two or three times a day: Take of Styptic Powder one drachm, Canada Balsam (or Sweet Gum) one drachm, Stramonium Ointment six drachms; mix thoroughly together.—When the hemorrhage is pro-

fuse, the patient should be kept as quiet as possible in the recumbent position. If inflammation is present, it must always be first overcome by injections of anodyne fluids, and the means advised for inflammation with external piles; occasionally, ice poultices to the anus will afford prompt relief; or, an opium suppository may be employed.

Among the other remedies that have been found efficacious in internal piles, are the following: Fresh Linseed Oil in doses of two ounces, repeated twice daily; Castor Oil and Copal Varnish, equal parts; ordinary Coal Oil; ointment of Sweet Gum; Cream three parts, Oil of Pennyroyal one part; mix; Oil of Flea-bane, Oil of Pumpkin Seed, Oil of Fire-weed, Oil of Horse-mint, Linseed Oil, equal parts; mix; Decoction of Solomon's Seal (internally); Oil of Horse-chestnuts, etc. With the exception of the Linseed Oil, and the Decoction of Solomon's Seal, these are all to be used as local applications. Cold water injected daily will give tone to the vessels of the rectum.

When the cellular tissue of the parts becomes thickened and infiltrated in a more or less circumscribed space, with thickening of the mucous membrane, one or more distinct, solid tumors are formed, which can not be removed by the preceding measures. In the early period of these tumors, Nitric Acid, Perchloride of Iron, or Chromic Acid, carefully applied to them, will frequently effect a cure; but where the tumors are large, indurated, and of a deep-blue color, the ligature will be required. In applying Nitric Acid, the bowels should be evacuated a couple of hours previously, and the patient should sit over hot water for some minutes, or have an injection of very warm water, in order that the hemorrhoidal disease may be well brought into view; then carefully wipe the part to be acted upon with a piece of lint, and afterward, carefully and lightly touch the diseased surface with the extremity of a small, flat piece of soft wood that has been just dipped into pure Nitric Acid. This done, smear the part and its neighboring mucous membrane well with oil, and then return the part within the orifice. If the part can not, from any cause, be brought down, the acid may be applied by means of a silvered glass speculum, introduced so as to bring the hemorrhoidal tumor into view. The acid may be applied, if necessary, every two or three days; it is not apt to occasion much pain, unless the surface close upon the verge of the anus is touched with it, which, of course, should be carefully avoided; an ulcer, or a fissure, in conjunction with the pile tumor, must first be healed before applying the acid, else much suffering will be produced. A careful examination of the parts to discover such affections, should always be made.

Nitric Acid, similarly applied, will be found of great service in *Prolapsus of the Rectum* when not very large, of recent origin, where the mucous membrane has not become very much thickened and changed in its appearance and structure, and where one or more large folds of mucous membrane are continually down, with a smooth velvety appearance, or a superficially-ulcerated and readily-bleeding surface, the tissue being extremely vascular. The acid should be applied to only a part at each operation.—When there is a considerable redundancy of loose skin, or long flaps of thick integument around the margin of the anus, this must be excised with the scissors after the disappearance of the prolapsus, or it will be reproduced. In long-standing cases, with structural changes of the mucous membrane, the ligature must be applied. If the prolapsus be due to pile tumors, the cure of the latter will be followed by a disappearance of the former.

Chromic Acid is a much more painful application to piles, occasioning a slough, and a shrinking of the tumor.—The modes of applying the ligature, the clamp, or the ecraseur for the permanent cure of internal piles, are laid down in most works on Surgery. In cases of constantly protruding piles, as well as in obstinate prolapsus of the rectum, where the patient will not submit to the application of nitric acid, or to operation by ligature, etc., or, where these are not deemed very advisable by the physician, great relief may be had by wearing a properly-made spring and pad to give support to the parts, and keep the protrusions within the rectum. Solution of Perchloride of Iron, so frequently serviceable in hemorrhoids, will also prove of equal efficacy in prolapsus of the rectum.

Chronic Tympanites is an inordinate accumulation of gas in the intestinal tube, giving rise to a very great prominence of the abdomen, which may be mistaken for ascites. It may be *caused* by the use of certain articles of food, by a habitual constipated condition of the bowels, and is frequently associated with hysteria, uterine and spinal disease; sometimes, it occurs as a result of enteritis, or peritonitis. In these instances it is more apt to take place among those of weak digestive powers, or who are great eaters. It is also frequently associated with intestinal adhesions, stricture of some part of the intestinal tube, compression of the tube by abnormal growths, and organic lesions of the biliary, digestive, and other adjacent organs.

The chief *symptom* is the gradual enlargement of the abdomen, the tympanitic sound elicited by percussion, and the absence of fluc-

tuation, which will determine it from dropsy. With the tympanitic condition there may be a sense of lassitude, indolence, or debility, sometimes cutting pains or shifting pains, palpitations, a sense of discomfort when the clothes are worn too tightly around the abdomen, or when this is pressed upon, sometimes borborygmi, indigestion, and a sense of fullness after meals. In some cases, the only symptom observed will be the tympanites. Although the disease usually develops itself gradually, I have known instances where it became manifested rapidly, in a very few hours.

The *prognosis* is usually favorable, except in those cases where it is associated with intestinal adhesions or organic lesions of adjacent organs, and which lesions are generally observed in cases proving fatal.

The *treatment* consists in avoiding those articles of food that give rise to flatus, and administering stimulating tonics to impart tone to the mucous lining membrane of the alimentary tube. The introduction of a long tube into the rectum, and removing the air by means of a large syringe or air-pump, should not be neglected, as it is often followed by happy results. In addition, the bowels should be injected, two or three times a day, with a mixture of Tincture of Prickly-ash Berries four fluidounces, Tincture of Nux Vomica ten or twenty minims, Infusion of Capsicum four fluidounces; mix for one injection.* The bowels should be frequently rubbed with some stimulating liniment, as, for instance, a mixture of equal parts of Oils of Cajuput, Juniper, Sassafras, and Olive Oil,—rubbing for half an hour or an hour at a time, and as hard as can be borne. Internally, the Tincture of Prickly-ash Berries, with or without the addition of Tincture of Nux Vomica, will be found an efficacious remedy. If acidity be present, Charcoal, or the Compound Powder of Charcoal will be required. In some cases, electromagnetism will be found useful.—When organic lesions exist, these must be removed by the appropriate measures before we can expect the tympanites to disappear.

DISEASES OF THE LIVER, ETC.

Notwithstanding that the liver is an organ that has been the subject of much research for many centuries past, its anatomy, physiology, and functions are still incomplete and not satisfactorily

*The Infusion of Capsicum to be made by pouring Boiling Water one pint, upon powdered Capsicum half an ounce; allow it to stand until cool, and strain for use.

defined; and though pathological anatomy reveals to us the sequelæ of hepatic inflammation, as, sanguineous, lymphatic, and purulent exudations, as well as the conditions of atrophy, hypertrophy, cancer, tubercle, fatty degeneration, etc., of the organ, we are still in a state of much obscurity and uncertainty as to the symptoms, causes, and treatment of these various states.

The lungs, the liver, the kidneys, and the skin, appear to be the great depurating organs of the system. The hydrogen and carbon are thrown off by the lungs and liver; the nitrogen by the kidneys, while the skin eliminates carbonic acid, nitrogen, etc. But the liver appears to be an organ fulfilling other than mere excretory functions, performing an important part in secretion, in purifying the blood, in the production of animal heat, and in nutrition. Among those who have investigated the functions of the liver, and who has thrown much light upon them, is Austin Flint, jr., M. D., of New York city.

This gentleman, in a series of investigations regarding, what he terms, "a new excretory function of the liver," has demonstrated that the bile is a complex fluid, containing among other principles, a substance formed by the disintegration of brain and nervous tissue, viz., cholesterine. This substance, being an excretion, pre-exists in the blood, which has absorbed it from the brain and nerves, where it acts as a poisonous, injurious body, its accumulation in the blood being to the liver, in a manner, what an accumulation of urea is to the kidney; cholesterine being, in health, separated from the blood by the liver, it is thrown with the bile into the upper part of the small intestine, becomes transformed into stercorine (seroline), in which form it is evacuated from the rectum.

The secretory function of bile appears principally to consist in the manufacture of glyco-cholate and tauro-cholate of soda, substances which, like all other secretions, do not pre-exist in the blood, are found in no other organ or situation, are first met with in the substance of the liver itself, and are not discharged from the body, but become absorbed in their passage along the alimentary canal. The same may be said concerning another principle (amyloid substance, hepatine, glycogene), formed by the liver, designed more especially for manufacturing fat, but which may be readily converted into sugar by a process allied to fermentation. These salts are observed principally at a certain period of digestion, and are designed to aid in some of the nutritive processes, which would become defective if they were not secreted. There is no doubt but what these discoveries of Prof. Flint, jr., will lead to important and valuable results not only in the diagnosis and treat-

ment of liver diseases, but also of many maladies of the brain and nervous system, which have been, and are still enveloped in great obscurity.

Beside these, the bile contains other elements, as biliverdine or coloring matter, water, chloride of sodium, phosphate of soda, of lime, and of magnesia, fats, with oleates, margarates, and stearates of soda and potassa, carbonates of soda and potassa, etc. The practitioner should, therefore, in the investigation and treatment of diseases of the liver, bear in mind this two-fold function of the organ, and its relations to the lungs as an eliminator of hydrogen and carbon; remembering, likewise, that from the lack of an accurate knowledge of all the functions and pathology of the organ, its therapeutics must necessarily be of a more or less empirical character.

In the examination of liver affections, palpation and auscultation may be employed, but percussion will be of the most value, enabling us to define the boundary of the organ, especially its upper and inferior borders, anteriorly and laterally; its posterior margins can not be determined. A sense of resistance and dullness on percussion are signs that a solid organ is underneath; these are the signs of the presence of the liver, on percussion; resonance, is the sign of a hollow organ, or cavity.—Inspection of the stools to determine the absence or presence of bile in them, is also another mode of examination frequently employed.

It must not be forgotten that an examination of the urine forms a valuable and important means in the diagnosis and treatment of hepatic disease. Thus, by the application of nitric acid to the urine, the presence of biliary pigment in this fluid may be detected. If the urine, though at first of a normal color, becomes darker and darker upon standing, from a slow oxidation of the pigment, it contains melanine, which is indicative of melanotic cancer of the liver. If the needle-like and star-like crystals of tyrosine, or the round, yellow, occasionally spiculated, balls of leucine are found in the urine, it is an evidence of chronic atrophy of the liver. If bile acids are found in the urine in any quantity, it is an indication that there exists an obstruction of the common bileduct, either along its course, or at its termination, as is observed in some forms of jaundice. The bile acids may readily be detected by adding to the urine containing them a small piece of white sugar, and then pouring on gently, in such a manner as not to mix the two fluids, a little strong sulphuric acid. If, after standing for a few minutes, a deep purple, or scarlet color, be observed at the line of contact of the two fluids, it is a sure indication that the bileducts are

obstructed. If, on the other hand, a brown color be observed, the jaundice present is due to suppression of the biliary function.—M. Cunniset states that bile may be detected in the urine, by the following method: to forty or fifty parts of the urine under examination, in a test tube, add four or five parts of chloroform, and then shake the mixture. If bile be present, the mixture assumes a fine yellow color, and on allowing it to rest, the chloroform falls to the bottom of the tube, taking with it the fatty matters of the urine colored by the yellow biliary substance.

Among the symptoms more commonly observed in the various affections of the liver, one or several of which may be present, are the following: tenderness or pain upon pressing along the right side of the sixth, seventh, eighth, and ninth dorsal vertebræ, but which is apt to be absent when structural degeneration has occurred; pain in the right side extending even to the shoulder-blades and pit of the stomach; at times a sense of uneasiness and tightness; sallow complexion; yellowness of the eyes; bowels irregular, generally disposed to looseness; irregular appetite; nightmare; palpitation of the heart; asthmatic symptoms; shortness of breathing; piles; urine high-colored, sometimes scalding or unnaturally hot, and depositing a sediment if allowed to stand,—sometimes it is scanty, then quite free; tongue white, but sometimes brown or yellow toward the base or root; bitter and disagreeable taste; a dry, harsh, constricted state of the skin; or a greasy skin; a short, dry cough; numbness of the limbs; cold hands and feet; blotches and pimples on the face; tightness or constriction of the chest; yellow and scaly or branny eruptions on the skin; erysipelas; itching of the skin; swelling of the right side; and in the last stage of induration, hemorrhages from the stomach or bowels.

CHRONIC HYPEREMIA OF THE LIVER.

Chronic Hyperemia of the Liver is a very common morbid condition, met with among sedentary persons, the intemperate, those who are addicted to high living, as well as among individuals residing in hot countries, or in malarial districts. Persons once attacked with it are liable to its return upon an exposure to the slightest causes. It may be present in various degrees, and under different associations. The most dangerous forms of chronic hepatic disease are often the result of chronic hyperemia of the liver.

The *causes* of hepatic hyperemia are various; thus, an impediment to the flow of blood through the liver, from diseased heart,

especially of the valves on its left side, giving rise to an accumulation of blood in the hepatic vessels; or, an obstruction to the circulation in the portal vessels, from overeating, diseases of the abdominal viscera, etc.; and the degree of the congestion and of its symptoms, will be due to the existing amount of obstruction offered to the circulation in the vessels referred to. Other causes may also depress the nervous energy of the liver, and impair its venous tonicity, as, sudden changes of temperature; exposures to cold, dampness, or malarial influences; intemperance; want of exercise; dyspepsia; periodic fevers, etc. Hyperemia may also be the result of an unhealthy condition of the blood, independent of any obstruction to its circulation, as, in scurvy, purpura hemorrhagica, leucocythemia, etc.

Whatever may be the origin of the hyperemia, the *symptoms* will be about the same, though varying in intensity according to the degree of congestion. Actual pain is seldom if ever present; there will be a sense of fullness or weight in the right hypochondrium, which is sometimes very annoying; more or less derangement of the appetite; tongue coated white, with more or less of a brownish fur at some part of it; debility or indolence; a more or less yellow tinge of the conjunctiva; lowness of spirits; a dry or clammy condition of the skin, with a dingy appearance, and, if the congestion be considerable, the skin will present a decided appearance of jaundice, from a diminished secretion of bile; urine scanty and turbid; dull headache; disturbed sleep; unpleasant dreams; and frequently a sensation of tension or heaviness will be felt across the shoulder-blades, or below the right scapula. Constipation may be present, or it may alternate with diarrhea, and the stools will show a greater or less deficiency of bile; the bile is not only diminished in quantity, from lessened functional activity of the organ, but may also be more or less acrid or unhealthy. Sometimes, lying upon the left side will give rise to more or less discomfort.

Enlargement of the liver from an unnatural fullness of its vessels, generally accompanies an intense or long-standing hyperemia, and which may be detected by percussion yielding dullness over a larger extent of surface than that accompanied by the healthy organ. If the hyperemia be constant, owing to cardiac, abdominal or other disease, the secreting hepatic cells, and the bileducts will alternately become abnormally altered. In the *diagnosis* of enlargement of the liver from hyperemia, we have no positive indications that will enable us to determine it from hypertrophy of the organ, or enlargement from other causes, and will have to rely

for such discrimination upon the symptoms present, and the previous history of the case.

The *pathological appearances* that have been observed, are, dark red spots upon the yellow parenchyma of the liver, presenting a mottled appearance, resulting from congestion of the central vessels of the lobules; or, when the portal system is alone implicated, the parenchyma of the organ will be dark-red, and the spots yellowish, from congestion of the vessels in the interlobular fissures and spaces. If the hyperemia affects both the hepatic and portal venous systems, no yellow color will be observed in any portion of the liver. The organ is more friable than natural.

The *treatment* of chronic hyperemia of the liver, when not associated with any blood or organic disease is very simple, consisting in an avoidance of the cause, regularity of the bowels, with an occasional cathartic, frequent bathings, and in severe cases, hot-air baths, proper attention to diet, and exercise in the open air. Emetics occasionally administered may be of service in cases associated with asthma, chronic bronchitis, etc., but unless they are preceded by a cathartic, they are apt to prove hazardous. In severe cases, counter-irritants over the region of the liver will be very useful, as, the Compound Tincture of Camphor.—When the congestion is due to functional or organic diseases of other organs, no great benefit can be derived from treatment until the organic or functional disease has first been removed by the proper remedies.

Where there is a tendency to habitual congestion, as well as in the hyperemia common to our Southern and malarial States, manifested by sallowness of complexion, tumidity of the abdomen dryness of the skin, sometimes an œdematous condition of the inferior extremities, shortness of breath on the least exertion, furred tongue, deranged appetite, indigestion, ash or clay-colored stools, constipation, scanty, dark, and turbid urine, indolence, peevishness, lowness of spirits, increased heat of breath, dryness and scaliness of the lips, tenderness on pressure upon the hepatic region, and ultimately, an irritative fever, with nocturnal sweats, and colliquative diarrhea, anasarca, or other fatal termination,—in addition to the means already named, the patient should use internally, regularly and for a long period of time, preparations variously composed of some one or more of the following articles, as, Podophyllin, Leptandrin, Sanguinarina, Oleo-resin of Iris, Alcoholic Extract of Black Cohosh, Strychnia, etc., so compounding them that they may exert a sanitary influence upon the blood, liver, and nerves of the patient. In many instances, and espe-

cially those connected with malarial influences, the White Liquid Physic will be found an excellent remedy. Anemia will require some chalybeate in conjunction with the other treatment.

CHRONIC HEPATITIS.

Chronic Inflammation of the Liver may be the result of the acute form, or, it may have been chronic from the commencement; the surface of the organ may alone be affected, or the disease may be seated in its substance, or both may be involved. Formerly, this disease was considered of frequent occurrence; at the present day, it is doubtful if it is so prevalent as hyperemia of the liver in temperate climates; though it is by no means improbable that a persistent hyperemia may, as well as an obstinate inflammatory condition, terminate in such an organic lesion of the liver. Since the recent discovery of many other chronic maladies of the liver, it is strongly to be presumed, that the term "inflammation" has heretofore been applied indiscriminately to many of these organic lesions, and that gastric as well as duodenal diseases have also been often confounded with an abnormal state of the liver. A persistent hyperemia is with difficulty determined from a chronic hepatitis. In hot countries, chronic inflammation of the liver is much more common than in temperate climates.

The *causes* of chronic hepatitis are the same as those of the acute form, of which it is frequently the sequel. Exposures to cold; blows, as well as continued compression, on the right hypochondrium; powerful muscular efforts; sedentary and inactive habits; improper diet; irritations produced in the neighborhood of the organ; drastic cathartics; intemperance, or the moderate but habitual use of alcoholic liquors, which, however, also involves the stomach, gallducts, etc.; hyperemesis; excesses, of various kinds; deficient amount of sleep; and the use of mercury, may be named among the principal causes in cold and temperate climates. In the torrid regions of the globe, the disease is very common, especially among those who are indolent, indulge in stimuli and high-seasoned food, are intemperate in eating, and neglect the necessary attentions to hygienic measures. But the heat alone tends also to produce the disease, from its general enervating effects upon the system, and the erethism which it occasions along the mucous membrane of the intestinal tract, which may be readily carried to the liver. Local influences are also frequently observed where the disease is unusually common, and in all hot countries, the long-con-

tinued influence of malaria, is an important agent in developing the disease.

The *symptoms* of chronic hepatitis resemble those of the acute form, being more or less severe and equivocal in proportion to the degree of the inflammation. They are numerous, and vary very much in different individuals, and are frequently so similar in many respects to those of some other chronic disorders, that a practitioner may, without a very close and careful examination, be in doubt as to the hepatic or other origin of the malady presented to him. And this is probably owing to the fact that so many organs, as the brain, nervous system, lungs, stomach, duodenum, etc., are greatly indebted for their normal condition to the integrity of the liver, and vice versa, that a disease of this latter organ may involve one or more of the other organs, and, on the other hand, an abnormal condition of one or several of these organs must necessarily implicate the liver to a greater or less extent It must, however, be borne in mind, that the slighter and obscure forms of the disease are apt to present no distinct phenomena, and also that a similar obscurity of symptoms may sometimes exist where the inflammation is of considerable severity.

Among the symptoms more commonly met with are the following: a dull heavy pain in the hepatic region, and which is sometimes increased by rather deep pressure, by percussion, or by lying upon the left side; this pain frequently extends to the back and shoulder-blades, and to the epigastric region; not unfrequently the liver becomes enlarged, or there may be a fullness in its region; at times, a sense of uneasiness and constriction in the hepatic and gastric regions; the conjunctiva becomes more or less yellow; the skin dry, harsh, and sallow; the urine usually of a high color, but changeable as to quantity, often being unnaturally hot or scalding, depositing a sediment, and frequently giving indications of the presence of bile, or of some of its constituents, upon applying the proper tests; the bowels are usually deranged, with dark or greenish, offensive, slimy or watery stools; the tongue is usually coated with a brown fur, thicker toward its base, with, at times, a bitter and disagreeable taste in the mouth. As the disease progresses there will be acceleration of pulse at night, with fever and restlessness, night sweats, emaciation, and a prostrating diarrhea. The disease may prove fatal by terminating in some form of dropsy, hemorrhage, or one of the structural maladies of the organ hereafter treated upon.

When the surfaces of the liver are involved in the disease, the symptoms are much more distinctly marked. If the convex or

superior surface is affected it is apt to be associated with symptoms of pulmonary disorder; and if the concave or inferior surface be affected, the symptoms will be associated with those of gastro-intestinal, and sometimes even renal derangement.

"When the superior and exterior part of the right lobe is affected, the patient then lies with most ease on the right side, and often feels, at an advanced stage of the disease, more or less acute pain, or a dragging sensation, upon turning to the left. If this latter occur, the existence of adhesions between the liver and right side may be inferred. He therefore prefers the semi-recumbent position, or lies on his back or right side." (*Copland.*)

It is seldom the case but that one or more of the other organs of the body become either functionally or organically implicated with the hepatic disease, owing to the intimate relations existing between them, as, the brain and nervous system; the skin, the lungs, digestive organs, uterus, etc.; and consequently additional symptoms to those named above, will be observed, and which, to a great extent, will indicate the organs implicated. Thus, there may be a slight, hacking, and dry cough, dyspnœa, asthma, or dull thoracic pains; a white coat on the tongue associated with the brown, a roughness of the tongue, nausea, vomiting, impaired or capricious appetite, gastric acidity, fullness and distress in the epigastric region, with other symptoms of gastric disease; a constipated condition, with light-colored stools; or an obstinate diarrhea or dysentery, hemorrhoids, pains in the hypochondriac and iliac regions, etc.; palpitations of the heart; more or less headache, chilly sensations, disturbed sleep, nightmare, disinclination to mental or physical exertion, more or less depression of spirits, despondency, capriciousness, irritability of temper, peevishness, etc.; or an unnatural, greasy appearance of the skin, yellowish and scaly or branny eruptions, or pimples, blotches, or troublesome itching, will be observed upon the face, neck, or other portions of the cutaneous surface; and so on.

When the inflammation has continued for some time, palpation may detect the enlarged liver extending beneath the false ribs, and perhaps in the direction of the umbilical and epigastric regions, and sometimes it will be found more swoln in the right hypochondrium; its degree of tumidity, and the hard and thickened condition of its border may be detected by percussion. Dr. Walshe, of London, has given an auscultatory sign of enlarged liver, which he terms "*hepatic compression rhonchus.*" While the sound may be absent, or escape detection for several days, he states that it has always been present in cases examined by him where there was a notable increase of bulk in the organ, and that he has never met with it in

other conditions of disease. It commences at the time the inspiration murmur is about at an end, is peculiarly slow and drawling in its evolution, and exists independent of any lung affection. This sound consists of a great number of excessively fine, dry crepitations, rather superficial than deep-seated, and is wholly different from crepitant, subcrepitant, and dry crackling, pulmonary rhonchi, and from pleural rhonchus. It is rendered audible by forced inspiration only, and may be heard in front, at the side, and in the back of the right half of the chest, at or near to the upper edge of the liver.

The *diagnosis* of chronic hepatitis must be wholly based upon the history of the case and the existing symptoms; but, as these symptoms are equally common to other chronic hepatic maladies, we will not always be able to positively and satisfactorily diagnose a chronic inflammation from any other chronic affection of the liver. The *prognosis* in recent simple chronic hepatitis is almost always favorable; but it must never be lost sight of, that a previous mercurial treatment is apt to render the disease very obstinate of cure, and, in many of these cases, which admit of great relief by the means hereafter named, a permanent cure is absolutely out of the question. This may be due to the actual presence of the mercury in the liver, or to some commencing organic lesion produced under its influence. Where structural changes are present the prognosis is more or less unfavorable, in accordance with the duration and character of the changes. Long-standing chronic hepatitis, without organic degenerations, is generally curable, but requires a long period of treatment.

The *pathological appearances* of chronic hepatitis vary very much, with the exception of enlargement of the liver, which is almost uniformly present; this enlargement may be complete or partial. The tissue of the organ may present either a paleness or a diffused redness; it may be more dense, indurated, and friable; or, may present abscesses, a flabby condition, and adhesions. Sometimes it will have a brownish, slate-colored, or blackish color, but usually in spots or patches. Ordinarily, some form of degeneration may also be observed, as, atrophy, hypertrophy, cirrhosis, fatty liver, etc. In most instances, some other organs will be found involved with the hepatic affection.

In a work on Diseases of the Liver, by Dr. Budd, this author has divided inflammatory diseases of the organ, according to the nature of their causes and termination; though in our present knowledge, such a division is hardly practicable. He ranges them as follows:

1. *Suppurative inflammation*, or that which leads to suppuration

and abscess, and which may be caused by mechanical injury, contamination of the blood with pus from a suppurative phlebitis, ulceration of some part, the blood of which is returned to the portal vein, and which is a very common cause of hepatic abscess.

2. *Gangrenous inflammation* terminating in gangrene of the liver, and due to the occurrence of gangrene in other parts, the septic agency being conveyed by the blood.

3. *Adhesive inflammation*, or inflammation that causes effusion of coagulable lymph, due to spirit-drinking, to the presence of tubercles, cancer, hydatid tumors in the liver.

4. *Inflammation of the veins of the liver*, which may be of a suppurative or an adhesive character, or, both combined.

5. *Inflammation of the gall-bladder and gallducts*, which may be of a catarrhal, suppurative, croupal (plastic), or ulcerated character.

This arrangement may, possibly, be of more value to the dissector than to the attending physician, as it may assist him in the determination of the various pathological conditions exposed by the knife.

The *treatment* of chronic hepatitis will vary somewhat according to its duration. If it be of recent origin, sudorific, diuretic, and cathartic medicines composed principally of Podophyllin, Oleo-resin of Iris, Leptandrin, etc., together with vapor baths, and stimulants applied externally over the hepatic region, will be found sufficient. But, more commonly, the disease is not presented to the physician until after it has been in existence for some time, or has resulted in some structural lesion of the organ,—lesions which should be constantly remembered by the practitioner.

In these cases of long duration it will be found in practice that no one course of remedies will be found applicable to all patients; that which may be of service to one will be of no avail to another,—hence, a general description of the more important agents is all that that can be laid down. An emetic, or a succession of emetics, at intervals of two, four, eight, or sixteen days, will be rarely required, except in those cases where there is a general torpor of the nervous system. The principal indications to fulfill are, to overcome the chronic inflammation of the organ, to restore its functional activity, and to remove abnormal conditions of other organs that are present, either as causes or effects.

To accomplish these results we must produce and maintain an influence upon the liver, as well as upon the digestive canal, in order to keep up regularity of the bowels, which latter is a very important consideration in the treatment of this malady. Among the preparations that have proved useful for this purpose may be named

the following: 1. Compound Pills of Podophyllin; 2. Compound Pills of Leptandrin; 3. Compound Powder of Leptandrin; 4. Take of Iodine twenty grains, Strychnia five-sixths of a grain (or a grain), Leptandrin, Xanthoxylin, Alcoholic Extract of Black Cohosh, each, one drachm; mix, divide into sixty pills, of which one is a dose, to be repeated three or four times a day; 5. Take of Citrate of Quinia and Strychnia forty grains, Oleo-resin of Blue Flag forty grains, Leptandrin forty grains; mix, and divide into forty pills,—to be taken in the same manner as the preceding; 6. Take of Podophyllin ten grains, Leptandrin forty grains, Sanguinarina five grains, Alcoholic Extract of Aletris forty grains; mix, and divide into forty pills,—to be taken same as preceding; 7. White Liquid Physic; 8. Dilute Nitro-muriatic Acid Baths over the region of the liver, or the liquid cathartic mentioned on page 757. If the stomach is acid, this must be obviated by the means named under Gastric Acidity, on page 742. An irritable state of the stomach may be overcome by the internal use of anodynes, and sinapisms or other counter-irritants over the epigastric region. Pain in the stomach, nausea, or vomiting may be removed by the means named for these symptoms under Dyspepsia, page 748.

Another class of agents which should never be omitted in the treatment of long-standing cases of chronic hepatitis, is that chiefly addressed to the blood, and termed "alterative." Among these may be named, 1. Bromide of Potassium; 2. Bromide or Iodide of Ammonium, the latter especially in cases associated with syphilis; 3. Take of Tincture of Black Cohosh, Tincture of the Bark of Bitter-sweet Root, each, two fluidounces, Tincture of Bloodroot one fluidounce, Tincture of Sheep Laurel Leaves half a fluidounce; mix, and give from ten to twenty drops three times a day in a little sweetened water; 4. Take of coarsely-bruised Blue Flag, and Black Cohosh Roots, each, two ounces, coarsely-bruised Yellow Dock Root, Bark of Bitter-sweet Root, Cinchona Bark, Sassafras Bark, Prickly-ash Berries, each, one ounce, Soluble Pyrophosphate of Iron five rachms, Whisky, Water, Glycerin, No. 2, each, twenty-four fluidounces; mix, and form an elixir, the dose of which is from two to four fluidrachms, repeated three times a day; 5. Take of Compound Syrup of Stillingia, Compound Syrup of Sarsaparilla, each, one pint, Tincture of Black Cohosh two fluidounces, Iodide of Potassium one ounce; mix, and give from two to four fluidrachms three times a day in a wineglassful of water.—The Compound Tincture of Tamarac is frequently used in hepatic affections, more especially when complicated with diseases of the digestive apparatus; it acts as a laxative, alterative, diuretic, and tonic, and may frequently be

beneficially employed in conjunction with attention to the skin, the diet, and exercise.—Chlorate of Soda, Phosphate of Soda, Nitrate of Soda, and other salts of this alkali, are very useful in hepatic affections, and are generally to be preferred to those of Potassa; though it must be borne in mind that a want of this latter alkali may become a source of disease. In the bile, soda preponderates over the potassa; in the liver tissue it is the reverse of this; soda also prevails in the blood, and potassa in the muscles.

Another very important part of the treatment is, the administration of diuretics, to render the urine more normal in quantity and quality, and among the agents that may be beneficially employed for this purpose are, Acetate of Potassa, Citrate of Potassa, or infusions or decoctions of Wild Carrot, Winter-green, Queen of the Meadow Root, etc. A very useful diuretic is an infusion of Marsh Mallow Roots, two parts, Spearmint Leaves one part, which may be drank freely. However, if the urine is in proper amount and presents a healthy character, or if the remedies heretofore named effect such a favorable result upon this fluid, the employment of diuretics may then be dispensed with.

It is also a very important measure in the treatment of chronic hepatitis to attend to the functions of the skin, by daily bathings, as heretofore explained,—frictions, and the occasional use of the Spirit Vapor Bath.

In obstinate and unyielding cases, the intermittent employment of the Compound Tar Plaster over the region of the liver will be found very useful; it will relieve the fullness, tenderness, and weight complained of, as well as aid in the reduction of the size of the liver. A solution of Hydrochlorate of Ammonia, or of Iodide of Ammonium frequently rubbed over the region of the liver will also prove serviceable, as well as active stimulating liniments applied two or three times a day along the spinal column. The Ammonia Solutions may be employed alternating with the Compound Tar Plaster.

Any complications that may co-exist, as, of the heart, lungs, stomach, or intestines, (diarrhea, dysentery), etc., will require the treatment to be so modified as to exert an influence upon the hepatic disease as well as the complication. And in such cases, it is generally preferable to employ those agents only that have been found efficacious in both the hepatic and other maladies, when existing separately and independent of each other.

The diet should be nourishing,—indeed, in regard to diet, exercise, exposures, etc., the practitioner should be guided by the rules heretofore laid down.

HEPATIC ABSCESS.

Abscess of the liver may follow either the acute or chronic forms of hepatitis; it is a frequent termination or consequence of these inflammations in hot countries, and is especially apt to occur among those of strumous habits, or who are laboring under a vitiated condition of the blood, (phlebitis, pyemia, dysentery, ulceration of parts, etc.) In temperate climates it is much less frequent. Mechanical injury may occasionally give rise to it.

There are no *symptoms* by which we can positively diagnose hepatic abscess, either in its period of formation or of suppuration, except when a large cyst contains the matter and is located near the surface. The special symptoms are, pain in the hepatic region, swelling, jaundice, febrile symptoms, throbbing in the region of the liver, sense of weight, rigors, and night sweats; though an abscess may be forming, and these symptoms be wholly absent. Rigidity of the rectus muscle, ascertained by palpation, is considered by some medical men as a sure indication of a deep-seated abscess; but it has been met with in other hepatic maladies. Another set of symptoms are, pain in the right shoulder increased by pressure on the side, vomiting immediately after eating or drinking, a short, dry cough, not of pulmonary origin, and rigidity of the abdominal muscles. When either of the group of symptoms named are present, we may infer a forming abscess. In other cases, the diagnosis will be very imperfect and unsatisfactory, and will in a great measure depend upon our knowledge of the antecedent circumstances under which the disease arises, carefully and rigorously analyzing all the circumstances and symptoms that can be ascertained, and repeating these examinations daily, until we are fully satisfied regarding the nature of the case. We must especially determine abscess from a distended gall-bladder, from a pleuritic effusion on the right side of the chest, from hydatids in the liver, and from hepatic cancer.

A *distended gall-bladder* forms a globular tumor, circumscribed, hard, and equally resisting in every part, while the tumor from an abscess is more diffused, is soft and fluctuating at its summit, while its base is hard and resisting. (*Budd.*)—In *pleural effusion*, the signs named under Pleurisy will be present; but if the hepatic abscesses open into the pleural cavity of the right side, the signs of the abscess will exist prior to those of a pleural effusion; besides, the matter from the abscess frequently passes through the lung tissue into this organ, from whence it is expectorated; in this instance, the pleural disorder will scarcely be observed, or will

be very limited, while the inferior extremity of the right lung will yield dullness, tubular breathing, and other signs of inflammatory action—the expectoration being of a rusty color, and followed sooner or later by a purulent expectoration of a reddish or whitish color, and containing some of the bile constituents and minute fragments of liver tissue. Occasionally the pus escapes through the thoracic walls.—In *hydatids* there is seldom if ever any pain, derangement of nutrition, or febrile reaction; but if the hydatid cyst contains pus, the diagnosis will become very difficult, if not impossible. In *hepatic cancer*, there are no marked febrile symptoms, no fluctuation, and hard knotty-like masses may be distinguished on palpating along the hepatic region; beside which, cancerous disease is apt to be manifested in other parts of the body. Medullary cancer sometimes gives a sense of fluctuation, yet it is not so distinct nor so diffuse as in abscess, and some of the hard knotty masses may frequently be detected upon a careful examination.

When the abscess has formed, and is seated near the surface, the swelling and fluctuation will reveal it; but if it be deep seated, or be very small, we will have no positive indications of its existence. Though if of an indolent character, or if occurring in enfeebled or broken-down constitutions it is apt to be attended with hectic fever, night sweats, faintness, syncope, great debility, perhaps, also, dyspnœa, diarrhea, or dysentery. Emaciation, sunken and icteric countenance, a turbid, purulent, or muco-purulent urine, and a disposition to recline in some position, may also be noticed in many cases. In obscure or doubtful cases the examination should be conducted in the same manner as named in the preceding paragraph.

Abscess may prove fatal without being discharged from its seat in the liver; but in most instances it opens and discharges its contents in a direction depending upon the part of the liver occupied by it, and with symptoms indicative of the direction it has taken. Thus, it may discharge its contents into the peritoneal cavity, giving rise to pain, vomiting, and symptoms of fatal peritonitis from perforation. If the abscess opens into the stomach, a distressing vomiting of purulent matters will at once take place. If into the intestines, sudden diarrhea with discharge of pus will occur; if it perforates the diaphragm it may enter the pleural cavity giving rise to suppurative pleurisy, or, as more usually happens, from an adhesion being formed between the lung and diaphragm, the matter is discharged into the lungs from whence it is expectorated or coughed up, in the form of a dirty-red or brownish puriform matter.

In all these cases, any pre-existing tumor formed by the abscess will greatly diminish in size, though pain or soreness, hectic fever, and constitutional disturbance may remain. Adhesions may also form between its peritoneal covering and that of the stomach, etc.

The *prognosis* of abscess of the liver is unfavorable, yet cases sometimes recover, more especially among those in whom the abscess is seated at the surface or lower border of the organ, and is thus enabled to discharge itself through the abdominal parietes; and probably, also, in cases where the abscess is of small size and the subject of a robust constitution. We must not be misled by the presence of alternating favorable and unfavorable symptoms; an apparent recovery may ensue, and the patient ultimately die with symptoms of purulent resorption. A proper treatment will frequently prolong the patient's existence even when it will not effect a cure.

The *pathological appearances* are, more or less enlargement of the liver or of some portions of it, and presenting morbid appearances similar to those named under Chronic Hepatitis. In various portions small abscesses may be observed, having a narrow congested circle surrounding them. These small abscesses are frequently non-encysted, while the larger ones are encysted, the cyst being thin or thick, and more or less imperfectly organized. In some parts may be observed inflamed portions, with incipient suppuration in the midst, especially in those cases where the inflammatory affection has assumed a more active form. Abscesses are more apt to occur in the posterior edge and right lobe of the liver, and are more frequently deep-seated and large; the superficial are generally smaller and more curable. The pus is inodorous, but occasionally very fetid. The serous covering of the liver is often thickened, opaque, dense and more or less resistant, with laminar depositions beneath it of an atheromatous character. Sometimes, it will be found to have formed adhesions to contiguous surfaces. According to the seat of the disease, its causes, etc., other organs may also be found diseased, as, the lungs, intestines, spleen, stomach, etc.

The *treatment* of hepatic abscess consists in subduing any active inflammation that may manifest itself, and to sustain the strength of the system and impart health to the vitiated blood by means of tonics and alteratives. To accomplish the first indication, anodynes, or Veratria, Aconite, Stramonium, etc., may be employed. In very severe cases leeches or cupping over the tender, inflamed, and enlarged part, is admissible. After the inflammation is subdued, the same alterative agents may be administered as named under

Chronic Hepatitis, together with a nourishing diet, and all other means to impart health and strength to the general system. The use of a dilute solution of Nitro-hydrochloric Acid internally, as well as applied externally over the hepatic region, will be very beneficial, unless it deranges the bowels. It must be borne in mind that but little influence can be exerted upon these abscesses by medicines, after they have formed and encysted, and the only hope of safety lies in imparting such tone to the general system as to enable it, not only to delay the rupture of the abscesses, but to withstand the prostrating influences of the rupture and discharge.

When the various symptoms attending the formation, presence, and discharge of pus are present, as, formication, rigors, cold profuse sweats, depression, dyspnœa, cough, hiccough, suffocating sensations, pain, great thirst, vomiting, etc.; these must be treated upon general principles, the same as when they occur with abscesses in any other organ, bearing in mind that the most the practitioner can do, will be to palliate urgent symptoms, and to sustain the strength and vital powers of the system.

In no case should the abscess be tampered with by endeavoring to open it; such a course has been advised by some practitioners, and has occasionally proved successful, but in the majority of cases it is a dangerous practice, as the pus is apt to escape into the peritoneal sac and occasion a more or less severe peritonitis. Again, air is very liable to enter the cavity, and perhaps some blood also from slight hemorrhage, then decomposition ensues, a secondary inflammation is excited, and death may speedily ensue.—If the abscess points toward the surface, it will be better to allow it to rupture spontaneously, favoring this, however, by poultices. When open, the matter should not be pressed out, but should be allowed to escape on the poultices, which act as a valve to prevent the ingress of air into the cavity. The disease has sometimes been cured by passing an exploring needle into the abscess, or by opening it gradually by means of caustic potassa applied to the prominent part; these operations may prove useful in cases where the liver adheres to the abdominal walls, and where there is but one abscess. In other cases their utility is doubtful; besides, there is, frequently, more than one abscess.

We may determine whether the liver adheres to the abdominal walls, by observing that at a certain part, the prominent edge of the organ remains there unchanged, no matter what position the body may be placed in, and also that over the abscess, there is a circumscribed œdema, or a slight blush on the skin. If the skin, however, retains its natural appearance, and the liver shifts its

position when the patient changes his posture or draws a deep breath, there is no adhesion. (*Budd.*)

WAXY LIVER.

This condition of the liver has been variously termed, Scrofulous Enlargement, Amyloid, Lardaceous, and Albuminous Liver; it is a true degeneration, due principally to a "metamorphosis of the glandular structure of the organ into a much more dense albuminous material than in the normal condition; a change which results in total destruction of the function, as well as the structural characteristics of the gland cells, and in a great increase of the solids of the organ at the expense of the fluids, the blood ceasing to circulate freely, and the water being diminished from three-fourths to three-fifths, or possibly in some cases to one-half of the weight, the solids being correspondingly increased, the fat either increased or unchanged." (*W. T. Gairdner.*)

The *causes* of this disease are not well understood. Males appear to be more subject to it than females. Constitutional syphilis appears to be a common cause, though it is frequently met with among scrofulous and phthisical individuals, as well as among those who have been under the influence of mercurials. It is also met with co-existent with scrofulous caries, and may likewise result from a series of attacks of intermittent fever. Intemperance in alcoholic liquors also appears to be a frequent predisposing cause.

The *symptoms* of waxy liver are very equivocal, being those peculiar to hepatic disorder, as made known by its complications with other organs, as, digestive derangements, nausea, vomiting, tympanitis, defective nutrition, discoloration of the feces, diarrhea, etc. The disease comes on insidiously, without much pain, tenderness, or any inflammation. The first indication of the disease is, the great enlargement of the liver, passing considerably below its normal boundary, and accompanied with more or less enlargement of the abdomen. Jaundice is seldom, if ever present; but there is a gradual emaciation, and the urine is apt to be loaded with albumen; if albumen and waxy-looking casts of the secreting tubules of the kidneys are observed in the urine, these organs are also implicated. The spleen is likewise apt to become enlarged. In some cases, after the disease has existed for some time, the superficial abdominal veins enlarge, a little fluid collects in the peritoneal cavity, and the skin becomes slightly yellow. The appetite may continue good for a long time.

If we find the liver enlarged, and can feel a smoothness of its surface, and a rounded condition of its lower edge, and there is also more or less enlargement of the abdomen, with emaciation, and no antecedent inflammation or pain has occurred, and the patient has scrofulous disease of the bones with suppuration, or is disposed to phthisis, scrofula, or secondary syphilis, we may safely *diagnose* waxy liver; and more especially if, at a later period, the urine becomes albuminous. When the kidneys are involved ascites or anasarca soon takes place.

The *prognosis* is unfavorable, and is much more grave when the kidneys become implicated. If the original affection or cachexy can be cured before the liver has become very much enlarged, the kidneys remaining healthy, the disease may be greatly benefited, and the patient's life be prolonged.

The *pathological appearances* are peculiar; the size of the liver is greatly increased as well as its density, which may reach as high as 1085; and conveys a wax-like sensation to the touch, though the knife passes more readily through it than it would through wax. To the eye the organ presents the semi-transparency of bacon-rind, or melted wax. The organ is very pale, and after death contains only a little pale, watery blood. In a slighter degree of the disease the lobules appear remarkably clear and well defined; in an advanced degree, the lobules can scarcely be distinguished, or no trace of structure will be observed in the interior of the organ, save an occasional blood-vessel. The albuminous material is deposited within the lobule and among, but not within, the secreting cells, and is sometimes mixed with fat, producing an opaque white material,—though the fat is no essential element of the disease. A dead white opaque matter running in the course of the portal vessels, may, from this cause, be frequently observed, and between these the transparent lobules themselves, with the hepatic vein in their center. The waxy liver is but very slightly affected by water, alcohol, acids, alkalies, or ordinary re-agents, and may be preserved for a long time without decomposition; under the microscope, the peculiar element which has changed the organ appears only as a refracting, corneous-looking substance, of no particular form or structure. (*S. Wilks.*) Other organs will frequently be found involved with the liver, as, the spleen, kidneys, etc.

In the *treatment* of waxy liver, we should endeavor to find out the peculiar condition of the system upon which it depends; if it be due to scrofula, syphilis, use of mercury, or spirit-drinking, the remedies and means used must be such as are suited to the partic-

ular cachexy, whatever that may be. Dr. Budd has known the liver to diminish very much in size from the prolonged use of Ammonia; in one case, he also derived considerable benefit from the prolonged use of Sesquicarbonate of Ammonia in doses of five grains twice a day, together with a properly regulated diet. A long course of dilute Nitric Acid, twenty minims, repeated three times a day, in cases due to syphilis and syphilitic osseous affections, and, dilute Nitro-muriatic Acid, in tuberculous disease, have also been recommended, to be used in conjunction with the other remedies employed.

FATTY LIVER.

In the normal state there is always a certain proportion of fatty material in the liver, amounting on an average to three or four per cent. of the whole mass; but it is only when this oily material becomes enormously developed in the hepatic cells, increasing both the size and weight of the organ, that it becomes a fatty degeneration; the structure of the organ itself, however, is not degenerated. This disease is very apt to occur in indolent persons, persons who are addicted to the use of alcoholic or malt liquors, and those who are large eaters, or who use much fatty diet. It may also follow or accompany certain diseases, as, the exanthematous, long-continued diarrhea, phthisis, etc. Indeed, among a large proportion of persons who have died of pulmonary consumption, fatty liver has been found to exist, independent of the presence of any tubercles in this organ. Tuberculous disease of other parts may likewise be accompanied with a hepatic fatty degeneration. It would also seem that the long-continued use of mercurials, acute affections, as well as other causes that permanently impair the functions or the nutrition of the liver, may dispose to its fatty degeneration. Young persons appear to be more subject to it than old; and females oftener than males.

The *symptoms* of fatty disease of the liver, are by no means characteristic, being those also met with in hepatic enlargement or congestion. There is considerable enlargement of the liver; no jaundice, or if it does exist, it is in a very slight degree; emaciation; no ascites nor anasarca; and a pale, greasy or velvety character of the skin. The urine is apt to be neutral, contains considerable mucous flocculi, and has a specific gravity less than natural. The enlargement of the liver often occasions a sense of fullness and weight in the abdominal region, shortness of breath, and even nausea and vomiting. There are no positive diagnostic signs of this affection.

The *pathological appearances* met with in fatty liver are, a considerable enlargement of the organ, which has occasionally been so great as to occupy the whole of the abdominal cavity. The liver is also paler, softer, dotted with brown or red, and more greasy than natural, greasing the scalpel when cut into. The oily matter, which is principally composed of olein, is found in the biliary cells, (and not in special fatty cells), which cells acquire two or three times their natural size, lose their secretory character, and no longer contain biliary granules; but little bile will be found in the gall-bladder, which becomes contracted. The amount of oil in the organ may vary from ten to fifty per cent. of the whole mass, or even more. If the quantity of oil becomes so great as to rupture the hepatic cells, some of the oily matter may be observed outside of these cells. When fatty and waxy liver co-exist, the organ will be found greatly enlarged; dense, opaque, and yellow when cut into; small fatty granules and globules, as well as a degenerated epithelium will be seen under the microscope. Fatty liver may also exist in conjunction with other affections of the organ, as, atrophy, cirrhosis, etc.

The *treatment* of fatty liver consists in avoiding indolent habits, intemperance, etc., as well as abstaining from fats, sugar, starch, and butter. The patient should rise early, take active exercise, live principally on lean meat, with considerable salt, and drink water; the meals should never be full or hearty, but always moderate; he should bathe the whole surface of his body with a stimulating weak alkaline bath, repeating it every day or two; occasionally, a Spirit Vapor Bath should be taken; and such medicines should be taken internally as will increase the secretion and the flow of bile, as, Podophyllin, Leptandrin, Oleo-resin of Iris, Kalmia, Cider, Chelidonin, Berberin, etc. In addition to this, any existing tuberculous or other malady, should be subjected to the appropriate treatment therefor.

CARCINOMA OF THE LIVER.

Cancer of the liver is an affection occasionally met with, though Dr. Budd states it to be of frequent occurrence in England. The liver may be the only organ in which the cancer is seated, or it may be manifested also in some other organs, as the breast and stomach. The hepatic carcinomatous tumors may be white and fibrous, *scirrhous;* but more frequently they are soft, *medullary.* But every variety of cancer may be met with in the organ.

The *cause* of cancer is not well understood, though it may be

due to a low grade of vitality, or faulty nutrition of the parts affected, arising from anything that will obstruct or interfere with the natural functions of these parts.

The commencing *symptoms* of hepatic cancer are very obscure, being those peculiar to other affections of the organ. After a longer or shorter time, an enlargement of the liver is observed, with tenderness upon pressure, and more or less pain in the hepatic region. In conjunction with these, will be nausea, vomiting, a short dry cough, pain in the right shoulder, rigidity of the abdominal muscles, impaired or changeable appetite, emaciation, anemia, and depression of spirits. In some cases jaundice may be present; and, in others, ascites. As the disease progresses, pains will be experienced in the back and loins, febrile paroxysms will occasionally occur, the pulse will become frequent, the surface-temperature increased, the tongue red and furred, and the urine high-colored, giving a red or pinkish sediment; finally, colliquative night sweats and diarrhea, sometimes hemorrhages from the stomach or bowels, aphthous ulcerations of the mouth, with great exhaustion, which increase more or less rapidly until death takes place.

The *diagnosis* of hepatic cancer is almost impossible during its early period, unless in connexion with the liver symptoms cancer, be found to exist in some other part; and even then, the liver may be free from the disease. Dr. Harding states that if in connexion with symptoms of hepatic or stomach derangement in the female, he could find a small tumor varying in size from that of a pea to that of an almond, seated just beneath the skin of the breast, and most usually a little to the outer side of the nipple, he should positively diagnose cancer in the liver. In the male, a similar small mass had been found in the subcutaneous tissue of the loins.

Cancer of the liver may be determined from *waxy liver*, in which the spleen is apt to be enlarged, and the urine to be albuminous, in addition to which there is apt to be present either a scrofulous caries, secondary or tertiary syphilis, phthisis, or other antecedent conditions peculiar to waxy liver. In cancer, if the liver be very large, its surface can generally be felt uneven or nodulous; there is also pain,—both of which are absent in waxy liver.

From *fatty liver*, in which there is no pain, less constitutional derangement, the enlargement comes on less rapidly and more uniformly, and the patient is not a drunkard, nor consumptive,—the previous history is also unlike that of cancer.

From *hepatic syphilis*, in which the patient previously suffered from syphilis, and was treated by mercurials; in which syphilitic ulcers or cicatrices in the throat, are present, as well as a pale,

cachectic, but not jaundiced appearance, perhaps enlargement of the spleen, a want of tenderness in the region of the liver, and if any nodules are felt upon its surface, they are smaller and not so hard as those of cancer.

From *affections of the gall-bladder*, in which the enlargement at the lower border of the liver is rounded or somewhat pyriform, beside which the patient has previously suffered from one or more colicky attacks due to the passing of gall-stones, and his skin presents a deeper tint than in cancer. Cancer of the gall-bladder may co-exist with hepatic cancer, or cancer of other parts, is more common to persons somewhat advanced in years, and presents more marked symptoms of the cancerous diathesis.

From *cancer of the stomach*, in which the pain is more toward or in the epigastrium, and shoots into either hypochondrium; the vomiting is more frequent; the matters ejected are of dark color; the location of the tumor is different; and the symptoms of hepatic disease are absent, or not so well marked as those of the digestive organs.

From *cancer of the omentum*, in which there is no jaundice, no alteration in the appearance of the feces, and, in which, generally, but not invariably, the rest of the tumor and its boundary is different from that of cancer of the liver.

From *enlargement of the right kidney*, in which percussion yields a dullness of a different periphery from that of hepatic cancer, which is marked externally by the abdominal tympanitic sound, and is not affected by deep inspiration; in addition to which, the prominent symptoms present will be those of diseased kidney, functional or organic, instead of liver disease.

The *pathological appearances* of cancer of the liver vary according to the stage and character of the malignant affection. Tumors of various sizes will be found disseminated throughout the liver, having a yellowish appearance, a hard and firm texture, and making a peculiar noise under the scalpel. Not unfrequently their central portions will be soft, containing a dark-colored fluid. These tumors give an uneven, knotty or nodulated feel to the surface of the liver; or of softness when they have become softened; and sometimes they will be met with in the same liver, of every shade from light brown to black, as in the melanotic tumors. Usually the tumors are inorganized; though their internal structure, when hard, will often present fibrous variations from the center, or, concentric circles. The liver tissue surrounding the cancer may be healthy, or it may present at some parts a pale and fatty appearance, etc. Scirrhous is of slow progress, and has a dense, fibrous basis; en-

cephaloid progresses rapidly and has a loose cellular basis. The disease may also be found in other parts, either as a cause or as an effect, as, in the gall-bladder, stomach, kidneys, uterus, breast, etc.

The *treatment* of cancer of the liver is purely palliative, as its termination is always fatal. Anodynes and sedatives are indicated to relieve pain and promote sleep; counter-irritation to allay peritonitis when it is excited into action, aided by fomentations, sedatives, etc. Blisters or pustulating applications are inadmissible. Tonics and good diet are required to sustain the patient's strength and prolong life. And, as a general rule, the less interference with medicines the better for the welfare of the patient and the reputation of the practitioner.

HYDATIDS OF THE LIVER.

The liver is more liable to hydatid development than any other organ, and the affection is by no means an unfrequent one. Hydatid tumors consist of a sac apparently formed of condensed liver tissue and the remains of obliterated vessels, which incloses a thin bladder or cyst containing a clear liquid, in which float more or less numerous similar, but smaller globular cysts or bladders, of various sizes. Both these and the parent cysts are termed, *acephalocysts*, or, bladders without heads. A peculiar microscopic animalcule has been observed to occupy these cysts, termed *echinococcus*. The most frequent seat of hydatids is in the right lobe of the liver, very near the surface. Hydatids are parasitic growths, the germs of which, probably, are introduced into the body by means of drink, diet, etc., and become developed under favorable circumstances, as, from blows on the side, excessive dampness, poor diet, etc.—Although recoveries often occur, neverthless, the disease may be considered a very dangerous one.

The *symptoms* of hydatids in the liver at their early period, are very obscure, as they occasion no pain, no jaundice, no dropsy, nor any hepatic, or gastro-intestinal derangement; it is only when they have increased in size so as to mechanically disturb the hepatic functions, that attention will be directed to the cause of such disturbance. But as their growth is usually very slow, years may pass from their first development before there will arise any marked symptoms to attract notice, and, the symptoms may often be so obscure, that a life-time may pass without their presence being suspected.

The first symptoms usually observed are, a sense of weight and fullness in the hepatic region, more or less disturbance of the digestive functions, and perhaps dyspnœa. Upon making an examina-

tion, the liver will be found enlarged, either extending downward into the cavity of the abdomen, or else, enlarging upward so as to materially interfere with the action of the diaphragm and lungs, occasioning eventually a hard, dry cough, or cardiac palpitation. If it interferes with the circulation of the portal vein, or of the vena cava, anasarca of the inferior extremities and ascites may be the result. The tumor formed by hydatids is usually without a hardened base, is circumscribed, soft, and yielding, and is not accompanied by the usual signs of abscess, nor by the constitutional effects of cancer. Percussion yields a very irregular outline of dullness; and if the blows be made abruptly and consecutively, a peculiar vibration may be perceived, greatly resembling that which is experienced on percussing a quantity of jelly.

The *diagnosis* of a hydatid tumor is rather difficult in its early period, or when it is small and deep-seated; but when it is large, and especially when seated near the surface, it may readily be distinguished from other affections with which it is possible to confound it, by the following symptoms:

From *abscess of the liver*, by its slow growth, the presence of little or no pain, and the entire absence of fever, as well as of any disturbance of the general system; in abscess, there is pain, fever, constitutional derangement, more rapid growth, and, perhaps, jaundice or ascites at an early period.

From *cancer*, by the absence of local tenderness, slow growth, and general health of the patient; in cancer, there is more or less pain or tenderness, a more rapid growth, emaciation, anemia, and other evidences of constitutional disturbance, with an unevenness of the surface of the liver in other parts, occasioned by the projection of other cancerous tumors.

From a *distended gall-bladder*, by the shape and position of the tumor, by the patient having previously suffered from colicky pains, and by the deep jaundice present; in hydatids, the tumor is not seated in the normal region of the gall-bladder, jaundice is absent, as well as colicky pains.

From *aneurism of the aorta* in which there is a distinct pulsation in the tumor, great pain in its region, and a bellows sound heard over the last dorsal, or the upper lumbar vertebræ; besides, aneurism is generally ushered in with a sudden cramp-like pain in the epigastric region, without either vomiting, purging, or jaundice.

In cases that are rendered obscure by the location of the tumor,—its slow growth, absence of tenderness or pain, non-interference with the hepatic, gastric, intestinal, or pulmonary functions, except at an advanced period, and the usual health of the patient remaining

undisturbed,—may lead us to suspect their hydatidic origin. The recommendation to explore the tumor with a fine exploring trocar, is not wholly void of danger, especially when it is small and deep-seated.—When the hydatid tumor becomes painful, and accompanied with rigors, febrile action, and constitutional disturbance, these indicate suppurative action.

The *prognosis* of hydatids of the liver is not necessarily unfavorable; usually, the affection continues for many years without giving rise to any serious symptoms, although the walls of the sac are liable to ulcerate at any time, rupture, and discharge its contents. If the fluid be discharged into the stomach or intestines, so that it may pass by stool, or by vomiting, the sac may ultimately close up, and the patient recover. The same result may ensue if the fluid is discharged through the lung and expectorated, provided no inflammation of the lung or air-tubes, nor any great amount of constitutional suffering is produced. (A microscopic examination of the fluid expectorated, or vomited, etc., will reveal its source, by the presence therein of the acephalocysts, and hooks of the echinococci. A hard, dry, straining paroxysm of cough usually precedes their expectoration from the lungs.) In all these cases, recovery is not apt to occur very rapidly. If the fluid is discharged into the peritoneum or pleura, a fatal peritonitis or pleuritis is apt to result therefrom. And a fatal result is likewise liable to follow those cases in which suppurative inflammation of the sac, or of some of the neighboring tissues, is excited. If a secondary hydatid tumor forms in the lung, the patient may be destroyed by suffocation; if numerous primary or secondary tumors form, nutrition will be interfered with, and death may ensue from exhaustion.

One difficulty is, to determine whether one, two, or more tumors are present, as they frequently exist in great numbers, disseminated throughout the tissue of the liver. "Experience proves, however, that it is seldom that more than three or four are developing in various parts of the organ at one time; but it is this circumstance which constitutes the difficulty, and we may say the danger of interference; for if one is collapsed through evacuation of its contents, the others enlarge, and the patient dies at last from exhaustion." (*Garrod.*)

The *pathological appearances* observed are, sacs formed of hepatic tissue, of various sizes and in greater or less numbers, which inclose, each, the acephalocyst; this is composed of friable, minutely laminated envelopes, which are not adherent to the inner surface of the sac containing them, and which contain a clear fluid, of a salty taste, non-albuminous, neutral or faintly alkaline, and of specific

gravity 1.008 to 1.013. In this fluid float numerous acephalocysts, and, under the microscope, the hooks or the teeth of the echinococci may be seen. The membranous wall of the cyst appears to be albuminous, and contains phosphate of lime. Ulcerations, suppuration, etc., may also be observed, when they have taken place, as well as alterations of the tissues in which these effects have occurred.

The *treatment* of hydatids should have in view their destruction without rupturing the sac containing them; if this can be effected, the tumor shrinks to a certain degree, its further growth is arrested, and there is no longer any danger to be feared from it. Certain agents have been advised to destroy the vitality of the hydatids, as, common Salt, and Iodide of Potassium, which may be given internally, as well as applied locally in strong solution or ointment. But these do not always succeed. Tobacco fomentations have, in a few instances, been successful, applying them upon the side over the tumor; the objection to them is, the nausea and depression they are apt to occasion. In one case, I derived great benefit from fomentations over the region of the liver, composed of Tobacco one part, Balmony three parts. A mixture composed of American Petroleum, Aqua Ammonia, Oil of Turpentine, Tincture of Stramonium Seed, equal parts, and rubbed several times a day on the side over the tumor, continuing its use for a considerable time, is also said to have been found serviceable.

But medical means frequently fail, and tapping the tumor has been advised, so as to empty it of its contents, which is followed by a destruction of the vitality of the hydatids. This, however, is attended with some risk, as, the entrance of air into the sac may give rise to suppurative inflammation; or, some of the fluid may pass into the peritoneal cavity, exciting a fatal peritonitis. Nevertheless, in many instances the operation has proved successful. The instrument used is a fine exploring trocar, which should be inserted downward, the outer end being kept at a higher level than that in the body, in order to prevent the admission of air, and the water be drawn off by means of an exhausting pump, being very careful not to allow a particle of air to enter the cyst. By this means, each cyst may be evacuated, as it enlarges and becomes prominent. Long-standing hydatids should not be treated in this manner; it will be better to allow them to rupture spontaneously.

CIRRHOSIS OF THE LIVER.

This disease,—also known by the names of Gin-drinker's or Hob-nail Liver; Granular, Tuberculated, Nutmeg, or Mammillated Liver;

Chronic Diffuse Inflammation of the Liver, (*Frerichs*), etc.—consists in an atrophy of the lobular substance of the liver, the organ being much diminished in bulk, hard, dense, and studded with yellow granules or small roundish bodies of various sizes. The disease never affects the liver partially, but always attacks all parts of its substance simultaneously, and in pretty equal degree. Males are more liable to it than females, and generally between the ages of thirty and forty-five, though it may occur at any age.

The immediate *cause* of this disease is unknown; "it may exist as an independent degeneration, or it may spring from the waxy or the fatty conditions." (*W. T. Gairdner.*) It is frequently preceded by inflammation of the fibrous structure of the liver (Glisson's capsule), resulting in a thickening of this capsule. Yet inflammation is not essential, as, in some cases, it has not prevailed; and it is not yet satisfactorily solved whether the thickening of the capsule be due to the inflammation, or to one of the lesions accompanying organic atrophy. The habitual excessive use of alcoholic drinks is probably one of the most common determining causes of cirrhosis, more especially among those who dilute their drinks very little, if any. Alcoholic drinks may occasion the disease from the ready inflammatory condition of the liver produced by them when absorbed into the blood, and, probably, also by determining impediments to the pulmonary or cardiac circulation. Occasionally, the disease is met with, in which the only discoverable cause is, bad and insufficient diet, or faulty digestion, etc.

Hepatic cirrhosis is mostly complicated with organic disease of other parts, as of the stomach, Bright's disease of the kidney, and various lesions of the heart and lungs, which may exist either as a cause of its presence, or as one of its results. Pulmonary consumption, so frequently accompanied with fatty liver, is very rarely found with cirrhosis.

The *symptoms* of cirrhosis are not sufficiently characteristic to enable us to positively determine its presence during life. At an early period they are similar to those met with in chronic hyperemia, as, a dull pain in the side, tenderness on pressure, deranged digestive functions, and, perhaps, a jaundiced skin. Sometimes, instead of appearing thus insidiously, cirrhosis may come on suddenly, with more or less severe febrile, local, and constitutional symptoms, constituting the acute form of the disease, which form may also be developed as a result of the disease in a more advanced stage,—and yet its true character may not be known until after death.

In the first stage of the disease, which is the only one in which a cure may be effected, many patients are very apt to have what they

term "colicky pains," which come on a few hours after dinner, accompanied by quick pulse, slight fever, vomiting, and constipation. With each attack these symptoms become more intense. The skin is dry, the tongue red and smooth in the center, pain at the top of the right shoulder, and a gradually appearing jaundiced hue of the skin. There is also some slight pain in the region of the liver and duodenum, and the stools contain much mucus, and perhaps are streaked with blood.

At an advanced period of the disease, when the contraction or atrophy of the liver is fairly effected, other symptoms will be present, the most constant of which is ascites, and, if Bright's disease of the kidney, or disease of the heart be also present, anasarca. There is no pain or tenderness in the abdomen, unless peritonitis be present. The decrease in the size of the liver may be detected by palpation and percussion, the former enabling us to detect the hard, irregular granulations seated upon the border of the liver as well as upon its inferior surface; the latter, to determine the diminution or total absence of percussion dullness in the region of the liver. But, if there be much fluid effused within the abdominal cavity, these signs can not be had, until after the tense and swoln state of the abdominal walls have been removed by tapping. The urine is very scanty, of a deep-orange or reddish-yellow color, of increased specific gravity, strongly acid, and gives an abundant precipitate of a bright-red urate of ammonia. If jaundice be present, the coloring matter of bile may be detected in it; if Bright's disease of the kidney exists, albumen will be found.

In addition to these symptoms, others may exist, as, a sallow, earthy complexion, a dry, rough skin, emaciation, debility, impaired appetite, dilatation of the veins on the surface of the abdomen, hemorrhages from the nose, stomach, or bowels, enlargement of the spleen, acid eructations, and more or less derangement of the gastro-intestinal functions. Small spots, resembling purpura hemorrhagica frequently appear on the face, or on the surface of the abdomen. Death may occur from gradually increasing exhaustion, from colliquative diarrhea, from the drain caused by paracentesis, or from hemorrhage from the stomach or bowels.

The enlargement of the abdominal veins, the ascites and hemorrhage from the stomach or bowels, are due to obstructed portal circulation. When anasarca is present, and appears previous to the ascites it is due heart or kidney disease; if it appears in the inferior extremities after the ascites has formed, it is owing to compression of the vena cava, and of the iliac veins. The jaundiced complexion is probably due to an obstruction to the flow of bile from the

lobules, which is occasioned by the hardened tissue in the portal canals.

Although the *diagnosis* of cirrhosis is difficult, still there are certain marks of distinction between it, in its fairly developed stage, and some other diseases with which it may be confounded; thus—*chronic hyperemia*, *waxy liver*, *fatty liver*, present more or less enlargement of the organ, no ascites, no evidences of any serious impediment to the portal circulation, and an entirely different history as to the habits of the patient, etc.

Hydatids of the liver presents an enlargement of the organ, with irregular outline, softness and fluctuation of the tumors, and no great impairment of the general health and strength; besides, the patient may be temperate. No ascites.

Cancer of the liver presents an enlargement of the organ, with hard prominences or nodules on its surface, the organ is painful, and tender to the touch, ascites may be absent, or, if present, not sufficient to render the walls of the abdomen tense, the skin perspires more or less, the patient may be temperate, and cancer may exist in some other organ. Hectic fever and night sweats are common in cancer.

Enlarged spleen produces ascites, but it may present a history different from cirrhosis; the patient may be temperate, have previously suffered from malarial fever, the skin is moist, and the enlarged spleen may be felt in the left side.

Peritonitis has a different history, there is abdominal pain and tenderness, an absence of the sallow look of cirrhosis, fluctuation is less distinct, a tendency to tuberculous disease, hectic fever, and sweating.

Ordinarily, the accumulation of fluid in the ascites of cirrhosis is greater than that due to other affections, and, after a paracentesis has been performed, it returns with much greater rapidity.

The *prognosis* of this disease is unfavorable; "Its course is uniform and continued, and it always proceeds more or less quickly to a fatal termination, being apparently uninfluenced by any plan of treatment." (*Becquerel.*)

The *pathological appearances* are a liver more or less diminished in size, and in weight, with rounded edges, and small, round nodules projecting from all parts of its surface. It is usually united to the abdominal walls, to the diaphragm, or to both, by false membranes or bands of adhesion. On cutting into the substance of the liver, the organ will be found tougher and much paler than natural, containing but little blood, and presenting a mottled appearance, due to numerous roundish bodies varying in

size from the smallest perceptible to that of a pea, or even to that of a nutmeg. These rounded bodies vary in color from pale yellow to brown, presenting a contrast with the pale or gray color of the intermediate substance, and are pretty uniformly distributed throughout the substance of the liver.—The capsule of Glisson is thickened, whitish, or opaque, more close and resisting, and intimately adherent; in the interior of the parenchyma, this thickening appears as whitish lines inclosing the hepatic lobules, and sometimes the rounded bodies. The hepatic tissue is apt to be dry from paucity of blood, and, from obliteration of many of the vessels and ducts of the organ, it is difficult of injection. The gall-bladder is almost always quite natural.—If other organs are affected, as the kidneys, spleen, heart, lungs, etc., they will present evidences of diseased action.

The *treatment* of cirrhosis of the liver is palliative, being careful not to pursue measures that will lessen the power of the heart, but to adopt those that will sustain strength, check hemorrhages, and overcome vomiting and diarrhea; for the latter two, large doses of Bismuth will frequently be found to answer. Spirituous drinks must positively be abandoned, and, for a time, good newly-made cider may be substituted for them, to which, some alkaline carbonate may be added, if deemed necessary. The ascites should be kept down as much as possible by diuretics or hydragogue cathartics in its early period; but, at a later stage, when the strength and flesh are much reduced, they should not be used, as they are apt to augment instead of lessen the amount of fluid. Tapping is never of much service, as the fluid returns rapidly; yet it may be performed only when there is great difficulty of breathing, or other symptom requiring immediate relief from the abdominal distension. Pure air, an attention to the skin, and local applications of the alkaline iodides or bromides, with stimulants, over the hepatic region, are important. Sedatives often afford considerable comfort. It is seldom, if ever, that attention is called to this disease in its early stage, when there is a possibility of effecting a cure.

There is another form of *Atrophy of the Liver* due to an obliteration or closure of the common duct, the only symptom indicating its presence being jaundice, and which possesses, at the present day, no interest for the therapeutist.—Both tyrosine and leucine exist in the urine in either acute or chronic atrophy of the liver.

JAUNDICE. (*Icterus.*)

One of the most significant indications of disorder of the biliary apparatus, and one that presents itself very frequently, is jaundice; indeed, there are very few hepatic affections in which this symptom is not manifested in a greater or less degree. In consequence, although a mere symptom, it has been considered of sufficient importance, among medical writers, to be treated upon separately. This affection is especially characterized by a more or less marked yellowness of the skin and of the conjunctiva, whitish or clay-colored stools, and a bilious or saffron-tinted urine, which stains linen a deep-yellow color. It is generally sporadic, but occasionally appears as an epidemic, especially during very wet seasons, or after the close of military campaigns.

Causes.—Jaundice is undoubtedly owing to the presence of one or more of the biliary elements in the blood; but it is still a matter of inquiry how these elements get into this fluid. Many suppose, that when there is an obstruction, preventing the flow of bile into the intestine, this is re-absorbed and carried into the circulation; again, others maintain that jaundice arises from a suppressed or defective secretion of bile; in the latter instance, certain elements remaining in the blood, as, the biliary acids, coloring matter of bile, or cholesterin. Dr. Geo. Harley believes that jaundice may arise from suppression of the biliary secretion, or, from re-absorption of the secreted but retained bile. And his method of distinguishing between the two, is by an analysis of urine, as explained heretofore, on page 799. His views are the ones generally received at the present day.—Other views have been presented to the profession to account for certain indefinite forms of jaundice: Thus, Frerichs advances an idea that the action of some poison in the system converts the colorless bile acids in the blood, into bile pigment, and thus a form of jaundice be produced.

I have heretofore, (page 798), referred to the discovery of Prof. A. Flint, Jr., that cholesterine derived from the brain and nervous system, is taken up by the blood, from which fluid it is separated by the liver, and is discharged from this organ as a product of excretion, in the form of stercorine.

Frerichs is opposed to the view that jaundice may be the result of an imperfection in the secreting functions of the liver. He says: "All the means for detecting traces of the essential elements of the bile in the blood generally, and in that of the portal vein in particular, have been exhausted without any result; neither the

coloring matter, nor the acids of the bile, substances for which we possess tests of considerable delicacy, have been found." May not this be owing to the fact, that these substances, (the glyco-cholate and tauro-cholate of soda, etc.), do not pre-exist in the blood, but are solely products of secretion, which subserve for assimilation? Indeed, under no circumstances are these secretory substances ever found in the blood.

Again, Frerichs continues: "In the same way that urea accumulates in large quantities in the blood in granular degeneration of the kidneys, so ought the biliary acids and bile pigment to accumulate in the blood in cases of granular liver." It is not the bile acids and pigment that accumulate in the blood, but the product of excretion that pre-exists in this fluid, cholesterine. And this substance, according to Prof. Flint, holds the same relation to bile, that urea does to urine; and its accumulation in the system, the same as the accumulation of urea, occasions poisonous results. In simple jaundice, in which the coloring matter of the bile is resorbed from the biliary passages, the disease is not dangerous; but in grave cases of jaundice, in which there is usually some structural change in the liver, cholesterine is retained or accumulates in the blood, and the disease like uræmia almost invariably terminates fatally,—this latter condition, Prof. Flint terms *Cholesteremia*. These are points which should receive the serious attention of every medical man, and Prof. Flint's article, upon the subject, which may be found in the American Journal of Medical Sciences, October, 1862, is well worthy a careful perusal.

The various abnormal conditions in which jaundice may exist as a symptom, are as follows: a temporary or permanent obstruction of the common duct, during the passage of a gall-stone; cancer of the liver, or of the pancreas; temporary or permanent obstruction of the ducts from adhesive inflammation; enlargement of one of the lymphatic glands contiguous to the common duct; obstinate constipation, in which the intestine, filled with fecal matters, presses on the common duct; duodenal disease, obstructing the common duct, etc.,—all of which occasion an impediment to the flow of bile into the intestine. Most of the structural lesions just treated upon in the preceding pages, are apt to be accompanied by jaundice, from their suppressing the secretion of bile, or rendering it defective both in quality and quantity. A suppression of bile may also arise from excesses of various kinds; an inactive, sedentary life; powerful, or long-continued mental emotions; a poisoned condition of the blood, which may occur during the course of certain diseases, or from poisonous matters

introduced into the circulation; gastric derangements; suppression of certain cutaneous eruptions; and occasionally the jaundice may appear without any known attributable cause.

Symptoms.—The condition of jaundice is very readily determined by the yellow color of the skin and conjunctiva, which may vary in tint from a bright-lemon to a dark-olive color. When the color is of a green tinge, it has been termed *green jaundice*, and is apt to result from closure of the common duct; when the color is of a very dark hue, it has been termed *black jaundice*. Not unfrequently an icteric discoloration pervades the internal tissues, as ascertained by investigation after death; and in some rare cases, from the cornea or the humors of the eye becoming jaundiced, all objects appear either yellow, or covered with bright-yellow spots.

Jaundice is frequently preceded by a state of languor, inactivity, drowsiness, loss of appetite, flatulency, and constipation, which may continue in a greater or less degree during the presence of the icteric affection; sometimes, on the contrary, diarrhea may be present, with an offensiveness of the discharges; and again, the stools may be natural, or nearly so. And, in serious cases, the drowsiness may pass into coma or delirium, and fatal cerebral disorder, probably, from retained cholesterine; and this may occur even when the jaundice has existed for many weeks without presenting any alarming symptoms. During the presence of the affection, various symptoms will be associated with it, depending upon the character of the hepatic disease giving rise to it, and its complications. Among the symptoms more usually encountered, may be named,—tongue coated with a dirty-yellowish fur; mouth dry, with a bitterish taste; pain in the head; more or less pain in the right side, which is increased on pressure, and there may also be pain at the top of the right shoulder, beneath the right scapula, or between the shoulders; or, there may be pain or uneasiness in the epigastric region; the pupils are apt to be more or less dilated; sometimes a sense of heat and excessive itching of the skin; perhaps nausea or vomiting; intestinal derangements; constipation, with a drab or grayish color of the stools; frequently a variable pulse; high-colored urine. In nearly all cases the patients become thinner; and, sometimes, there is more or less peevishness, irritability, or extreme sensitiveness, the person crying even from imaginary causes. Frequently, the affection is so mild as not to interfere with the ordinary pursuits of the patient; while in other instances, there will be more or less interference presented, even to an absolute necessity for confinement in bed.

The jaundice may come on slowly or suddenly, according to its cause; and the more severe its symptoms, the more serious is it in its character. The darker the discoloration the more grave the disease; but the same can not be said of a slight icteric hue, which may be present during some grave hepatic lesion, as, for instance, cirrhosis. Simple, uncomplicated jaundice usually lasts from one to six weeks, or even longer, and, as a general rule, terminates in health; but when complicated with hepatic, cardiac, or cerebral disease, it is apt to prove fatal.

Jaundice, having manifested itself, the physician is still in the dark as to its prognosis and treatment, unless he can determine the hepatic disorder giving rise to it, or can ascertain its particular producing cause, which are frequently very difficult matters to accomplish. Indeed, the difficulty in *diagnosis* commences, as it were, with the presence of the icterus. Still, attempts, by the light of what knowledge we have, should always be made. A yellowishness of the conjunctiva, without an icteric hue of the skin at the same time, can not be considered as indicative of jaundice. *Chlorosis* may give a slight greenish hue to the skin, but the conjunctiva presents a pearly or bluish lustre; the same occurs with malignant affections in which the skin has a sallow earthy appearance; the yellow tinge of the conjunctiva is not present in pyæmia unless jaundice co-exists.

If the patient has been free from any symptoms of hepatic disorder, and the jaundice is preceded by some powerful mental emotion, we may, as a general rule, safely attribute it to this cause. In all cases, the urinary analysis, heretofore referred to, will determine whether the icteric symptom is due to suppression of the biliary secretion, or to an impediment to its flow into the intestine—but it will not inform us what has occasioned the one or the other of these conditions. We should therefore, beside acquiring a detailed history of the case and an accurate knowledge of all the phenomena attending it, very carefully examine the various organs of the body, to determine the existence of one or more of the lesions with which jaundice may exist as a symptom, as,—waxy liver, acute yellow atrophy which is associated with cerebral disturbances, cancer, fatty liver, cirrhosis, acute hepatitis, disease of the bileducts, obstruction from gall-stones, disease of the heart, or of other organs that may induce hepatic disorder, pyæmia, or, the presence of poisonous substances in the blood, etc.

The *prognosis* of jaundice rests wholly upon its cause. Simple, uncomplicated jaundice is usually curable. The less serious the attendant phenomena, the more favorable is the prognosis; it is

also favorable when resulting from moral or mental causes; likewise when the stools assume a more natural appearance, with a gradual disappearance of the icteric tint of the skin and of the accompanying symptoms,—though it must be remembered that the discoloration of the skin may continue for some time after the impediment to the flow of bile has been removed, and the urine no longer gives indications of its presence. The jaundice during pregnancy, generally disappears after delivery. When the jaundice is complicated with structural lesions it is very apt to prove fatal; also when it is due to a suppression or defection in the secretion of bile. An obstinate, long-continued jaundice, is generally due to structural lesion, and is unfavorable, though recoveries sometimes occur; yet, in the course of my practice, I have met with three cases in which the patients, having been previously in apparent good health, were suddenly attacked with jaundice, which proved fatal in one case in five days from the first manifestation of the disease, and in the other two, in seven days,—in each, the stools were pale, hard, devoid of odor, and very scanty, and in one case there was a constant intractable epistaxis until a short time previous to death. If the jaundice accompanies pneumonia, peritonitis, pyæmia or other blood affections, it is apt to prove fatal. The presence of cerebral symptoms is an indication of danger. Severe pain in the hepatic or epigastric region, rapid pulse, great debility and emaciation, a dark or livid color of the skin, obstinate paleness of the stools, chilliness, œdema of the extremities, wakefulness, depression, melancholy, and hiccough, are unfavorable symptoms. When the skin is deeply discolored, as in *green* or *black* jaundice, a fatal result most generally ensues.

There are no *pathological appearances* peculiar to jaundice. The icteric hue may be found coloring all the internal tissues, especially the cellular, adipose, and serous. Sometimes there will be no evidences of disease sufficient to account for the jaundice or its fatality. In other instances, various structural changes will be observed in the liver, gall-bladder, biliary ducts, portal vein, hepatic veins, stomach, heart, kidneys, etc., some of which changes, are referred to under their respective heads in this book.

The *treatment* of jaundice is based upon its cause; but we are not always able to satisfactorily ascertain this, hence the means employed, are, to a great extent, empirical. When the cause is known, our object should be to remove it, and then the jaundice will disappear; but, unfortunately, the peculiar structural lesions upon which the jaundice depends, are frequently of such a nature as to render all therapeutical measures unavailable, except as far

as palliation of urgent symptoms is concerned. There is "one principle to be borne steadily in mind in all cases, whatever their cause, and that is to promote in every way the functions of those organs by which compensatory elimination of bile is effected." (*S. H. Ward.*)

When the jaundice results from inflammation of the liver, or of the gallducts, as manifested by a sense of fullness, with pain and tenderness in the hepatic region, extending as far as the epigastrium, and which is augmented upon pressure, a redness of the tongue, frequent pulse, and other indications of febrile action, leeches or cups should be applied over the affected parts, followed by hot fomentations of Lobelia, Hops, Stramonium, etc., an occasional Hot Air Bath, frequent bathings of the surface, and nauseating doses of Bloodroot and Ipecacuanha. A gentle diaphoresis should be constantly maintained. The bowels should be kept free by Podophyllin and Bitartrate of Potassa, or, what will be found better in many cases, a mixture of Compound Powder of Jalap and Bitartrate of Potassa. Proper attention should be paid to the kidneys, keeping up their action by means of saline diuretics, or, cooling vegetable diuretics. The diet must be moderate and light. After the more active symptoms have disappeared, small doses of a mixture of Podophyllin, Leptandrin, Sulphate of Quinia, and soluble Hydrastin, should be given three or four times a day, for several days subsequently. Of course, the more severe the symptoms, the more energetically must the above measures be employed.

In those cases where the patient having been previously in a state of health, is attacked with jaundice, and no other symptoms can be detected except drowsiness, languor, constipation, derangement of the appetite, and extreme sensitiveness; and the person is able to be about, one of the following preparations will be found of much efficacy, conjoined with laxative doses of Podophyllin and Leptandrin, or, of the Compound Pills, or Compound Powder of Leptandrin: 1. Take of Golden Seal, Barberry, each, one ounce; Sheep Laurel, Bloodroot, each, two drachms; Cider one pint and a half; mix. The dose is a tablespoonful three or four times a day. 2. Take of Wild Cherry Bark, Prickly-ash Bark, Bloodroot, Golden Seal, Sheep Laurel Leaves, each, in powder, one ounce; Cider five pints; mix, and infuse for several hours. The dose is the same as the preceding.

In some cases, I have substituted Whisky or Spirits for the Cider, and with good effect, though I prefer the latter when a good article can be had. In a similar way, various combinations may

be formed into a tincture or infusion, of, Horse-radish, Bayberry Bark, Bitter Root, Yellow Walnut Bark, White Poplar Bark, etc.

If there is pain, tenderness, and enlargement of the liver, in connection with the above form of the disease, stimulating liniments in which Oil of Turpentine enters as an ingredient, or, the Croton Oil Liniment, or, the Compound Tar Plaster should be applied over the hepatic region.—Excessive drowsiness, and other cerebral symptoms, must be combated by active purgatives and diuretics, together with energetic counter-irritating measures to the scalp, neck, and along the spinal column. Saline purgatives and diuretics are generally to be preferred in these cases.

When the jaundice is known to be the result of powerful mental emotion, torpor of the liver, or, when it is of a simple, uncomplicated character, but very obstinate to treatment, emetics will prove serviceable, which may be repeated daily, or every other day.—When the jaundice is due to excessive secretion of bile, as may be known by the alvine evacuations being colored with bile, or by bilious diarrhea, and, sometimes, vomiting of a dark bilious matter, and usually more or less febrile action, Oil of Turpentine will be found of much service, to be given in drachm doses every two or three hours, in conjunction with Spirit of Nitrous Ether to prevent strangury, and produce perspiration. With this, may also be used Turpentine Liniments to the side, and, if there is considerable gastric irritability, sinapisms should be applied over the epigastric region. Turpentine has also been found useful in jaundice due to biliary calculi; two parts of Oil of Turpentine mixed with three parts of Sulphuric Ether, and taken in half fluidrachm or fluidrachm doses every morning. As turpentine is apt to occasion nausea, vomiting, and pain, some caution should be used in its administration. The means recommended for gall-stones, are, however, to be preferred.

Other agents have been recommended in jaundice, that have frequently proved of considerable benefit, as for instance: Take of clean hard-wood Soot one ounce, Salt, Black Pepper, each, half an ounce, White or albumen of six Eggs; mix. The dose is half a tablespoonful every morning; the patient drinking freely of an infusion of Wild Cherry during the day. Bernard has shown that albumen becomes assimilable only through the medium of the function of the liver, and it may be that it acts as an excitant of this organ, or as a superior cholagogue, hence the efficacy of the white of egg in jaundice, associated with, or due to a torpid condition of the liver.—"In jaundice with obstruction of the biliary ducts, we should make early use of Nitric Acid or Nitro-

hydrochloric Acid, which should be greatly diluted with water, in order to have the remedy more quickly assimilated, and to produce more certain effects. A watery solution of Nitrous Acid is easily made, and may be drank as a pleasant lemonade; it is less apt to produce griping than the nitric or nitro-hydrochloric acids, beside which, it not only destroys and lixiviates the deposits of cholochrome and other amido-acids, but it also tones the digestive organs, and acts antiseptically. Nevertheless, a remedy to stay the abnormal action of the liver cells we are yet in want of. Creosote is beneficial. In all cases where the disorder of the liver proceeds from the intestinal canal particularly, Creosote, Charcoal, astringents like Gallic Acid, and preparations of Iron, particularly the Tincture of the Sesquichloride given together with some Nitric Acid, are highly beneficial." (*Thudicum.*) Bathing with dilute Nitro-hydrochloric Acid in the hepatic region will also be of service.

Prepared Beef's-gall has also been of considerable advantage in many cases of jaundice depending upon obstructed flow of bile, but in order to be of efficacy it must not be administered for an hour or two after a meal, so as not to interfere with the action of the gastric juice; then it may pass into the duodenum and act upon the chyme, at which period alone will this remedy be useful, by rendering the chyme fit for assimilation.—In jaundice from suppression, Benzoic Acid has been recommended.—When the jaundice is idiopathic, or, is due to, or associated with, dyspepsia or chronic gastric irritation, crystalized Nitrate of Silver in doses of three-quarters to one grain, given on an empty stomach, and repeated twice a day, has been highly recommended; it is said to give immediate relief, and to effect a cure in ten or twelve days. If constipation be present, the agent may be combined with some laxative.

The diet in jaundice should be plain and unirritating, but nutritious and of easy digestion, avoiding fats and articles consisting of starch; meats, vegetables, fruit, and raw eggs are the best. Good Cider may be drank several times a day; it forms a grateful draught, as well as a useful medicine. Stewed Barberries, or Barberry preserves may also be advantageously used; probably the efficacy of these acid articles is due to the malic acid they contain. A tendency to mental or physical inactivity should be resisted by the patient; moderate exercise should be taken, when there are no symptoms of irritation or inflammation; and all harsh and debilitating measures must be carefully avoided. The bowels, kidneys, and skin must be attended to during the whole course of the disease.

ABNORMAL CONDITIONS OF THE BILE.

The bile is an exceedingly complex fluid, and, as has been already stated, performs a two-fold office, viz., that of an excretory and that of a secretory fluid. The former office consists chiefly in conveying cholesterine, an excrementitious substance, from the blood, which is passed from the body in the form of stercorine, a substance nearly identical with the cholesterine; it is also very likely that the biliary salts, as the chlorides, carbonates, phosphates, etc., are recrementitious. The latter office consists in carrying on the hepatic secretions, as the glycocholate and tauro-cholate of soda, etc., which do not pre-exist in the blood, and are not discharged from the body, being probably absorbed, or employed in some way, to aid in some of the nutritive processes. Prof. Flint's experiments appear to place these views of the offices of the bile and of the functions of the liver, beyond a doubt.

In the time of Hippocrates and Galen, we find that the bile, or the liver, was supposed to be concerned in the production of animal heat as well as in the processes of assimilation and nutrition, views which correspond with those of Flint and Bernard of the present age.—Bernard supposed that sugar was formed in the liver, but more recent investigations have led to the belief that this organ only forms a substance, more especially designed for the production of fat, that may, however, be readily changed into sugar. These opinions, together with others, which it is unnecessary to repeat here, tend to demonstrate the two-fold function of the liver, and of its peculiar fluid, the bile.

It must, therefore, be readily perceived that any great disorder in the hepatic function, diminishing or increasing the quantity of the bile, or altering its quality, must necessarily occasion much disturbance in the general system, from a deficiency in either the excretory or secretory elements of the bile, or in both, as well as from a retention of those substances in the blood from which these excrementitious or secretory elements are derived. Still it must be borne in mind, that many maladies may and do exist, with which the liver has but little if anything to do, except perhaps secondarily. And it has in past years been too much the case that medical men have jumped at conclusions, and attributed certain disorders to the liver, or to the bile, without seeming to be aware that the stomach and intestinal canal are much more readily exposed to disease, entering them in various forms by the mouth, and which gastro-intestinal maladies are the originators of the hepatic derangements, aided

sometimes by neglect of the surface, exposures to sudden changes, sedentary habits, etc.

The conditions of the bile, connected with functional disorder of the liver, may be as follows: 1. *Excessive Secretion of Bile*, which may be the result of high living, irritating articles of diet, stimulating or fermented drinks, and other causes that may give rise to gastro-intestinal irritation and hepatic congestion. It is more especially apt to occur during hot seasons. There is generally more or less fullness, pain and tenderness in the region of the liver, and frequently pain in the right shoulder, some febrile reaction, a general feeling of indisposition, dryness and sallowness of the skin, foul tongue, scanty and turbid urine, perhaps regurgitation of bile from the duodenum vomited up from the stomach, and almost invariably a diarrhea, in which the stools are of a yellowish-brown or green color, and contain bile, usually of an acrid, irritating quality, and which is accompanied with tenderness of the abdomen, and griping pains, and sometimes soreness and irritation at the anus.

The *treatment* consists in removing morbid accumulations from the intestines by a purgative dose of the Compound Powder of Jalap, which also exerts a derivative influence upon the liver. Should the diarrhea still continue, astringents may be administered, in conjunction with opiates, when pain or griping is present. In some instances, after the purgative, the Compound Powder of Rhubarb and Potassa, will be of service, to which one-third or one-fourth part of Tincture of Prickly-ash Berries may be added. Considerable gastro-intestinal irritability remaining after the action of the purgative, with diarrhea and pain in the hepatic region, may often be overcome by a mixture of Subnitrate of Bismuth, Geraniin, and Opium; together with hot fomentations over the painful regions. When there is heat and dryness of the skin, perspiration must be produced by bathings of the surface, and the employment of the Compound Tincture of Virginia Snakeroot. In malarial countries, the addition of Sulphate of Quinia to the articles used will be of service; and in anemic cases, the Tincture of Sesquichloride of Iron, or Solution of Perchloride of Iron may be administered with advantage, in conjunction with the other remedies. I have frequently derived much benefit, when pain, or diarrhea is present, from the following preparation: Take of Sulphate of Quinia ten grains, Sulphate of Morphia three grains, Elixir Vitriol one fluidrachm; mix, dissolve the salts, and add to the solution, Essence of Cinnamon two fluidounces. The dose is thirty or forty drops in a tablespoonful of water, to be repeated every two, three, or four hours.

To prevent a return of the disease, which may occur frequently and ultimately occasion some structural lesion, the patient should avoid all the exciting causes, and strictly conform to the sanative principles of hygiene, as, attention to the skin, stomach, bowels, and kidneys; respiration of pure air; exercise; nourishing, digestible, and unirritating food, etc.

2. *Deficient Secretion of Bile*, not due to structural hepatic lesion, is most generally dependent upon a torpid or inactive state of the liver, and is the premonitory indication of some more serious hepatic disorder, which, however, may be avoided by proper management. It may be the result of a sedentary life, of insufficient, or, innutritious food, of chronic hyperemia of the liver, of dyspepsia, and not unfrequently occurs after the use of active purgative medicines. Any cause that will produce exhaustion or depression of the nervous system, may give rise to inactivity of the liver; it may also accompany certain conditions of the system, as, anemia, chlorosis, cancer, scrofula, etc. The *symptoms* are, an irregular or constipated condition of the bowels, light-colored stools, high-colored urine depositing a sediment, impaired appetite, with more or less indigestion, flatulency, drowsiness, frontal headache, depression of spirits, peevishness or irritability; sallowness of the skin, heavily-coated tongue, disagreeable and bitter taste in the mouth in the morning, frequently nausea, and, generally, more or less gastric acidity. There is a general feeling of indolence, or both mental and physical inactivity. Occasionally diarrhea may be present.

This functional disorder is best *treated* by regularity in diet, using nutritious and easily digestible articles, moderate exercise, regularity in the sleeping hours, frequent bathings of the skin, and regularity of the bowels by means of some cholagogue medicines. Thus, the Compound Powder of Charcoal, or, the Powder of Rhubarb and Potassa, heretofore named, may be used in sufficient doses, repeated three times a day, to produce one, but not to exceed two evacuations daily; these preparations will be of service in cases attended with gastro-intestinal acidity. In other cases the following may be used: Take of Podophyllin two grains, Leptandrin sixteen grains, White Sugar three drachms; mix, triturate thoroughly together, and divide into sixteen powders, of which one is the dose, to be repeated three times a day. Or, the Compound Pill of Leptandrin, Compound Cathartic Pill, or Compound Pill of Dandelion, may be used, one or two per day, as required, to keep up a soluble condition of the bowels. In anemic cases,

with feeble digestion and want of appetite, the following pills will prove serviceable: Take Citrate of Iron and Strychnia forty grains, Podophyllin seven grains, Leptandrin forty grains, Alcoholic Extract of Aletris forty grains; mix, and divide into forty pills, of which the dose is one, two, or three, daily, according to the effect upon the bowels. The action of the remedies employed may generally be facilitated by the daily application of rubefacient liniments over the hepatic region, and along the spinal column between the shoulder-blades. In long-standing cases, or where this biliary deficiency has frequently occurred, a prolonged course of treatment will always be required, in order to produce permanent benefit.

3. *Unhealthy states of the Bile.* The bile may be said to be in an unhealthy condition when it is deficient in either its excretory or secretory elements, or, in both at the same time, and these conditions may exist whether the bile be in excess or scanty. This state of the bile may be due to some faulty condition of the blood, which does not furnish the required amount of excretory or secretory elements to the liver, or, it may be due to structural disease of this organ itself; occasionally, it may arise from hepatic functional disorder, connected with nervous depression, or, nervous overexcitement of the organ.

We have no means by which we may positively determine these states of the bile, and, therefore, will have to rely principally upon the symptoms. Thus, when there is no hepatic structural lesion, and the skin is sallow; the mental faculties depressed, enfeebled, or deranged; with or without tenderness in the hepatic and duodenal regions; the appetite impaired; the stools lighter-colored than natural, or, perhaps, clay-colored, whether looseness or constipation be present, and furnishing little or no stercorine; the urine scanty, and high-colored from the presence of bile pigment; a sense of languor, indolence, and indifference; and a great tendency to drowsiness; we have every reason to believe that the excretory function of the liver is faulty and does not purify the blood of those excrementitious substances that are designed to form the excretory biliary elements.

On the other hand, if it be the secretory elements of the bile that are at fault, the skin will be more or less sallow and dry; the head will feel heavy, or there may be headache, but no particular torpidity or enfeeblement of the mental faculties; pain or tenderness may or may not exist in the hepatic region; the appetite is variable;

digestion slow; usually, habitual constipation, but no great decolorization of the stools, which may be of natural color, or darker than ordinarily; the urine paler than usual or natural, in usual amount, and giving no indications of the presence of bile pigment; and the strength fails gradually, with emaciation and anemia from imperfect digestion and nutrition.—If both the excretory and secretory biliary elements are at fault, there will be more or less of a mixture of the two sets of symptoms just named, and which will render the diagnosis still more difficult.

When the morbid condition of the bile consists in an excess or deficiency of only one or two of its elements, as, of its water, its mucus, its coloring matter, its phosphoric acid, its soda, lime, or magnesia, etc., or, in the presence of some foreign body, as, a free acid, urea, etc., we have no means of determining this condition during life, and the symptoms accompanying it will be in accordance with the morbid alteration of the bile, but which it is impossible for us to diagnose. This state of the bile may be due to functional or structural disease of the liver, or, of some other organ intimately associated with it, as, the lungs, heart, stomach, or kidneys.

When we meet with a case of one of these morbid states of the bile, and upon a careful examination find it to depend upon organic lesion of the liver, or other organ, the *treatment* will be that recommended for such lesion.—If no such lesion be found, and the symptoms indicate a deficiency in the excretory biliary elements, the agents to be employed will consist chiefly of alterative tonics, diuretics, and cholagogues. Sulphate of Quinia, Xanthoxylin, Alcoholic Extract of Black Cohosh, Compound Syrup of Partridgeberry, Hydrastin, Hydrochlorate of Ammonia, Creosote, etc., are among the alterative tonics. As diuretics, we may employ the Compound Infusion of Parsley, Compound Infusion of Trailing Arbutus, Pipsissewa, Juniper Berries, Water-melon Seeds, Cleavers, Eryngium, Liatris, Acetate of Potassa, Oil of Turpentine, etc.; and, as cholagogues, laxative doses of Podophyllin, Leptandrin, Oleoresin of Iris, etc. A very excellent cholagogue pill, useful in many hepatic derangements, is composed of Podophyllin five grains, Leptandrin twenty grains, Ipecacuanha five grains, Extract of Hyoscyamus thirty grains; mix, divide into twenty pills, and give two or three pills per day, in doses of one pill at a time, so as to keep up a laxative effect. Among persons very susceptible to the action of podophyllin, the quantity may be diminished to two or three grains, if necessary.

Again, if the faulty condition of the bile be due to a deficiency of its secretory elements, tonics will be required, as, Alcoholic Extract of Nux Vomica, Strychnia, Citrate of Iron and Strychnia,

Elixir of Cinchona and Iron, Hydrastis, Salicin, Columbo, Alcoholic Extract of Aletris, Quassia, Helonias, Chelone, Barberry, Nitro-hydrochloric Acid, etc.; likewise alteratives, as, Compound Syrup of Stillingia, Yellow Dock, Scrophularia, Celastrus, Sassafras, Iodides and Bromides of Potassium, or of Ammonium, Iodide of Iron, Phosphate of Iron, etc.; and cholagogues, as, Leptandrin, Sanguinarin, Taraxacum, Albumen, Soda, etc.; and if laxatives are required, Podophyllin, Oleo-resin of Iris, etc.—When both the secretory and excretory biliary elements are at fault, it will require a proper combination of these two therapeutical measures.

If only one or two elements of the bile are deficient, or in excess, which, as already stated, is of very difficult determination, we can only treat the case upon general principles, being governed by the symptoms present, and the peculiar condition of the patient. And, in such cases, as with many others of an obscure character, great judgment, caution and skill are required, on the part of the practitioner.—In the above cases it is almost impossible to satisfactorily lay down any specific rule of treatment, for the conditions present, of the liver, the bile, the blood, the nervous system, etc., are found to vary so much in different patients, that the measures to be employed can only be mentioned in general terms—and which, indeed, is the case with the treatment of all chronic maladies, though many are, in this respect, much better understood than others. It is principally in the more obscure affections in which the knowledge, judgment, and skill of the practitioner are especially displayed.

In all these unhealthy conditions of the bile, we must be very careful not to fatigue, depress, or enfeeble the system; treating urgent symptoms, when present, by the means heretofore named for them, when occurring in this class of diseases. Moderate exercise in the open air should be taken daily, if the weather will allow; the skin should be bathed daily; the food should be light, nutritious, and easy of digestion; the apartments be kept comfortably cool, and well ventilated, for respiration of pure, healthy air, is a means of the greatest importance; and all high living, alcoholic or fermented drinks; exposures to great heat, cold, or moisture, sedentary habits, and excesses of all kinds, should be studiously avoided.

The *Gall-bladder* and *Ducts* are liable to several abnormal conditions, as, Accumulation of Bile in them, Distension of the Gall-bladder, or Cancer, etc., the diagnosis of which is by no means positive, and, indeed, in nearly every instance, only an approximation to the actual condition of the parts can be had. Besides

which, abnormal states of these organs have been found after death among persons who, during life, presented no symptoms indicating the existence of such states. Another difficulty in the investigation of chronic affections of the gall-bladder and ducts, is, that these affections are ordinarily associated with either functional or organic lesions of the liver, rendering the diagnosis still more obscure, and, consequently, permitting us to advise only palliative treatment, or therapeutical measures in accordance with the general principles of practice.—There is, however, one affection with which medical men are more conversant, and upon which I will bestow a brief consideration, and that is

Biliary Calculi or *Gall-stones.* Gall-stones are ordinarily formed in the gall-bladder, and occasionally in branches of the hepatic duct. The gall-bladder may be filled with these calculi without there being any indications of their presence, but when they move along the duct, their passage more commonly occasions considerable pain. Not unfrequently they become arrested in their passage, and continue permanently lodged unless set free by ulceration. It is rarely the case that gall-stones are found in persons who have passed middle life, and they occur more generally among persons of sedentary pursuits, of indolent habits, or who have much mental anxiety or trouble. Fat persons and high livers are quite subject to them; and the use of fermented strong drinks, or lime-water, also appears to favor their formation.

The *cause* of gall-stones appears to be an unhealthy state of the bile, or its decomposition, and which may possibly be due to blood disease, hepatic disease, innutrition, or, perhaps, "some putrid ferment generated in, and absorbed from, the intestinal canals." This change in the composition of the bile must precede the separation of the substances forming the calculi; the same as alkaline urine must precede the deposition of phosphatic crystals in the urinary bladder. But we are still in the dark as to a knowledge of the cause of the decomposition.

Gall-stones vary in size from that of a small pea to that of a hen's egg, are round or oval, with rough surfaces, frequently polygonal with smooth, roundish facets, are of a yellowish-brown color, or variegated greenish and brownish, are usually lighter than water, and burn readily with a yellowish flame, leaving only a very small quantity of ash. They consist chiefly of cholesterine in layers, with patches or layers of bilifulvine and biliverdine (coloring matter) in various proportions and shades, small masses of stellate crystals

of bistearate of lime, and a minute quantity of phosphate of lime mixed with shrivelled cylindrical epithelial cells; upon cutting into the concretions they are usually found to contain a brown, pulpy, exceedingly fragile, granular, and non-crystalline matter, consisting, when carefully washed, of threadlike, cylindrical fibres, of different lengths, variously branched, and which are supposed to be casts of the biliary ducts; and the substance holding them together, instead of being inspissated mucus or bile, is cholic or choloidic acid, or both. (*Thudicum.*) Sometimes, no tangible nucleus can be detected in the calculus, in which case it is of a pure pearl-white color, consisting throughout of cholesterine, which is almost invariably precipitated from bile in a crystalline form. Converging rays from the center of the calculus to its circumference are formed by the crystallization of the cholesterine, but when these are colored by bile pigment, an appearance of distinct concentric layers is usually presented. Tauro-cholic acid is the solvent of cholesterine, and to its decomposition in the bile may probably be attributed the deposition of the excrementitious element.

Occasionally gall-stones have been found, consisting chiefly of bile pigment, mucus, and some calcareous salts; or, of stearate of lime; or, of phosphate or carbonate of lime; and having nuclei of coagulated blood, lime, or mucus, and often an appreciable amount of copper; in rare instances, uric acid has been found in gall-stones.

It is very probable, therefore, that the first step in the formation of gall-stones is the presence of a small substance of some kind, even of crystals of cholesterine itself, to form a nucleus, around which the cholesterine is deposited from the morbidly altered bile, as the second step.

When calculi are in the gall-bladder there may be no *symptoms* whatever of uneasiness or pain; or there may be pain experienced in the epigastrium darting toward the right side and to the back, with more or less gastro-intestinal disorder, and, perhaps, a slight yellow tinge of the skin. But when the stone commences to move, there are almost always some well-marked symptoms during its passage along the ducts. Very suddenly the patient is attacked with excruciating pain in the epigastric region and in the right side, which, after a longer or shorter period, subsides, and after a certain interval of rest, is renewed with as much severity as before. The sufferings are often so intense that patients will writhe on the floor in the greatest agony. Pressure upon the epigastrium usually affords a degree of relief, but not complete. In connection with the pain there is distressing nausea and vomiting, which is frequently so excessive and severe as to bring up large quantities of gastric acid, and, occasionally, even

some bile,—great exhaustion, cold extremities, a cold perspiration over the whole body, and spasmodic contractions of the abdominal muscles. The pulse remains unaffected, or becomes slower or weaker than natural. The pain is complained of as being spasmodic, and it is often attended with a "sense of constriction around the inferior part of the chest, as if a cord were tied tightly around it, and which is a very distinctive symptom of sudden stoppage of the common gallduct." (*Budd.*) Jaundice is frequently present, but not always, and may be the result of a partial or complete obstruction of the common duct. As soon as the stone has passed through the duct, and escapes into the duodenum, a relief from all these symptoms occurs suddenly, and the patient remains free from suffering until another one commences to move along the duct, when similar symptoms are renewed.—Sometimes there will be no pain present, but rigors and other symptoms, greatly resembling those peculiar to chronic intermittent fever, and which are due to calculi in the hepatic duct or ducts.

The severity and duration of these symptoms vary according to the number, form, and size of the concretions, and the condition of the ducts. The longer the calculus is in passing, the more severe is the pain, and the greater the liability to inflammation of the ducts; and not unfrequently an enlargement of the liver from retention of bile, or a fullness of the right side from distended gall-bladder, or a throbbing sensation, may be detected.—If the stools be carefully examined among patients subject to the affection under consideration, it is often the case that one or more gall-stones will be found.

Ulceration of the stomach may excite a local *peritonitis*, the symptoms of which will greatly resemble those of the passage of a gall-stone,—but the tenderness from the very first, its augmentation on pressure, the acceleration of the pulse, and other symptoms of inflammatory action, will distinguish the peritonitis. *Flatulence* likewise may produce a severe pain in the right side, but it is never so severe as in gall-stones, nor is it attended with the symptoms of exhaustion, spasmodic action of the abdominal muscles, etc., it may come on suddenly, though more commonly gradually, is often preceded by dyspeptic symptoms, and, in some cases, is attended with a lancinating or keen-cutting pain whenever a mouthful of food is received into the stomach,—it is also apt to be shifting.

The *prognosis* of gall-stones is usually favorable, though persons who have been once attacked are always liable to subsequent attacks at longer or shorter intervals. A long retention of the stone in the common duct may prove fatal, either from the excessive pain and vomiting induced, or, from a permanent closure of the duct, with

jaundice. Rupture of the gall-bladder, or of the duct behind, is followed by speedy death, but it is of rare occurrence. Inflammation or ulceration of the gall-bladder or duct may prove fatal. A very large calculus having passed into the intestines may in its progress through the bowels give rise to slight colicky pains and tenesmus, or, it may obstruct the bowels at some point, and give rise to constipation, or even fatal ileus.

The *treatment* of gall-stones consists chiefly in relieving the pain and spasm during their passage. For this purpose a fomentation of Stramonium Leaves and Lobelia, as hot as can be borne, should be applied over the the painful region, and be frequently renewed. Internally, Opium, or Extract of Belladonna, in substance, and not in tincture, should be given, being very cautious in their administration, lest, after the cessation of pain, they may give rise to dangerous symptoms of narcotism. I advise these agents in substance, because of the great irritability of the stomach, that almost always rejects any fluids received into it. Frequently, the gastric irritability may be lessened by the exhibition of officinal Hydrocyanic Acid. Ether and Chloroform have also been employed with benefit, as well as Oil of Turpentine; and it must be observed that these three agents are solvents of cholesterine, and may possibly act by being conveyed through the circulation to the suffering organ; but we have no positive proof that such is really the fact. A combination of three parts of Ether with two of Oil of Turpentine, and given in doses of from half a fluidrachm to a fluidrachm, once or twice a day, has been found of considerable service, although it is not so much employed now as in past years. I have often derived benefit from the administration of the Compound Tincture of Lobelia and Capsicum by mouth, or, if the gastric irritation will not allow the stomach to retain it, by injection into the rectum. Tincture of Gelseminum internally, in doses to relax the system, aided by anodyne and relaxing cataplasms, will also prove useful.

Dr. Prout recommends large draughts of hot water, to every pint of which one or two drachms of Bicarbonate of Soda has been added,—to be used in conjunction with Opium. He thinks the alkali relieves the distressing gastric symptoms by neutralizing the acid present, while the hot water acts like a fomentation to the seat of the pain.—The Spirit Vapor Bath will also prove serviceable in those cases where it can be employed. As to emetics, which have been frequently advised, I am decidedly opposed to them; if nauseants can be retained upon the stomach long enough to produce complete relaxation of the system, and relief from pain, that is all we

can desire for the time being, and the subsequent production of emesis is superfluous and unnecessary.

After the cessation of pain, and when we have reason to infer that the calculus has passed into the duodenum, we should hasten its evacuation from the intestines, as well as the discharge of the accumulated and irritating bile, by a purgative dose of the Compound Powder of Jalap and Senna, aided by copious injections of warm water.

Having thus disposed of the calculus, and of the symptoms occasioned by its movement through the duct, the next object will be to prevent these concretions from again forming, and this can only be effected by the employment of those measures that will give health and energy to the blood, nerves, and liver, in order to the production of healthy bile. For this purpose, regularity of the kidneys and bowels, normal action of the skin, good plain, digestible diet, not too rich or gross, avoidance of all alcoholic, vinous, and fermented liquors, and plenty of exercise in as pure an atmosphere as can be had, are very important measures. To influence the action of the liver, albumen, Leptandrin, Hydrochlorate of Ammonia, Nitro-hydrochloric Acid, and other cholagogues may be administered, if necessary. And if any hepatic, gastro-intestinal, constitutional, or other disease be present, it must be met by the appropriate treatment. The use of mineral waters containing large proportions of carbonate of soda, will also be of benefit.—In many instances of jaundice, cider that has not yet undergone alcoholic fermentation, has proved of great benefit, and its efficacy may, probably, depend upon its malic acid effecting some healthy change in the bile; it may, therefore, be worthy a trial in the treatment of gall-stones.

It has also been proposed to make use of internal remedies for the purpose of dissolving any calculi that may still remain in the gall-bladder. Chloroform, Ether, Turpentine, salts of Soda, and Soda-soap, are all solvents of cholesterine, and have been recommended for the object proposed. Ether and Turpentine, as mentioned above, has been administered with this view. Also Chloroform one part, Alcohol eight parts, Syrup fifty-five parts; mix,—to be given in such doses, that half a fluidrachm of the chloroform shall be taken daily; or, some medicated wine may be used instead of the syrup. But it is very much to be doubted whether agents administered by mouth can produce any more solvent effect upon biliary than upon urinary calculi, when once formed; besides, it is impossible to positively determine either the presence of calculi in the gall-bladder, or their solution in the living body by the means named.

DISEASES OF THE SPLEEN.

Although the anatomical structure of the spleen has been minutely investigated, yet of its functions and its diseases we know but little. In its structure it is very similar to that of the lymphatic glands, and indeed is found only among those animals that are red-blooded and possess a distinct lymphatic system. Its functions are supposed to be,—to separate the coloring matter from the blood of the portal circulation, preparing this fluid for the action of the liver,—to remove excess of watery fluid from the newly-absorbed chyle,—to generate white globules, that always exist in large number in the splenic vein,—and to serve as a diverticulum, protecting neighboring organs from having their vessels over distended with blood. As giving some support to these views it may be stated that it is by no means uncommon to find affections of the lymphatic glands associated with abnormal states of the spleen, either as a cause or an effect,—that when the spleen has been removed from animals, the lymphatic glands assume a vicarious activity, and but little, if any, colorless bile is to be found in the gall-bladder,—and that enlargement, or other abnormal condition of the spleen is almost invariably present in leucocythemia, anemia, inflammation of the lymphatic vessels, chlorosis, scurvy, etc.

From the intimate relations existing between the spleen and the lymphatic system,—between it and the liver and lungs in the process of hematosis, as well as from its sympathies with other organs, it may be at once seen, how readily this organ may be influenced to take on abnormal action, and how difficult it must be to determine whether its pathological phenomena are those of a primary or secondary affection. And, indeed, it is frequently the case, that an extensive organic lesion of the spleen exists without the manifestation of any symptoms positively and satisfactorily indicating their splenic origin. "We know that this organ is often involved in blood diseases, that especially in fevers it becomes almost disintegrated, and that in pyemia it is the seat of secondary deposits, capillary phlebitis, and suppuration; but we know nothing of the indications which mark these conditions, as they are wholly obscured by the more general symptoms of disease." (*Barclay.*)—It is extremely rare to find affections of the spleen present, unless accompanied with some marked malady of one or more other organs; beside which, with the exception of considerable splenic enlargement, it is very difficult, if not frequently impossible, to

satisfactorily diagnose the presence or nature of diseased conditions of the spleen.

According to Heinrich, there exists a strong tendency to splenic diseases in certain families, especially among persons of certain temperaments, as those who are lymphatic, and disposed to solitude, melancholy, and extreme sensitiveness. Females are especially subject to them, from the splenic tumefaction occasioned by menstrual disorder. Children are more liable to tuberculous affections of the spleen, while chronic enlargement of this organ is ordinarily met with only in adult life. Softening, atrophy, hardening, and cartilaginous degeneration, very rarely occur in the young, but are quite common during middle age and subsequently.

Splenic diseases may be the result of mechanical injuries, as falls or blows; of depressing mental emotions; of suddenly suppressed habitual discharges; of excessive exercise or labor, which produce distention and irritation of the splenic structure; of an excessive use of alcoholic drinks; of the employment of the water of swampy lands as a common drink; and of the use of food containing considerable hydrogen and carbon, as, the fat vegetable oils, saccharine and amylaceous substances, etc. Constant sedentary position of the body, excessive heat and moisture combined, especially in swampy regions, and on low grounds subject to inundations, are also named as causes of splenic maladies. Distension and softening of the organ are also said to result from the abuse of narcotics, and, especially, hydrocyanic acid. Enlargement and softening are a common consequence of intermittent fevers, typhus, exanthema, scurvy, and pyemia. "In the history of its enlargement, this will sometimes be found as a sequel of intermittent fever, commonly known as 'ague cake.' Very often no precursory phenomena are discovered, and its cause is quite unknown; occasionally it is associated with enlargement of the liver, and probably then both are lardaceous. It is intimately connected with an anæmic state of the blood; and as its functions in reference to the elaboration of this fluid become better understood, we shall probably obtain more direct indications of the changes which it undergoes in disease; at present we can only affirm that there seems to be some close relation between one of the forms of enlargement and the condition of leucocythemia. In consequence of this circumstance it may be also associated with general dropsy; with ascites it would seem to be connected only through the medium of concomitant disease of the liver." (*Barclay.*)

Chronic Splenitis is a somewhat obscure disease, and is usually associated with or succeeds some malarial fever, or some gastric, or hepatic affection. It may also follow acute splenitis; and is occasionally complicated with abdominal dropsy, or hemorrhages. There is generally more or less of a low febrile condition present, with a sense of fullness in the splenic region, and a deep-seated, dull pain or tenderness that is augmented by deep pressure. Sometimes a periodically recurring lancinating pain will occur. The skin is usually dry, countenance sallow, pulse quick and small, tongue somewhat coated, perhaps nausea, and the stools dark and fetid. Resolution, suppuration, or degeneration are its usual terminations.

If the painful and tumefied organ loses its tenseness, and imparts a soft, yielding sensation at certain points, when palpated, while at the same time rigors and hectic fever manifest themselves, *suppuration* has occurred; and, at a more advanced period, fluctuation may be more or less distinctly recognized. The purulent matter may be discharged through the bowels, or be coughed or vomited up, according to the point at which the abscess breaks and the adhesions it may form with the neighboring organs. Recoveries may sometimes occur.

If we can detect a spongy condition of the spleen with an indistinct undefinable margin, and but little if any pain with or without pressure,—if the features present dark spots, the gums become dark colored, spongy, and bleed easily, with hemorrhages from other parts, dropsical effusions, bloated face, small and compressible pulse, protuberant abdomen, cold extremities, fetid breath, quick breathing, emaciation and debility, *softening* of the spleen has taken place. In these cases, almost invariably the skin presents more or less the appearance of purpura hemorrhagica. The blood in this degeneration of the spleen is dark, thin, and does not readily coagulate.

It may be proper to observe that in all cases of hemorrhage from the stomach or bowels, in anemia, chlorosis, anasarca, ascites, and chronic liver diseases, it will be well for the practitioner to carefully examine the region of the spleen in order to detect any abnormal condition of this organ, which will be frequently ascertained to co-exist with these maladies, and a knowledge of which may lead to more efficacious measures.

The proper tissue of the organ is the part attacked, involving its nutrient vessels, its internal fibrous elastic coat, and sometimes even its external peritoneal covering. The organ is found more or less turgescent after death, exhibiting variegated tints of blue and

red upon its surface. The internal structure is generally more or less softened.

But the abnormal condition more commonly met with is *Chronic Enlargement of the Spleen*, which may be owing to fibrous infiltration, hyperemia with structural alteration, hypertrophy, waxy degeneration, malignant growths, etc.; lesions that present no characteristic symptoms to enable us to form a correct diagnosis of them.—In an examination of the spleen, when enlarged, the patient should lie on his right side, and the examination should always be made before a meal, as the sounds elicited by percussion vary greatly according to the degree of fullness of the stomach. In health, the spleen never projects below the false ribs even during a deep inspiration, and while the splenic tumor is concealed beneath the false ribs, we must be careful to avoid falling into error. A constant dullness of sound over the left hypochondrium in the region of the spleen is a presumptive evidence of splenic enlargement, when in addition, a sense of weight and tenderness is complained of in this region, when the false ribs project more than natural and are somewhat immovable, and the patient is in the habit of selecting a position that will afford more or less relaxation of the walls of the abdomen. As soon as the enlarged organ projects beneath the false ribs, its margin may be detected by careful palpation, and percussion will readily detect dullness in the protruding portion, as well as sonorousness around its margin. The organ presents a firmness and fleshy hardness to the touch, is rather inelastic, and has usually an oblong form. If no dullness can be detected, we may infer that the spleen is not enlarged. It must be recollected that the spleen may become so enormously enlarged as to extend superiorily even as far as on a level with the third or fourth rib, inferiorly, into the lowermost part of the left iliac region, and laterally in front, even beyond the right side of the median line; though such excessive dimensions are not very frequently met with. Therefore, in making the examination we must be careful to distinguish splenic disease from pleuritic effusion, tubercular deposit in the inferior lobe of the left lung, disease of the stomach, of the left lobe of the liver, of the colon, or of the ovary, also from ascites, and disease of the left kidney; but should these maladies co-exist with the splenic affection, then the symptoms must be investigated in detail. In connection with these physical signs we must assist ourselves in forming the diagnosis, by the history of the case, and the acccompanying morbid phenomena.

The *symptoms* usually present in cases of enlarged spleen, and more especially when this is due to malarial influence, are, a sense of weight and fullness in the left hypochondrium, rarely any pain or excessive tenderness; the skin will present a peculiar, pale, dusky or light-mahogany color; the conjunctiva have a dull bluish or greenish tint, and the eyeballs appear more or less sunken; the tongue and lips are pale, the papillæ of the former being small and whitish,—frequently the tongue will be coated white, and occasionally its body will be redder than natural; the gums shrunken and sallow; appetite variable; digestion imperfect with emaciation, and protrusion of the abdomen; bowels variable, with a lighter or darker color of the stools than natural; urine also variable, but commonly pale, abundant, and of low specific gravity, containing albumen if dropsy be present; debility; periodic or constant pain in the head, back, and limbs; occasional chilliness; dejection of spirits; restless nights and unpleasant dreams; palpitations; difficult breathing, especially upon exercise; coldness and numbness of the extremities; and the pulse usually quick, small, and easily compressible. If a drop or two of the blood of the patient be examined under the microscope, it will be found deficient in fibrin and red corpuscles, with, in many instances, an increase of white corpuscles.

These symptoms it must be observed are more or less gradually developed, and all of them may not be present in any one case, though several will almost invariably be met with, and as the disease progresses, they become more severe, the patient becomes mentally and physically indolent, peevish or hypochondriacal, with, perhaps, a dry cough, dyspnœa, attacks of hiccough, ascites, or renal disease, increased emaciation and debility, hemorrhages, hectic fever, or delirium, coma, and death.

The *prognosis* of chronic splenic disease depends entirely upon the character and duration of the disease as well as of the cachectic symptoms present, the co-existence of lesions of other organs, and the age of the patient. Enlargement due to malarial causes when of recent date and occurring in persons not over thirty-five years of age, is mostly curable; but if the enlargement existed previous to the attack of malarial disease, recovery is very doubtful. The older the patient, the longer the disease has existed; and, the more prominent the accompanying cachexia, the less favorable will be the prognosis. Waxy degeneration, malignant growths, (atrophy), the existence of dropsy, of hepatic or renal disease, etc., are almost always unfavorable.

The *pathological appearances* will be in accordance with the

character of the lesion. In hypertrophy the spleen will present a thickening of its cellular tissue, have somewhat the dark color and firmness of muscular tissues, and be of increased weight. Sometimes the hypertrophy may be accompanied by no change in the structure of the organ, which will present the same characters as are observed in its healthy state. In enlargement from malaria, pus may be found in the structure of the organ, or, cartilaginous or ossific deposits in its fibrous coat, adhesions between its peritoneal covering and neighboring parts, etc.; but, when the enlargement or tumefaction has not affected the splenic tissue, but is owing to congestion, the spleen may present a normal appearance after death. Frequently it is soft, and flexible, like a coagulum of blood inclosed in a thin, more or less tough, membrane. And again, especially when the enlargement is oblong, the organ will be found much firmer than natural, and its margins thin and notched. Waxy degeneration, malignant tumors, etc., when present, will be known by their peculiar characteristic appearances, and the coexistence of lesions of other organs may always be ascertained.

The *treatment* of chronic maladies of the spleen must be entirely upon general principles, keeping up a moderate stimulation of all the excretory organs, with alteratives, tonics, chalybeates, etc., to meet the indications, viz., to improve the portal circulation by removing all impediments; to overcome the periodicity of irritative action when present, and to restore the blood to a normal condition. In cases of anemia, chlorosis, leucocythemia, and other cachexia associated with splenic disease, I have derived great benefit from the preparation containing Glycerin and soluble Pyrophosphate of Iron, referred to on page 774. When there is much debility or nervous depression, I employ, in addition, pills composed of Bromide of Potassium, and Xanthoxylin, Strychnia, (or Citrate of Iron and Strychnia) and Alcoholic Extract of Black Cohosh, in various proportions. And in all cases of enlargement, I have found considerable advantage to follow puncturing the skin over the region of the enlarged organ, daily or every other day, by means of the Dermabiotokon,* and then rubbing in over the punctured surface, an ointment composed of Iodide of Ammonium one drachm, Hydrochlorate of Ammonia one scruple, good prepared Lard one ounce; mix. I prefer this to the Compound Tar Plaster in these affections.

In enlargement following malarial fevers, Sulphate of Quinia

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* This instrument can be had of Messrs. Wade & Ford, surgical instrument makers, New York City.

has been found a very valuable remedy for the restoration of the general health; it may be given in quantities varying from twelve to fifty grains during the twenty-four hours,—suspending its use if it creates a sense of uneasiness, debility, or appears to arrest the secretions. I generally prefer giving it in doses of two grains every two or three hours, instead of the larger doses advised. If a chloro-anemic condition be present, with indications of dropsy, it may be combined with the Sulphate of Manganese, so that three or four grains of this salt may be taken daily. A combination of one part of Sulphate of Quinia with three parts of Phosphate of Iron, and given in syrup, has also proved efficacious. If, after the exhibition of Quinia, the urine becomes hot or acrid, the medicine is probably passing away through the kidneys, and must be diminished in its doses, in order to have it exert any influence on the local malady.—If symptoms of purpura manifest themselves, Hydrochloric Acid, or Nitro-hydrochloric Acid will be found useful, in conjunction with the Tincture of Chloride of Iron; or, the Elixir of Cinchona and Iron, because, where debility exists with this condition, Cinchona will be found to answer a much better purpose than the salts of quinia.—If much flatulence be present, saline purgatives as well as drastics must be avoided, lest hemorrhage result,—in such cases, Castor Oil with Oil of Turpentine, etc., may be used. (*See Flatulence and Tympanites.*)—Obstinate constipation is by no means unfrequent in chronic affections of the spleen, and the employment of cathartics generally augments the constipation, so that the patient gradually requires larger doses to produce a cathartic effect. Catharsis is by no means desired, except occasionally—regular daily evacuations, as near healthy as possible, in quantity, are all that is necessary, and may be procured by mild cholagogue laxatives combined with Strychnia, or Alcoholic Extract of Nux Vomica, as, Podophyllin, Oleo-resin of Iris, Alcoholic Extract of Bitter Root, Xanthoxylin, etc.

Among the other agents that have proved serviceable in this disease, are, 1. Milk of Sulphur, Precipitated Carbonate of Iron, each, five to ten grains; mix for a dose, to be repeated three or four times a day. In some instances, Sulphate of Quinia two grains may be added to each dose. 2. The inner bark of White Ash (*Fraxinus acuminata*), boiled in White Wine, and taken in wineglassful doses, three or four times a day, has been advised as a remedy for "ague cake." 3. The Citrate of Quinia and Iron, or Citrate of Quinia, Iron, and Strychnia.

Every means should be taken to invigorate the system; avoiding ardent spirits, and any kind of stimulant, as a general rule, as

well as all the circumstances and causes that may produce or keep up the malady; being temperate in food, drink, and exercise, and doing nothing that will enfeeble or irritate the nervous system. In some instances, currents of electro-magnetism passed through the enlarged spleen, once or twice a day, and persisted in for a long time, will be found very useful. If possible, the patient should change his residence to a place where he will not be subject to malarial influences.—Any co-existing disease of other organs must be met by appropriate measures, properly conjoined with those desired for the splenic affection.

CHRONIC DISEASES OF

THE GENITO-URINARY SYSTEM.

URINE AND ITS CONSTITUENTS.

BEFORE treating upon chronic diseases of the Genito-urinary System, I will at first make a few brief statements relative to the more important normal and abnormal constituents of the urine, as well as to some of the general characteristics of this fluid. (*See* pages 87 to 124.)

Healthy urine is of a light-amber color, transparent, acid, reddening litmus paper, and of a violet-like odor; in the course of twenty-four hours, an average quantity of 35 ounces is passed, though this may vary from 20 to 50 ounces, it is of the temperature 92° to 100° F., when passed, of specific gravity 1.010 to 1.030, and contains 800 or 1000 grains of solid matter in solution, as,—chloride of sodium 100 to 300 grains,—400 to 600 grains of urea,—5 to 10 grains of uric acid,—3 to 6½ grains of creatine,—5 to 10 grains of creatinine,—57 grains of mixed sulphates,—and from 10 to 30 grains of mucus, besides alkaline and earthy phosphates, coloring matter, etc. Among the alkaline and earthy salts, the acids and bases are present in about the following proportions: From 90 to 125 grains of chlorine—from 25 to 40 grains of sulphuric acid—from 45 to 50 grains of phosphoric acid—from 20 to 30 grains of free acid—from 26 to 110 grains of potash—from 75 to 200 grains of soda—from 2 to 7 grains of lime—from 2 to 5 grains of magnesia—from 5 to 13 grains of ammonia, etc.—The specific gravity of the urine may, for all practical purposes, be determined by a good urinometer.

A visible deposit in urine when passed, or shortly after, is abnormal; if the microscope enables us to detect yellowish epithelial cells in the urinary deposit, we should test for bile-pigment; if pus, or casts are detected we should test for albumen.—The most

important *normal* constituents of the urine, in its pathological relations are the following:

1. *Urea* is a nitrogenous compound, derived from the disintegration of some of the nitrogenized tissues, and, probably, also from imperfectly assimilated food rich in nitrogen; it is not formed in the kidneys, but is merely excreted from the blood by these organs. A large proportion of the urea passed by the kidneys, exists previously in the form of uric acid. The elimination of urea is *increased* by water, salt, tea and coffee without milk or sugar, gelatine, animal soups, eggs, milk, jellies, and nitrogenized diet generally, cubebs, cantharides, and atropia; liquor potassa, and bicarbonate of potash increase both uric acid and urea, and, with phosphate of soda, lessen the quantity in the system by hastening its (urea) elimination from the body. Its elimination is *diminished* by sugar, starch, fat, cream, tapioca, sago, arrow-root, cod liver oil, alcoholic drinks, beer, tea or coffee with cream and sugar, and non-nitrogenized diet generally, digitalis, benzoic acid, citrate of iron and quinia, acetate and phosphate of soda, colchicum, etc.; acetate of potassa, colchicum, quinia, and cod liver oil diminish both uric acid and urea in the urine, and arrests its (urea) formation in the system.

Urea may be known to be *in excess*, when the urine has the specific gravity of 1.020 to 1.030, has a strong urinous odor, and when upon the addition of an equal bulk of nitric acid to it, it forms flat, shining, rhomboidal plates of nitrate of urea, without requiring any concentration of the urine previously, by evaporation. Urea is *deficient* in quantity when the urine is of specific gravity 1.001 to 1.008, is in increased quantity, and when, upon the addition of an equal bulk of nitric acid to it, after it has been evaporated to a mucilaginous consistence, crystals of nitrate of urea form slowly, or in a small quantity. (*See* page 108.)

2. *Uric Acid* is another normal nitrogenous and excrementitious constituent of the urine, being derived from the disintegration of some of the nitrogenized tissues, and, probably, from the malassimilation of nitrogenous articles of food; it is eliminated by the skin and lungs, as well as by the kidneys. (It may be proper to state here that the recent experiments of Perls, Oppler, and Zalesky, tend strongly toward proving that urea and uric acid are not separated from the blood by the kidneys, but are produced in the kidneys, from creatine, creatinine, etc.; and when they are detected in the blood it is because they have been absorbed from the urinary organs.) Uric acid is *increased* in the urine by animal diet, by alcoholic drinks, beer, liquor potassa, bicarbonate of potash,

suppression of perspiration, etc.; and we also find an increase of urinary uric acid in several cutaneous affections, as, eczema, psoriasis, pemphigus, etc. It is diminished by atropia, cod liver oil, quinia, tea, coffee, acetate of potash, colchicum, digitalis, etc.

To detect uric acid in healthy urine, some nitric or hydrochloric acid must be added to the urine, which, decomposing the soluble urates in which it exists in the urine, sets free the uric acid, which falls in crystals. Uric acid in excess, the urine yielding crystals of the free acid scattered among an amorphous deposit of urates, is more frequently met with in chronic than in acute diseases. Uric acid is met with in more or less diminished amount in diabetes, chlorosis, anemia, hysteria, and the advanced periods of Bright's disease. In the commencing stage of an attack of gout it is diminished in the urine, but increased in the blood. The excess or diminution of uric acid must be determined not by its ready precipitation, but by its actual amount.—When treating cases of uric acid deposit, it is not necessary to render the urine more than neutral, for, if we make it alkaline, phosphates will be developed.—In these cases the uric acid may be rendered soluble, or be retained in a soluble state while in the bladder, by carbonate of soda, bicarbonate of potash, and carbonate of lithia, but carbonate of ammonia should not be used, as it forms less soluble salts than either of the others.—Nitro-muriatic acid is considered an oxidizing agent, supplying oxygen to the system; it acts upon uric acid, converting it into carbonic acid and urea, the last products of oxidation,—and if this conversion is not effected by the action of oxygen, oxalate of lime or sugar may result as the consequence of the imperfect oxidation of the uric acid and urates. (*See* page 110.)

3. *Urates*, which consist principally of urate of soda with smaller proportions of urates of lime, ammonia, and magnesia, are redissolved when the urine is heated, become again deposited as the fluid cools, are immediately dissolved by liquor potassa or ammonia, and deposit uric acid on the addition of nitric acid. They present an amorphous appearance under the microscope, are usually of a grayish, pink, red, orange, or brown color, according to the amount and kind of coloring matter (urohæmatin) present in the urine. Their presence may be due to cold, overexertion, excess in eating or drinking, hard study, sudden mental emotions, and sudden change in the manner of living; but in these cases their presence is only temporary. Urates in urine, or indeed deposits of any kind, are always indicative of either an ephemeral, or else a more serious derangement of the system, and their presence should never be disregarded. When the urates appear suddenly in the course of febrile or inflam-

matory diseases, it is indicative of a crisis, most generally for the better. When pink deposits occur every now and then, in the urine, without any acute disease being present, and any other attributable cause being absent, it indicates, as a general rule, some chronic disease of the spleen, liver, or heart, etc., with a tendency to gravel, and which should be treated by alkaline tonics. Urine containing urates is always acid, and, in chronic diseases, especially, crystals of free uric acid will be found among the amorphous urates, after the liquid has stood a short time, particularly in cancer of the liver, and other affections of this organ. When the urates are accompanied by the phosphates, the urine may be neutral or but faintly acid, depending upon the amount of phosphates present. (*See* page 111.)

4. *Phosphates*, which consist of amorphous phosphate of lime, crystals of phosphate of lime, and crystals of phosphate of ammonia and magnesia. These are derived partly from the food, and partly from the oxidation of the phosphorus in the nervous structures, etc. Phosphate of lime is not only met with in an amorphous state, but also occurs in crystals of various sizes, small and needle-like, or thick and wedge-shaped, or in more or less perfect rosettes, or penniform, stellar, etc.; and they occur much more frequently in the urine than the amorphous phosphates, or the triple ammonio-magnesian phosphatic crystals. Urine containing crystals of phosphate of lime is voided in large quantity, with frequent calls to pass it, and more or less uneasiness and smarting being occasioned by its passage, at the neck of the bladder and along the course of the urethra; it is usually pale, occasionally high-colored, is below the average quantity passed in twenty-four hours, is feebly acid when first voided, but speedily becomes alkaline, and contains an excess of urea and animal matter. These calcareous phosphatic deposits are of much greater pathological importance than those of the ammonio-magnesian phosphate, and generally appear with patients who present marked symptoms of nervous exhaustion.

Phosphates are usually present in cases where there exists much nervous or cerebral excitement; the urine containing them is usually neutral or alkaline, and when heated the phosphates are not dissolved. The phosphate of lime is not so readily dissolved as the phosphate of magnesia, hence, in acid urine the former may be precipitated, while the latter remains in solution. The phosphatic deposit in urine is dissolved by acetic, nitric, or hydrochloric acids, but not by liquor potassa, ammonia, or the alkaline carbonates. Ammonia, which, it must be recollected, is not a normal constituent of urine, when added to this fluid, causes a deposit of penniform

or stellar crystals, or crystals of the triple phosphate. (*See* page 114.)

Among the important *abnormal* constituents of the urine, are:

1. *Blood.* (*See* page 118.)

2. *Casts*, especially in albuminous urine. (*See* page 119.)

The epithelial cells lining the walls of the renal uriniferous tubes never appear in the urine but under the influence of disease; they differ in appearance, according to their location. The individual cells of the convoluted tubes are spherical; sometimes appearing oval, and by apposition become somewhat hexagonal,—they have but one nucleus, and are slightly granular.—The epithelial cells of the straight tubes are larger, less granular, contain a single nucleus, and are the last to exhibit any character of degeneration.—The epithelium of the calyces, pelves of the kidneys, and ureters, are more or less ovoid when isolated, are often seen in groups of two or three, when they are somewhat pyriform, are larger than those of the straight tubes, somewhat resemble the tessellated or pavement variety, and are never seen in a state of health; they are often met with in abundance during an attack of uric acid gravel, and, when irritation is present, give place to exudation and inflammation-corpuscles, and ultimately to pus-cells.—The epithelium of the bladder, urethra, and female vagina is of the scaly or squamous variety, and is always seen in healthy urine, either isolated or cohering; it is frequently present in abundance in albuminous and purulent urine.—Pus, mucus, or, as they are sometimes called, exudation-corpuscles, are usually present in the urine, during gonorrhea, leucorrhea, and stricture of the male urethra; and not unfrequently in cases of nocturnal emissions. Although not indicative of renal disease, these corpuscles may co-exist with it.—For the examination of renal casts under the microscope, a power of 200 or 250 diameters is sufficient; nothing can be gained by using any higher powers.—A full account of the renal casts, and the diseases of which they are manifestations, will be found in "Johnson on Diseases of the Kidney," and "Basham on Dropsy connected with Diseases of the Kidneys."

3. *Bile.* (*See* pages 121 and 799.)

4. *Pus.* (*See* page 121.)

5. *Albumen* may be detected in urine when this fluid contains pus or blood, or after an attack of scarlatina, diphtheria, during chlorosis, pregnancy, liver disease, etc., without being indicative of any serious lesion of the kidneys. It may also be found in the urine during leucorrhea, at the menstrual period, in hysteria, in spermatorrhea, and in prostatorrhea, without being necessarily an unfavor-

able manifestation. Indeed any temporary irritation or hyperemia of the kidneys may cause the urine to become more or less albuminous. It is only when it is constantly found in the urine, associated with casts, and with symptoms of failing health, that, as a general rule, its presence in this fluid denotes danger. However, in all cases in which albumen is detected in urine, this fluid should be subjected to repeated microscopic examination, for the purpose of detecting pus, blood-corpuscles, epithelial deposits, renal-casts, etc., and thus enabling us to form a correct diagnosis. When the circulation of blood in the kidneys is impeded by structural disease, so that the albumen of the serum of this fluid transudes through the renal capillary vessels, the prognosis is almost always unfavorable.

In examining for albumen where there is much phosphoric acid in the urine, (in which acid, albumen is very soluble,) we should first precipitate the phosphoric acid by adding a few drops of solution of chloride of lime, and then a little ammonia; let it stand for twenty-four hours, filter to remove the soluble phosphates, and then test with heat and nitric acid.

A very minute quantity of albumen in urine may be detected by the following means: Into a clean test-tube put half a fluidrachm of *fuming* nitric acid; carefully incline the tube, and let the same quantity of the suspected urine trickle down *very slowly* to the acid, over the surface of which the urine will float without the slightest admixture. If albumen be present, a milk-white, sharply-defined, tolerably tenacious film will form at the exact point of junction of the two fluids. If the amount of albumen be extremely minute, this film may be so thin as to become visible only by reflected light when the test-tube is inclined. When very thin, the albuminous film will be dissolved in the course of a few hours; otherwise it increases in breadth, diminishes in density, becomes yellow or yellowish-green at its under surface, and deposits at the bottom of the acid in the tube, minute coagula.—If a ruby or violet ring is developed, at the part in immediate contact with the acid, uroxanthine is present—and, if in addition to a red or violet hue, a green-colored ring is formed, bile is also present.—If the urine presents a granular-like, turbid appearance throughout, urates, uric acid, or epithelia are present, and the turbidity will disappear on the application of heat. (*A. Clark.*)

When it is desired to estimate the exact quantity of albumen in the urine, we first acidulate a given portion with acetic acid, heat it in a water-bath to the boiling point, collect the precipitate on a weighed filter, well wash it, dry it, and then weigh it,—from the weight found in this given portion of urine, that of the whole quan-

tity passed in twenty-four hours may be determined. As earthy salts are generally present with the albumen, we may burn the filter and albumen, weigh the ashes which remain (of the earthy salts), and deduct this weight from the previously determined weight of the dried albuminous precipitate.

A new substance, allied to albumen, the *hydrated deutoxide of albumen*, has been found in the urine of a patient laboring under mollities ossium; it is not coagulable by heat or nitric acid, until after the urine has been heated and then allowed to cool. (*See* page 120.)

6. *Oxalate of Lime* is a very common abnormal urinary deposit, occurring in the urine either in the form of octohedral crystals, or of spherical or oval masses, termed, from their resemblance to dumb-bells, "dumb-bell crystals." The octohedral crystals do not appear to be due to any peculiar diathesis or habit of body, are rarely observed in the urine until some time after it has been voided, are generally due to some defect in the processes connected with oxidation, and occasionally they result from some change in the urates of urine that has been allowed to stand for some time. Their presence becomes an important symptom, only when associated with severe local or constitutional manifestations of the existence of disease, being frequently observed in the urine of persons apparently in good health. When oxalates and urates co-exist in the urine, the latter may prevent the former from being discovered; in such case, the addition of a little liquor potassa will dissolve the opaque urates, and the oxalates being no longer obscured by them, may be readily seen.

Oxalic deposits are considered to be emanations from uric acid, in which this acid is imperfectly organized into carbonic acid and urea. Nitro-hydrochloric acid in doses of twenty drops, repeated three or four times a day, in some bitter tonic infusion, is the common remedy; this acid is an oxidizing agent, supplying oxygen to the system, which acts upon uric acid converting it into carbonic acid and urea,—if the uric acid is not converted by the action of oxygen into these last products of oxidation, oxalate of lime or sugar may result as a consequence of the imperfect oxidation of the uric acid and urates. Nitrate of Ammonium in doses of twenty grains three times a day, has also been found efficacious in many instances.

Dumb-bell crystals are never formed in the urine after it has been voided; they are always present when the urine containing them is first passed, and are very probably formed in the secreting tubes of the kidneys, being sometimes observed in the renal-casts. They often form the nuclei of uric acid, and oxalate of lime cal-

culi, and are likewise apt to cause hematuria. Their presence is of much importance clinically. To get rid of them the patient should frequently drink large quantities of fluid, as, a solution of Bitartrate of Potash, or other alkaline fluids; the general health, and especially the digestive organs must be attended to; with Iron, Quinia, or other tonics according to the patient's condition, and especially good air, exercise, but not to fatigue, and a proper and well-regulated nutritious diet. Oxide of Silver in grain doses every six hours, for three or four days, after which, in half grain doses three times a day, has been found very efficacious when dumb-bells are present in the urine, in conjunction with a pill three times a day, composed of Alcoholic Extract of Aletris, Extract of Gentian, Capsicum, each, one grain, Colombo a sufficient quantity. When both dumb-bells and crystals are present alternate the treatment, every four or eight days, for each. The surface of the body must also be especially attended to in these cases. (*See* page 123.)

7. *Grape Sugar.* (*See* page 122.) There are several methods of detecting sugar in urine, some of which are given in the sixth edition of my American Dispensatory, page 821. The determination of sugar in urine, as well as its quantity, is most easily and expeditiously effected by means of a polarizing apparatus, as, Mitterlichs.—The following process, being a modification of Fehling's test by Dr. Pavy, will be found useful in practice: Dissolve neutral Tartrate of Potash thirty-two grains, and Caustic Potash (*potassa fusa*) sixty-four grains in distilled Water half a fluidounce. Also dissolve Sulphate of Copper sixteen grains in distilled Water half a fluidounce. Mix these two solutions together. It is better always to prepare this test shortly before using it. One hundred minims of this test solution are decolorized by half a grain of sugar.

Under ordinary circumstances the urine requires no preparation for the application of this test. But if albumen be present, the urine must first be boiled and then filtered, in order to get rid of the albumen. Or, boil a small quantity of the urine with crystals of Sulphate of Soda, enough to insure a total separation of all that is coagulable, and then filter; the presence of the Sulphate of Soda does not in the least interfere with the application of the test solution.—If traces of sugar only exist in the urine, this fluid must first be concentrated by evaporation, and then treated with acetate of lead to remove coloring matter, urates, and phosphates—after which, filter.

To use the above copper-test solution, dilute the diabetic urine with four times its bulk of distilled water, and then from a smal

pipette, graduated into one hundred minims, let it slowly drop into a small porcelain capsule containing one hundred minims of the blue-test solution and a piece of caustic potassa about double the size of a pea, and which liquid must be made to boil gently over a spirit-lamp all the time of the operation. As soon as the blue color has disappeared, and a pure orange or orange-red color is produced, read off, on the pipette, the number of minims of diluted urine required to effect the decolorization.

Table showing the quantity of Sugar per fluidounce, for from 15 *to* 100 *minims, required to decolorize* 100 *minims of the blue copper-test solution.* (*Pavy.*)

Minims to Decolorize.	Sugar per Fluidounce.	Minims to Decolorize.	Sugar per Fluidounce.	Minims to Decolorize.	Sugar per Fluid-ounce.
15	16.	44	5.45	73	3.28
16	15.	45	5.33	74	3.24
17	14.11	46	5.21	75	3.20
18	13.33	47	5.10	76	3.15
19	12.63	48	5.	77	3.11
20	12.	49	4.89	78	3.07
21	11.42	50	4.80	79	3.03
22	10.90	51	4.70	80	3.
23	10.43	52	4.61	81	2.96
24	10.	53	4.52	82	2.92
25	9.60	54	4.44	83	2.89
26	9.23	55	4.36	84	2.85
27	8.88	56	4.28	85	2.82
28	8.57	57	4.21	86	2.79
29	8.27	58	4.13	87	2.75
30	8.	59	4.06	88	2.72
31	7.74	60	4.	89	2.69
32	7.50	61	3 93	90	2.66
33	7.27	62	3.87	91	2.63
34	7.05	63	3.80	92	2.60
35	6.85	64	3.75	93	2.58
36	6.66	65	3.69	94	2.55
37	6.48	66	3.63	95	2.52
38	6.31	67	3.58	96	2.50
39	6.15	68	3.52	97	2.47
40	6.	69	3.47	98	2.44
41	5.85	70	3.42	99	2.42
42	5.71	71	3.38	100	2.40
43	5.58	72	3.33		

The number of minims required will give the amount of sugar per ounce, as in the foregoing Table; but as the urine is diluted, and only represents the fifth part of an ounce, the amount given in

the Table must be multiplied by five, to get the amount of sugar in the fluidounce of urine. Thus, if 28 minims of diluted urine be required to effect the decolorization, this, according to the Table, would give 8.57 grains of sugar to the fluidounce,—but, as the urine is diluted, this is only for the one-fifth of an ounce, and must be multiplied by 5=42.85 grains in an undiluted ounce of urine. Three gallons of urine per day = 384 fluidounces =16454.40 grains of sugar.

8. *Inosite*, or muscle sugar, is generally found in the flesh of muscle; though it has been found in the urine in Bright's disease, and diabetes. It forms in cauliflower-like crystals, is soluble in water, but not in ether or alcohol, melts at 410° F., loses its water of crystallization in the air, when fused it forms into needles on being quickly cooled, but forms into a horny mass when slowly cooled, and it does not produce alcohol when yeast is added to it.

Urine containing it should be concentrated to one-fourth its volume; a little of this should be placed on platinum foil, and a drop or two of nitric acid be added, and the whole be evaporated to dryness. Moisten the residue with a little ammonia and a solution of chloride of calcium, and again carefully evaporate to dryness; if a grain of inosite be present, a lively rose-red color appears. The true sugars do not give this reaction.—Neutral acetate of lead does not throw down a precipitate with a solution of inosite; but basic acetate of lead produces in it, when warmed, a transparent jelly, which becomes white in the course of a few minutes, and assumes the exact appearance of paste. (*Neubauer and Vogel.*)

KIDNEY DISEASES.

Diseases of the Kidneys are frequently very insidious, coming on very gradually, and manifesting no appreciable symptoms of their presence until they have assumed a formidable character. Simple functional renal derangement is no evidence of disease of these organs, as the color, quantity, quality, and specific gravity of the urine are greatly influenced by changes of temperature, active or sedentary habits, mental emotions, and certain articles of diet or drink, as well as by a number of drugs. It is only by a microscopical and chemical examination of the urine that we become enabled, even at a very early stage of renal disease, to detect its existence. The microscope, by revealing to us the presence of casts, epithelia, blood, pus, etc., informs us not only of the presence of disease, but often of the particular portion of the kidney in which it is located; while chemistry makes known to us the existence of a more or less

serious abnormal condition of the kidneys, by its detection of albumen, etc. And, to verify the presence of a serious disease, these examinations should be frequently instituted. The symptoms usually present in chronic affections of the kidneys, but which are not always positive indications, are,—pains in the region of the loins and groin; weakness in the small of the back; numbness of the thigh on the side with the affected kidney; partial impotency; irregular urination; high-colored, scalding urine, depositing a sediment; sometimes white or milky urine; weakness of the lower limbs; sometimes a desire to void urine very often; bloody urine; pains in the testicles shooting into the loins; gravel; stone; suppression of urine; dropsical swellings; pain and burning in the testicles; swelling of the testicles; irritability of the bladder; mucous, and sometimes seminal discharges ooze from the urethra.

Those commonly complained of in affections of the *bladder*, are,—irritability of bladder; incompetency to retain more than a small quantity of urine, and for a short time only; pain or dullness in the region of the bladder, extending to the back, thighs, etc.; urine hot and scalding; depositing a sediment; sometimes bloody urine; appetite diminishes; depression of spirits; urine passes by drops; irregularity in quantity, quality, and the intervals of voiding urine; strangury; paralysis of the bladder; partial impotency; dull, disagreeable pain in the testicles; irritation of urethra; mucous and sometimes seminal discharges ooze from the urethra.—Yet, it must be recollected, that many of these symptoms may be present as the result of functional or organic lesion of other organs than the kidneys or bladder; and that to designate them satisfactorily is a very difficult, if not an impossible task, unless other aids and diagnostic means be employed.

BRIGHT'S DISEASE. (*Morbus Brightii.*)

Albuminaria, or Bright's Disease of the Kidney, so called after Dr. Richard Bright, who first described it, is a malady in which albumen is detected in the urine, and is frequently a cause of dropsy. It may exist in the acute form, or in the chronic; it is with the latter form only, which is much more frequently observed than the acute, that we have to deal here. Of late years the unity of the disease has been denied, and efforts have been made, based upon careful microscopical, chemical, and pathological investigations, to prove that in reality the disease consists of several renal maladies which agree in the one symptom of a more or less albuminous condition of the urine, and which view has been strongly maintained by Dr. George

Johnson, and others. And from the facts which have been made known by Dr. Johnson especially, and corroborated by other observers, there is no doubt but that the affection termed Bright's Disease, comprises various morbid conditions of the kidneys, essentially different from each other in their origin, their progress, and often in their results. It must, however, be stated that the dissimilar appearances observed in the renal-casts, and the varied conditions detected in the diseased kidneys, are considered by many excellent investigators to be different stages of the same disease, instead of different maladies. I will presently refer to these conditions under the names given to them by Dr. Johnson, to whom I am greatly indebted in the following description of the history and symptoms of this disease. But first, a few words as to the *causes* of kidney disease. In general terms, it may be said that any cause that will give rise to a more or less permanent congestion of the kidney, will induce either a temporary albuminaria, or a true Bright's disease. Excluding causes of local origin, Dr. Johnson observes: "It will be found that all the causes of renal disease have this common feature—that *they tend to produce a morbid condition of the blood*, either by introducing some poison from without, or by interfering with the elimination of certain noxious matters developed within the body, by so far reducing the quantity of nutritive food that it is insufficient for supplying the waste of the tissues and for enabling the blood to maintain its healthy composition, or, lastly, by some exhausting and depressing agency, which lowers the vital energy and diminishes the power which the healthy body possesses of resisting and overcoming injurious influences, whether originating within or without."

Exposures to cold and wet, suppression of perspiration, the intemperate use of alcoholic drinks, want of cleanliness, deficiency of nutritious diet, dyspepsia, cardiac, pulmonary, or hepatic disease, certain poisons in the system, as, of scarlet fever, of measles, of erysipelas, of cholera, of diphtheria, etc., in conjunction with sedentary habits, mental depression, bad air, etc., may each occasion albuminous urine, and eventually lead to true Bright's disease. A strumous habit of body appears to be a strong predisposing cause; and chronic renal maladies frequently follow gout, rheumatism, carbuncles, masturbation, constant presence of oxalate of lime crystals in the urine, renal calculi, improper use of diuretics, blows upon the loins, saccharine urine, etc. In many instances, the chronic form of Bright's disease is the result of a previous acute attack; and it is often developed slowly and insidiously without any known attributable cause.

The only positive *symptom* of this disease is the presence of renal-casts and the persistency of albumen in the urine; but with this, certain secondary or indirect symptoms are observed, which, however, vary considerably in different persons, and are not characteristic. There may be derangements of digestion; obscure pains or uneasiness in the loins; occasional attacks of nausea and vomiting; sense of weakness in the back; paroxysms of dyspnœa occurring more or less frequently, independent of any bronchial or pulmonary affection, and generally attended with palpitation of the heart; pains in the limbs and loins which are considered rheumatic; pulse frequently small and compressible; heart's sounds distant and feeble; debility; gradual loss of flesh; irregularity of the bowels; anemia; a red, brown, or dingy urine, containing casts and albumen; œdema of the face and other parts of the system, which gradually extends; firm pressure over the kidneys causes more or less tenderness or pain; the skin becomes harsh and dry, not perspiring even under exercise; drowsiness is a common symptom; and, not unfrequently, apoplexy, or convulsions. These symptoms may not become fully developed for several years, being very obscure at first, and the disease may even prove fatal without the patient having experienced any extraordinary symptoms.—In some cases, especially among those whose systems are enfeebled by want, exposures, intemperance, or disease, (scrofula, syphilis), the commencing symptoms observed, will be a frequent desire to urinate, flatulency, occasional attacks of diarrhea, dropsical swellings of the face and extremities, paleness, and increasing debility.

The urine is sometimes abundant, but ordinarily more scanty than in health, is acid in its reaction, generally of low specific gravity, and containing a diminished amount of urea, uric acid, pigment, and other urinary solids.—The pale, bloodless countenance, the dropsical condition of the cellular tissue, and the persistent albuminous urine, are certain indications of Bright's disease; though, it must be borne in mind, that a temporary absence of albumen in the urine is by no means uncommon.

As the disease progresses the symptoms more or less gradually become more severe and well marked; the breathing often becomes of a moist, wheezing character; a pearly mucus composed of compound granule cells, is frequently expectorated, (abortive epithelial cells); drowsiness increases; apoplexy, or coma ensues; and death; and before death the albumen may have disappeared from the urine.

In the *differential diagnosis* we must remember that epithelial-casts with well-developed renal epithelial cells, or with blood

globules, in the albuminous urine; pain in the renal region and along the course of the ureters; more or less frequent paroxysms of dyspnœa; quick, full, and hard pulse; febrile thirst; harsh and dry skin; and rapidly-developed dropsical swellings are indicative of *acute morbus Brightii.*

Bright's disease may be distinguished from *acute inflammation of the kidneys*, in which there is more soreness and pain in the lumbar region, more especially on the side of the inflamed kidney, with a retraction of the testicle of the affected side, and no albumen in the urine.

From *simple albuminaria*, which occurs temporarily in the course of some acute affections, or which may be due to pregnancy, or to cardiac or other disease, and in which the urine contains but a small amount of albumen, and no renal casts nor epithelial cells.—Bearing in mind, however, that epilepsy, apoplexy, convulsions, and coma, may be due to Bright's disease, or to another cause, namely, uræmia,—and which will require the microscope to correctly determine.

From *suppurative nephritis*, which is usually confined to one kidney, is attended with considerable pain, and, perhaps, also a well-marked enlargement in the renal region, irregular or periodical febrile symptoms, rigors, throbbing in the part affected, etc. Both blood and pus may be found in the urine, and perhaps a few renal casts with pus-globules attached.—In both *purulent urine* and *hematuria*, albumen will be found in the urine, but in small quantity, or proportioned to the quantity of pus or blood present. Both pus and blood may exist in the urine in Bright's disease, but the albumen will be in much larger amount.

From *anemia*, not associated with renal disease, in which dropsy is seldom present or not to any great extent, and no albumen nor casts are present in the urine.—When excessive discharges give rise to anemia, it is by no means uncommon to find the urine albuminous, and dropsy present,—but, upon the cessation of the discharges (hemorrhage, etc.), and as the patient recovers, the albumen will gradually disappear, no casts will be observed, and the dropsy, if due to this cause only, will also pass away.

From *chronic rheumatism;* from *chronic bronchitis*, which is frequently associated with Bright's disease; from *chronic dropsy*, not due to renal disease; and from *gastro-intestinal affections*, which may accompany the kidney malady,—solely by an examination of the urine, which will contain no albumen or casts, if Bright's disease be absent; or, should albumen be present, it will be only temporarily.

From *cancer of the kidney*, in which there is no dropsy or but slight, (but this may also be the case with true Bright's disease); and a small amount of albumen in the urine, with considerable blood, which occurs at frequent intervals. This periodical hematuria is a very important symptom, if not pathognomonic, of renal cancer.—From *tubercle of the kidney*, by the presence of tubercles in other organs, and the appearance in the urine of the degenerated cheesy-like tuberculous matters. Both of these affections are, however, very rare.

I will now briefly describe the several forms of renal disease which, according to many eminent authors, are included in the term Bright's disease.

1. *Chronic Desquamative Nephritis*, (*Johnson*), *Chronic Albuminous Nephritis*, (*Basham*). *Gouty Kidney*.—This may follow acute desquamative nephritis, or it may be manifested independent of any previous acute attack, coming on very insidiously, and often terminating in sudden death without the manifestation of any peculiar or troublesome symptoms. It may be due to gout, syphilis, scrofula, or other taint, want of exercise, abuse of liquors especially, mental depression, or whatever tends to lessen the physical or moral activity of the system, and cause an abnormal condition of the blood.

The usual premonitory symptoms are, according to Johnson, a gradual loss of strength with more or less emaciation, which latter is sometimes concealed by the anasarcous swelling of the body; a harsh, dry state of the skin, with defective perspiration; skin and lips pallid, or sallow, or pallor blended with a dusky hue; loss of appetite, though this is often variable; thirst; constant flatulence; perhaps gastric pain, pyrosis, and vomiting; headache, or heaviness of the head; a tendency to drowsiness; dimness of vision; and frequent attacks of epistaxis, or else amenorrhea or menorrhagia in the female. After a shorter or longer period dropsy may occur, though the disease often proves fatal without any dropsy whatever; a slight puffiness of the face, and in the eyelids is frequently observed, especially on rising in the morning; the urine, from its irritating properties, is frequently voided during the day, and the patient is compelled to get up once or oftener during the night, to urinate,—this symptom is frequently one of the earliest ones observed, and should always lead to an investigation of the urine.

This fluid will be found, at first, more acid than usual, of the

natural sherry tint, and occasionally deeply colored with urates, containing no albumen, but an amorphous granular material, and cylindrical granular-casts, covered with granules and entire or disintegrating epithelial cells, detached from the basement membrane of the uriniferous convoluted tubes. As the disease progresses in the second stage, the urine becomes paler and scanty, at first temporarily albuminous, the urinary solids become lessened, and the granular-casts become more numerous, being sometimes obscured by uric acid or urate of ammonia, (soda?). In the last stage of the disease, the urine becomes paler and permanently albuminous, and its sediment contains larger granular-casts, which from their appearance are called "large waxy-casts," with well-defined, sharp outlines, about $\frac{1}{500}$ of an inch in diameter or nearly equal to that of the renal convoluted tubes, and loaded more or less with resplendent granules, or aggregated masses of nuclei. Blood is seldom present in the urine in chronic desquamative nephritis; but an extensive destruction of cell-structure is going on, frequently beyond the power of subsequent reproduction.

The secondary diseases induced by this form of renal lesion are, dropsy, especially anasarca,—but dropsy is less frequently a consequence of this form of kidney disease, than of many of the other forms associated with albuminous urine.* Dyspepsia; chronic vomiting after meals; diarrhea; pulmonary disease, especially dyspnœa with wheezing and cough, or chronic bronchitis with a copious secretion; inflammation of the serous membranes; *obstinate* chronic rheumatism, more commonly seated in the muscles than in the joints; coma, and convulsions; diseases of the heart, especially hypertrophy with or without valvular disease; and hepatic disease, especially cirrhosis. When even one of these complications exist, the case is beyond remedial aid, though relief may sometimes be given.

The *pathological appearances* vary according to the advanced condition of the disease. At first, there is scarcely any change in the external appearance of the kidney, the only evidence of disease being in unnatural opacity of the convoluted tubes, due to their being filled with epithelial cells, either entire or in a disintegrated condition. In a further advanced stage, the kidney becomes diminished in weight and size; its cortical substance becomes thinner and atrophied, and the bases of the medullary

*Dr. Basham states—"The atrophied kidney, then, though it gives rise to albuminous urine, never produces renal dropsy, nor any of the symptoms characteristic of Bright's disease of the kidney." And again, "In fatal cases the cause of death may most frequently be traced to symptoms of uremic poisoning, referable to the influence of the retained urea on the nervous centers."

cones gradually approach the capsular surface of the kidney. One of the surest external signs that the kidney has not undergone much structural change, is, the distinctness and natural appearance of the lobular divisions on the capsular surface; but as the atrophy of the organ progresses, these markings become more and more completely obliterated. The basement membrane of the renal tubes having been denuded of their epithelial cells, the reproduction of these cells becomes wholly arrested, and the tubes become atrophied, and may contain a few broken and scattered particles of epithelium, an unorganized fibrinous or albuminous material, oil, or serum. These secondary deposits in the tubes are generally observed at an advanced stage of the disease, the fibrinous, or albuminous material forming the large waxy-casts. In some cases, a layer of very delicate, transparent, nucleated cells takes the place of the epithelial lining removed from the tubes, and the tubes remain of their normal size, or become more or less dilated, and appearing as if they were in detached, circular, or oval cyst-like portions. These cysts usually contain a yellowish or dark-brown albuminous liquid; sometimes fatty matter, cholesterine, etc.*

The kidney gradually loses its vascularity, and becomes atrophied so far as to reduce its weight and size to one-fourth of its natural standard, but retains its smoothness until at an advanced stage, when it becomes corrugated, hard, and whitish, with occasional patches of vascular engorgement. The medullary cones become contracted, indistinct, and finally obliterated. The outward aspect of the kidney in true desquamation, and in disintegration of the epithelium, without desquamation, is the same. In those cases where the unorganized waxy material is abundantly deposited in the tubes at an early period of the disease, the size and bulk of the kidney may be very little below the average, and the cortex will be firm, yellowish-white, and of waxy aspect in proportion to the amount of this secondary deposit present. Both kidneys are always attacked, but in one the disease may have progressed more rapidly than in the other.

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* According to more recent researches it would appear that the course and structure of the uriniferous tubes are more complicated than has been heretofore imagined, and which, if found correct, must tend considerably to lessen confidence in the accuracy of the above microscopical investigations. Henle, Ludwig and Zawarykin, Roth, Schweigger-Seidel, and other German investigators, have all been making independent researches upon the renal tubes, and thus far with about the same results as to the chief points. The question is, however, still undergoing investigation, not being fully decided, but enough has been elicited to prove that our previous views of these canals will have to be greatly changed.

The Malpighian capillaries and the arteries have their coats remarkably thickened, while the walls of the intertubular capillaries and of the emulgent vein present no appearance of hypertrophy or thickening.—Both layers of fibres in the muscular walls of the renal arteries become hypertrophied without change of structure, and the thickening is proportionally greater in the smaller afferent arteries of the Malpighian bodies; the hypertrophied arteries are also more tortuous than when these vessels are in a healthy condition, owing probably to the obstructed state of the circulation which attends extensive disorganization of the secreting tissues. The canal of these vessels remains pervious.

Besides the opacity and thickening of the capillary walls, the Malpighian capillaries undergo further changes. Their canals are normal in calibre, or but slightly narrowed; the thickened vessels become crowded together and less distinct than natural, presenting smooth surfaces free from deposit, or roughened by an indistinctly granular material; the entire Malpighian body is not sensibly enlarged, but the tuft presents a peculiar, whitish appearance. In the last stage of the disease, after the atrophy of the renal tubes, the Malpighian bodies become bloodless, atrophied, and the capsule shrivelled,—the decayed vessels sometimes containing a few oil globules.—The intertubular capillaries probably become atrophied, as they can not be readily seen; and a similar gradual wasting and obliteration of the minute veins likewise takes place; the larger branches become shrunk, contracted, and often contain firm coagula of blood, adhering more or less closely to their walls.

In the *diagnosis* of this affection, we must bear in mind that in the acute form of the disease the urine contains entire renal epithelial cells, while in the chronic form they are mostly disintegrated; and that while blood-corpuscles are common in the urine of acute nephritis, they are rarely seen in chronic desquamative nephritis, though this last may follow acute nephritis, in which case the blood-corpuscles gradually disappear. Albumen, disintegrated epithelium, hyaline, and large granular-casts, and large waxy-casts, are peculiar to the urine of this form of Bright's disease. The granular-casts first appear, becoming more abundant as the disease advances,—the albumen appears at a later period—both become more abundant during the middle period of the disease,—and then gradually diminish, the large waxy-casts replacing the granular.

The *prognosis* is favorable in proportion as the disease is at an early stage, its progress slow, and its secondary consequences few and unimportant; it is also more favorable when in addition, the

constitution is vigorous, and not debilitated nor tainted by disease. When the granular-casts become daily more transparent, and the epithelial cells more perfect and less abundant, the case is highly favorable. When dropsy is present, or pulmonary, cardiac, or hepatic diseases, severe gastro-enteritic symptoms, the chances of recovery are much diminished. A scrofulous disposition, or syphilitic taint is unfavorable. Scanty urine, with a diminution of its albumen and granular-casts, is indicative of a fatal termination, which is generally preceded by drowsiness, and coma, or convulsions. Previous acute nephritis, hereditary gout, intemperance, lack of nutrition, a rapid progress of the renal disease, and the appearance of the waxy-casts, are all unfavorable symptoms. Pus in the urine, or ischuria with a tendency of the urine to putridity, are also serious indications. One thing, however, should always be borne in mind, that even in incurable cases, life may be prolonged for a considerable period by judicious management. The disease is most commonly fatal by uræmic poisoning, coma, or convulsions.

In the *treatment* of this, as well as of other forms of Bright's disease, it must be recollected that, as Dr. George Johnson remarks, "it is not precisely a disease *in* the kidney, but a constitutional disease manifesting itself *at* the kidney," which we have to contend with, or, as Dr. W. R. Basham observes, "we must look to the kidneys rather as the organs which more plainly reveal to us the nature and peculiarity of the constitutional disorder, than as the *fons et origo mali*."

In the first place, all causes that may produce or perpetuate the disease, must be absolutely avoided, or, if the patient can not escape from them, he should be fortified against their influences. All bad habits must be corrected. The diet should be plain, in moderate quantity, and of easy digestion, avoiding pies, pastry, spices, rich or greasy dishes, articles that disagree with the stomach, or occasion flatulence, constipation, or other gastro-intestinal disorder. Meats, fish, or poultry may be used once a day if there are no secondary feverish, or inflammatory symptoms to contra-indicate their use; or twice a day, if the patient is weak and illy nourished, and not of too sedentary habits. Indeed, when there is an enormous drain of albumen from the system, highly albuminous food is proper, as, uncooked eggs, oysters, milk, juicy and rare-cooked beef, custards, calf's-foot jelly, etc. On the other hand, fat, butter, saccharine and amylaceous substances are improper articles, and should be dispensed with altogether. All liquors, alcoholic, vinous, or fermented, must positively be prohibited; yet pure wine is sometimes useful, as a tonic, in the early stage; and where the patient has been long ad-

dicted to the excessive use of alcoholic drinks, it may be prudent not to withdraw them suddenly or entirely.

The surface of the body should be kept warm, by wearing flannel next the skin throughout the year; and exposures to cold, damp, and sudden changes of temperature must be avoided. Moderate exercise in pleasant weather should be insisted upon, when there is no contra-indicating secondary disease present, as, walking, horse-back riding, or in an open vehicle,—avoiding fatigue, overexercise, jolting or sudden jerks, straining, etc. "When the disease has not advanced so far as to require rest and careful nursing at home, it will often become the duty of the practitioner to urge upon a patient the necessity for making a great immediate sacrifice by the temporary abandonment of home and his calling, with the hope of ultimately recovering his lost health and strength." Sailing, and especially at sea, is very useful; as well as change of scenery, etc., by travel on land,—but the sudden jerks given by railroad cars on starting, and frequently on stopping, are apt to exert an injurious effect upon the kidneys in all forms of Bright's disease. Long journeys by sea or land, and especially when these lead to sudden changes of temperature, are not advisable, especially in the advanced stage of renal disease. Cheerfulness of mind is a powerful auxiliary to successful treatment.

The skin must be carefully attended to by bathing the whole surface daily, or every other day, with a warm alkaline water, drying with friction to cause a gentle glow; and, every week or two, according to the strength of the patient, a Spirit Vapor Bath may be taken. If the patient can not take a spirit vapor bath, a warm bath may be substituted for it, repeating it every four, six, or eight days. If necessary, diaphoretics or diaphoretic infusions may be used at the time of taking a vapor bath, to aid in the promotion of diaphoresis. The Citrate of Ammonia, in an effervescent form, is recommended by Dr. Johnson, as a mild, pleasant, and efficient diaphoretic. When feverish symptoms or pulmonary congestion is present, a combination of Tinctures of Gelseminum and Aconite will be useful.

If the patient be of a scrofulous habit, or is gouty, or has a syphilitic taint, the proper remedial treatment must be pursued to remove them, or to overcome their influences as much as possible, by the means heretofore named for these maladies. Indeed, one chief object of treatment in all cases should be to purify the blood, and strengthen the nervous system.

Counter-irritants or revulsive means over the region of the kidneys and in the neighborhood of the loins, will be found very use-

ful, but we must be careful not to use agents that may exhaust or debilitate; as, for instance, Croton Oil Liniment, Compound Tar Plaster, setons, etc.; and we must be careful not to employ articles that may irritate or overstimulate the unhealthy kidneys, as, preparations containing Cantharides, Turpentine, etc. Dry cupping, firing, rubefacient liniments, sinapisms, and frictions are the proper means to employ, together with stimulating applications to the feet and legs. A combination, heretofore referred to on page 464, composed of Chloroform, Benzine, and Alcohol, will prove a useful counter-irritant to be applied over the lumbar region. I have, heretofore, employed the Compound Tar Plaster, intermittingly, but have of late years found the other means above named much more beneficial and less debilitating.

As internal remedies, we place our principal reliance upon tonics and alteratives. The preparation composed of Soluble Pyrophosphate of Iron, Blue Flag, Black Cohosh, etc., (*see* page 774), will be found very valuable. In some cases a mixture of Solution of Bromide of Potassium, or of Ammonium (thirty-two grains to a fluidounce), twelve parts, and Solution of Perchloride of Iron one part, will prove useful, in doses of a fluidrachm repeated three or four times a day, Where there is great want of nervous power, an appropriate quantity of a Solution of Citrate of Iron and Strychnia may be substituted for the perchloride of iron solution. It must not be forgotten, however, that iron is contra-indicated whenever signs of cerebral disturbance are present; in such cases I have derived benefit from a pill of Manganese (Oxide or Sulphate) one grain, Aletridin two grains,—mix for a dose, and repeat it two or three times a day,—the same time giving one or two active cathartics to relieve the head symptoms.—The Tincture of Chloride of Iron will frequently be found a very efficacious agent, acting as a tonic, restoring coloring matter to the blood, giving tone to the digestive organs, influencing the capillary vessels to healthy action, and acting as an astringent to check the drain of albumen from the kidneys. It may be given in combination with Tincture of Digitalis, Tincture of Kalmia, Infusion of Lycopus, Infusion of Rudbeckia Laciniata, Infusion of Eupatorium Purpureum, or Infusion of Epigea Repens, etc. Infusion of Asarum Canadense has been found efficacious in albuminous urine; also Infusion of Ampelopsis Quinquefolia.

Dr. Basham speaks highly of the following mixture: Take of Solution of Acetate of Ammonia one fluidrachm, Dilute Acetic Acid twenty minims; mix, and then add Tincture of Chloride of Iron ten minims, Water one fluidounce; mix for a draught, to be

repeated three times a day. As soon as the urine contains an excess of uric acid, the acetic acid and acetate of ammonia solution must be discontinued.—Lactate of Iron, Ammonio-tartrate of Iron, Ammonio-citrate of Iron, Malate of Iron, and Iodide of Iron, have all been found serviceable in this disease; substituting one chalybeate for some others, when these disturb digestion, or occasion headache.

When there is a deficient action of the kidneys, they may be gently urged by mild diuretics, as, an infusion of equal parts of Queen of the Meadow and Peach Leaves; an infusion of Rudbeckia Laciniata; or, an infusion of Parsley Root, etc. But one of the best agents I have met with to promote diuresis is Chloride of Gold and Soda in solution, either with or without the addition of the Hydrochlorate of Ammonia. Great care is necessary, however, never to irritate or overexcite the kidneys. It is generally much better to eliminate excess of fluid, when present, through the skin and bowels, than through the kidneys.

For the purpose of diminishing the amount of albumen passed by the urine, various agents have been advised, as, Iodide of Potassium, Nitric Acid, Tannic Acid, and Gallic Acid, and there is no doubt but that they have sometimes proved efficacious. I have, however, found more benefit from Alum than from any other article; it should only be used when the amount of albumen in the urine is considerable.

Unless dropsy be present, or symptoms of cerebral disorder, purgatives must not be employed. But the bowels must be kept regular, so as to have one alvine evacuation daily; if this does not occur naturally, it may be effected by small doses of Podophyllin and Leptandrin, or, of Oleo-resin of Blue Fag and Leptandrin, or, of Bitartrate of Potassa,—and, in many instances, the White Liquid Physic will be of service.

Among the most frequent and most distressing secondary consequences of disease of the kidneys, are *dropsical effusions*. These are to be combated by hydragogue cathartics, as, Elaterium in conjunction with Jalap and Bitartrate of Potassa, which I prefer to any other combination. In some cases, Tincture of Elaterium may be given in some Elixir of Cinchona and Iron, so as to produce the desired hydragogue effect. The cathartic should be repeated according to circumstances, every one, two, or three days, being careful to omit its use if more than a temporary debility follows its action. In all instances, when not contra-indicated, I administer in conjunction with the hydragogue, the Compound Infusion of Parsley, giving it not only during the presence of the dropsical effusion, but persisting in its use for some time after the effusion has disappeared.

While using these active measures, the patient's strength must be supported by nutritious diet, and mild stimulants. (*See Treatment of Dropsy*, pages 474 to 490.)

However, there may be instances in which hydragogues are contra-indicated, as, when they produce a persistent debility and exhaustion, or, when an exhausting diarrhea is present. In these cases, we must rely entirely on warm baths or the spirit vapor bath, aided by diaphoretics internally, as well as diuretics. Though, it must be recollected that the want of urinary flow is not owing to a torpid condition of the kidneys, but to their structural disorganization, and hence, diuretics must always prove injurious to these organs. And this will be more especially the case in long-standing and advanced states of the disease, in which nearly the greater portion of the renal organs is deprived of the power of exerting its natural excretory function, from structural degeneration. Still, it becomes necessary that diuresis must be produced, to relieve urgent and dangerous symptoms, even at the risk of increasing the renal disease, and we should select the least stimulating diuretics, as, Queen of the Meadow; Trailing Arbutus; Rudbeckia Laciniata; Compound Infusion of Trailing Arbutus, without the liquor; Horse-radish; Spruce-beer, etc. And the diuretic effects of these infusions may be greatly promoted by administering, in addition, the Chloride of Gold and Soda, and applying counter-irritants over the renal region.—If these means fail in evacuating the dropsical effusions, and the tension of the integuments threatens erythema and gangrene, it has been recommended to make a few punctures in the integuments with a needle, or to make incisions into the sub-cutaneous tissue of the legs. Being careful to check any subsequent attack of erysipelatous inflammation by keeping the incised or punctured parts enveloped in hot, moist flannels. Sometimes, when the effusion is in the abdomen, it may be necessary to use the trocar. Not unfrequently it happens, that after the fluid has been discharged by these operations, the kidneys begin to secrete more copiously.

Gastro-intestinal derangements occurring as secondary consequences will be very much lessened by a strict attention to the rules for diet, above referred to. Acidity, persistent nausea and vomiting, and excessive diarrhea, should be treated as already named on pages 741, 747, 757, and 775. In diarrhea, astringents are generally of most efficacy; opiates must not be administered when there are any signs of cerebral disorder. Nausea and vomiting may often be relieved by applications of chloroform over the epigastric region; but if the vomiting be of uremic origin, as known by the watery character of the fluid ejected, and its ammoniacal odor, or, if acid, by

the evolution of ammonia on the addition of caustic potassa to it, it will be very obstinate, and is best combated by allowing ice to melt in the mouth, and administering creosote, or morphia.

Uremic symptoms may be present, as, twitchings and convulsions of the voluntary muscles, headache, drowsiness, dilated or semi-dilated pupils, deadly paleness of countenance, stertorous, but easy breathing, vomiting, diarrhea, dimness of vision, and coma. The attack may consist of one or more convulsive paroxysms, which will be of the epileptic type, and which usually leave the patient deeply comatose. The first attack may prove fatal, or several attacks may occur at various intervals before death takes place. A slight drowsiness occurring in this form of Bright's disease, and persisting for a day or two, is a premonitory symptom that should not be overlooked, but should decide us to immediate and energetic measures. These symptoms must be met by active catharsis and profuse diaphoresis, with cold applications to the head, and hot ones to the inferior extremities; which treatment must be pursued energetically. Cupping on the loins will relieve the kidneys, and be found a very beneficial measure, frequently affording immediate relief. Not more than eight or ten fluidounces should be taken from an adult, and two or three fluidounces from a child three or four years old. It is better to repeat the cupping than to take too large a quantity of blood at once. To counteract the depressing effects of uremic poisoning, Dr. Johnson recommends stimulants, as, ammonia, wine, or brandy.—Frerichs advises chlorine internally, either inhaled in the state of vapor, or, taken dissolved in water; also, sponging the surface with vinegar, giving enemas of vinegar, and administering vegetable acids by mouth. He thinks that these acids, meeting with the poison in the system (carbonate of ammonia), neutralize the free ammonia and reduce it to a state of innocuous combination; this course has not been fully tested.

Any *pulmonary*, *hepatic*, or *cardiac* complications must be met by the treatment heretofore named for them as primary affections, being careful, however, to avoid all active depletive or exhausting measures, and, remembering, that as they are secondary consequences, we must not neglect the primary disease. Cirrhosis of the liver is a frequent complication of renal disease.—*Chronic rheumatism*, as a consequence of renal disease, will disappear upon the removal of the primary affection. The pains may be relieved by warm baths, and anodyne liniments.

2. *Chronic Waxy Degeneration of the Kidneys.* (*Johnson.*) *Lar-*

daceous, or *Amyloid Degeneration of the Kidneys*. Two forms of waxy kidney are now distinguished by pathologists, the acute and chronic. The disease comes on insidiously, and most commonly in patients greatly enfeebled by some previous wasting malady. It usually co-exists with tubercle of the lungs, caries, syphilis, emphysema, cancer, and abscesses, and may be produced by causes similar to those giving rise to the other forms of Bright's disease. The malady is intimately associated with other pathological conditions, as, non-desquamative disease of the kidney, fatty degeneration of the kidney, etc.—Waxy-casts are often observed in acute and chronic desquamative nephritis as the result of the last remains of secretory power, separating materials from the blood but not organizing them into cells; a true chronic waxy degeneration may occur, however, without being preceded by, or associated with, true desquamation.

The *symptoms*, excepting urinary inspection, are not of a positive character. The patient is usually pale and cachectic, or sallow and emaciated. In the greater number of cases dropsy is present, being either general and abundant, or slight and partial. Symptoms of uremia are seldom observed. At first, the urine may or may not be abundant and only slightly albuminous, but as the disease progresses, it becomes scanty, of high specific gravity, and exceedingly albuminous; some rare cases have been observed in which the urine continued entirely free from albumen. The urine is commonly pale, or of a light sherry-wine color, and gives but a scanty deposit. Upon examining the deposit under the microscope, it will be found to consist principally of large tube-casts of a waxy or hyaline appearance, around which may frequently be observed small cells, either separate or aggregated, and somewhat resembling those of pus. Johnson suggests that these small cells may be "abortive epithelial germs." These tube-casts do not give a violet color with iodine and sulphuric acid; but corpora amylacea, when present, do yield this color when acted on by the chemical agents just named. No cysts are to be seen in the deposit, and but few if any renal epithelial-casts.

In the *diagnosis* of waxy kidney, it must be borne in mind that large waxy-casts are observed in almost all forms of kidney disease; in the present affection, we only observe the immense amount of the waxy material itself; the character of the "casts" themselves, not being diagnostic. This takes the place of the epithelial lining of the tubes, the casts themselves having the full diameter of the renal tubes, and being entirely filled with the waxy material, which gradually suspends the secretory functions of the

tubes, impairs their nutrition, and finally destroys the renal functions entirely, unless benefited by appropriate treatment.—In addition to the waxy material passed by urine, enlarged (lardaceous) liver and spleen will be found to co-exist with the renal malady, as well as one of the wasting diseases of which the kidney affection is so frequently a complication, as, tubercular phthisis, caries, long-standing abscesses, constitutional syphilis, etc.

As there are many points of agreement and alliance between this form of kidney degeneration and the two forms next described, the *prognosis* and *treatment* will be considered together.

The *post-mortem appearances* of waxy kidney, are, usually an enlargement of the organ, though occasionally it may be diminished in size; externally it is smooth, or occasionally slightly roughened; the capsule is easily peeled off, and on section, the cortex is bloodless, of a yellowish or pale waxy-white color, smooth, shining, and with a few arborescent vessels on its surface. "The cortical part is slightly striated, the intervals of the striæ having a glistening appearance of a spermacetic brightness rendered more shining and resplendent under water." The bright glancing points which dot the smooth-cut surface of the kidney are the changed Malpighian bodies. The cones are unnaturally red and distinct. In the less severe cases, the microscope will be required in order to clearly make out these changes.

Under the microscope, the Malpighian bodies, being the parts earliest attacked, appear as shining particles with thickened capsules; and the waxy material will be found infiltrated into their vascular tufts. In the advanced stages of the disease, the blood-vessels of the cortex, of the pyramids, etc., will be found to have undergone a similar change. The epithelial cells of the uriniferous tubes are usually withered, often containing fatty particles; the tubes themselves are more or less filled with the waxy material, which may sometimes be pressed out in the form of hyaline-casts. The stroma of the kidney though enlarged is not lardaceous.—In nearly all cases enlargement of the liver and spleen, one or both, of a lardaceous nature, will be found to co-exist.

3. *Chronic Non-Desquamative Disease of the Kidney.* (*Johnson.*) Non-desquamative renal disease occurs in both an acute and a chronic form. The absence of desquamation is the characteristic feature of the disease; in some cases the urine contains neither renal epithelium nor any form of tube-casts; and the *diagnosis* during life must be based partly upon positive, and partly upon

negative evidence. The positive includes a scanty secretion of highly albuminous urine, clear, of natural color or somewhat paler, and giving only a very slight deposit, consisting of pavement epithelium from the bladder, and, occasionally, more or less small waxy-casts; the urine is usually acid, of varying specific gravity, and seldom up to the normal standard. The negative evidence is derived from the absence of renal epithelium, tube-casts, and indeed of any sediment, other than that just referred to, in the urine. According to Johnson, the appearance of the small waxy-casts indicates that the tubes in which they have been moulded still retain their epithelial lining, and are, therefore, considered by him as favorable signs; he also considers the appearance of blood-casts in the urine as of favorable import. The large waxy-casts are formed in tubes wholly deprived, or nearly so, of the epithelial cells lining their internal walls, and are not observed in the present disease.

The *symptoms* are usually serious in consequence of the impoverished state of the blood from the copious drain of its albumen, and of its becoming poisoned by retained excrementitious elements. Dropsy is present, which in the advanced stage of the disease becomes excessive, and intractable to treatment, together with symptoms of congestion and inflammation of the lungs, or of the serous membranes, dyspnœa, great debility, coma, convulsions, etc. Urine, same as named in the preceding paragraph. Benefit may arise from treatment in the early stage of this renal affection, and of the existence of which a microscopical and chemical examination will afford us correct indications; in the advanced stages, a cure is out of the question.

The *post-mortem appearances* are, an increase in the size and weight of the kidneys, which are firmer and much denser than natural. Each kidney may weigh even as high as from six to ten ounces, varying however according to the extent and duration of the disease. In very rare cases, the kidneys are considerably diminished both in size and weight. The cortical substance loses the color due to its vascularity and is found of a wax-like pallor, or yellowish pale, while the medullary cones retain their vascularity, and have a pale-pinkish color, In the advanced stage, the lobular markings become less and less distinct, and finally, only a few small, isolated, vascular patches can be seen over the capsular surface. Occasionally, hemorrhagic spots may be observed scattered over the surface, or in the cortical substance. The capsule is readily detached, leaving a smooth, ungranulated surface, the only inequalities being slight bulgings of the cortical substance, at

points corresponding with the parts where the original lobar divisions were located.

Under the microscope, the convoluted tubes are more opaque than usual, presenting a coarse, opaque granular appearance of their epithelial lining, occasionally of a brownish-yellow color. The epithelial cells appear to contain an unusual amount of solid matter, and the central axis of the tubes is lighter than the margins, presenting a free canal unoccupied with desquamated epithelium, but sometimes filled with the white coagulable material of which the small waxy-casts are formed. Rarely, hemorrhagic spots are noticed in the cortical substance, and some of the tubes may even be filled with blood. The straight tubes of the medullary cones usually present no important structural change.

The Malpighian capillaries pass gradually through a series of changes, from simple congestion without thickening, to a thickening of their walls and opacity, when they resemble firm, whitish, waxy coils,—acetic acid added to them renders these vessels transparent, and shows a single row of blood-corpuscles within them; in some of the Malpighian tufts, however, no blood-vessels will be seen, the circulation having entirely ceased in them, and the capsule and tuft sometimes become shrunk and atrophied, with, perhaps, oil globules deposited within and upon the vessels. The muscular coats of the arteries are often hypertrophied, but less constantly than with chronic desquamative nephritis; this hypertrophy appears to bear a direct proportion to the duration of the disease, and an inverse proportion to the general enlargement of the kidney. A large proportion of the intertubular capillaries are obliterated and atrophied.

4. *Fatty Degeneration of the Kidney.* (*Johnson.*) Fatty degeneration of the renal organs may co-exist with the maladies, heretofore considered, of these organs, or it may exist as a consequence of them, more especially of the non-desquamative form, or, it may be present as an independent lesion.

Two forms of fatty kidney have been met with, in which the general *symptoms* are somewhat similar to those already named in the preceding forms; indeed, I have observed a few cases in which the patients continued in apparent health, until a few weeks before death. The differential diagnosis between these two forms, are as follows:

a. The *smooth, white,* or *mottled,* and *enlarged kidney,* comes on, generally, as a consequence of acute Bright's disease, often sud-

denly, and developing itself rapidly; more commonly, its cause can be determined, as, previous acute disease of the kidney, repeated pregnancies, phthisis, etc. Dropsy is always present before the disease proves fatal; the face is pale and puffy, and the surface of the body smooth, white, and glossy. There is also a much greater tendency to secondary inflammations, and to uremic symptoms, and a less disposition to valvular disease of the heart, and hypertrophy of the left ventricle, than in the other form of the disease. The urine is in less quantity than natural, highly albuminous, and having a specific gravity deviating but little from the standard of health, rarely below 1.015, and from this to 1.030. It is voided of natural color, and deposits a slight cloudy sediment, which contains some epithelial elements, and small waxy-casts, entangling scattered oil globules and oil in cells. From time to time blood will be usually observed in the urine, especially in the earlier stage of the disease. Sometimes no oil will be present. The disease is of shorter duration than the subsequent variety, being less than six months; occasionally, it may be protracted for several years.

The *post-mortem appearances* are an increase in the size and weight of the kidney; in a few cases, especially those in which the patient survives for a sufficiently long period of time, it becomes diminished in size. The surface of the organ is smooth, and the capsule is thin, and easily peeled off. The cortical substance is either uniformly pale, or mottled by red vascular patches, and in some cases hemorrhagic spots will be found scattered over it. The medullary cones retain their normal color and vascularity; the consistence of the kidney is softer than natural, with frequently an œdematous feel and aspect—Under the microscope, the convoluted tubes are found distended and filled with oil globules of a larger size than in the form next described; some of the tubes may be ruptured. When blood has been effused into the convoluted tubes, hemorrhagic spots may be observed. The epithelial cells only are filled with oil, there being none in the intertubular tissue, and rarely any in the Malpighian bodies, or in the tubes of the medullary cones. The epithelial cells are usually disintegrated and atrophied, and can not be seen at all in some of the tubes, which are then occupied by their oily contents. The Malpighian capillaries are opaque and thickened. Much more fatty matter exists in this form of the disease, than in the one next described. This is considered by many as the true Bright's disease.

b. The *granular*, *brownish* or *red*, and *contracted kidney* is rarely met with in its early stage; it usually comes on very gradually and insidiously, often without any definite exciting cause, and frequently makes great progress before the urine affords any indications of the existence of renal disease. It may run a latent course for months and years, and is more usually observed among persons further advanced in years, than those laboring under the preceding form. Its victims are generally very cachectic, with a pale, anemic appearance of the surface, not so white as in the variety just described, and often with sallow and pinched features. Dropsy is generally absent, or if present, amounts to only a puffiness under the eyes, or a slight œdema of the ankles and legs. The œdema of the eyelids should be particularly noted by the practitioner at an early period, it extends to the face, and then to the extremities, being accompanied eventually with an obstinate dryness of the skin, pains in the lumbar region, febrile action, diarrhea, debility, and vomiting. Hypertrophy of the heart is frequent, as well as epistaxis. The urine is copious, three or four pints in twenty-four hours, of low specific gravity, sometimes as low as 1,010 or 1.005, but containing comparatively only a slight amount of albumen, or, in rare instances, it may be temporarily absent. A scantiness or suppression of the urine is indicative of a rapidly fatal termination. The deposit in the urine is very slight, consisting of hyaline and granular-casts, with minute quantity of epithelium, not often fatty; sometimes, there will be no deposit at all. Blood is rarely observed.

The *post-mortem appearances* are, considerable diminution in the size of the kidney, and a reduction of its weight some two or three ounces; roughness of its surface from numerous straw-colored elevations or prominences, termed "granulations." The capsule is opaque, thickened, and usually so adherent to the subjacent surface, that it can not be detached without tearing the glandular structure; sometimes, it may be peeled off, leaving the subjacent surface apparently smooth. In certain places the capsule sinks into the cortical substance, irregularly dividing the kidney, and giving to it a strikingly lobular aspect. The cortical substance is greatly atrophied, forming a thin rim around the bases of the medullary cones, not exceeding a line in thickness; the cones are atrophied to a much smaller extent. The whole kidney is tough and resistent, of a coarse granular texture, and of a red or brownish color. The yellowish-white opaque "granulations" observed in the kidney, vary in number, and are found, on a microscopical and chemical examination, to be composed almost entirely of fatty mat-

ter. It is seldom the case that a granular kidney in its early stage is observed; it is then of its normal size, and presents a thickening of the capsule and slight granulation of the surface of the organ.—Under the microscope, the secreting tissue is found to have undergone extensive degeneration; the Malpighian bodies are dwindled to half their size, and are abnormally packed together. Their vascular tufts are contained in a fibrous and granular envelop, and, sometimes, they are so crowded at the bottom of their capsules as to form an imporous knot. The renal tubes are variously altered and in various degrees, and frequently there are no traces of them. They may be deprived of epithelium and appear like mere tubular filaments, or may contain glassy fibrinous cylinders, or, be loaded with disintegrated epithelium, in both of which oil may frequently be observed, but in much less quantity than in the preceding form of the disease. Some tubes of normal character may also be observed. Minute cysts may likewise be seen in the tubes and in the cones, being often elongated when in the latter.

The varieties of disease just described under the names of waxy degeneration, non-desquamative disease, and fatty degeneration, are so closely connected with each other, that although as isolated conditions they may require a separate description, yet their *prognosis* may be considered under one head. In a certain sense, one form of disease may be considered as a sequence or later stage of another, though each form sometimes exists independent of the other; but their causes are about the same.

In forming our prognosis of these affections we should not rely alone upon the chemical and microscopic characters of the urine, but should carefully consider all the circumstances of the case, as to the patient's constitution, predispositions, manner of living, previous exposures and diseases, causes of the renal disease, etc., as well as his actual mental and physical condition. There are certain circumstances that not only develop the disease with many persons, but, when present, render the prognosis unfavorable, as, a scrofulous tendency, exhausting diseases, profuse and debilitating discharges, want of nutritive diet, unhealthy diet, intemperance, protracted chronic disease, previous renal disorder, syphilitic or other taints of the system, etc. The presence of symptoms of uremic poisoning, of phthisis, caries, enlarged liver or spleen, hypertrophy of the left ventricle, or dropsical effusions, confirm the seriousness of the case.

The presence of small waxy-casts in the urine are more favorable than that of the large casts, as, the former indicate the existence of

epithelial lining upon the walls of the renal tubes, and the latter, an absence or destruction of this epithelium. Small waxy-casts are, however, more favorable in the acute forms than in the chronic; when there is a long-continued deposit of waxy-casts in the latter forms, it tends to the disorganization and atrophy of the tubes. Large waxy-casts indicate embarrassed circulation, impeded renal secretory functions, and degeneration of the renal gland-cells.—Frequently, unless a most careful examination be made, the waxy-casts may, from their sparseness, escape detection.

A scanty urine of low specific gravity, and highly albuminous, is unfavorable, more especially when the albumen is persistent and there is an obstinate dryness of the skin; if, under such circumstances, blood appears in the urine, it is rather favorable, as indicating an early stage of the disease, though this must not be too confidently relied upon, because blood may occasionally be present in the latest stages. The more persistent the presence of albumen in the urine, the more unfavorable is it.—When, with the continued albuminous condition of the urine, numerous oily-casts and cells are also present, the urine being nearly of natural color, and depositing only a slight cloudy sediment, a fatal result will inevitably occur. A temporary presence of albumen, or of a few oily-casts, are, not necessarily unfavorable, as these may often be observed during convalescence.

An absence, or a gradual disappearance of the above-named general and local signs, may be considered favorable; though, generally, the prospects of a patient laboring under a chronic Bright's disease are exceedingly gloomy. In some instances, especially in the granular contracted kidney, by a proper course of treatment, hygienical and therapeutical, life has been prolonged for a number of years; in others, death occurs in a very short time after the first recognition of the symptoms. Pneumonia, pericarditis, ischuria, or uncontrollable vomiting and diarrhea are indications of speedy death.

The *treatment* required for these several forms of Bright's disease, both hygienical and therapeutical, as well as for their secondary consequences, differs in no respect from that named for Chronic Desquamative Disease, on page 873.

SUPPURATION IN THE KIDNEY.

There are several affections of the kidneys, in which pus may be found in the urine; but the mere fact of its presence in this fluid, does not determine its source nor the nature of the particular renal

malady giving rise to it,—this must be had principally from the other symptoms.

Pus may, however, be detected in the urine when the kidneys are healthy, and, consequently, it is always highly necessary to ascertain its source, in order to be positive that the renal organs are not implicated. If it be derived from the *urethra*, (gonorrhea), a drop or two may be squeezed from the meatus urinarius, beside which, the history of the case, and a careful exploration of the canal will solve the matter; when the urethra is the source, the pus is usually in small amount, and does not affect the general properties of the urine.

If it be derived from the *vagina*, (leucorrhea), the history of the case, an examination of this canal, the additional presence in the urine of vaginal or pavement epithelium, and the discharge occurring as well when no urine is passed, as when it is, will determine this source.

If it be derived from the *bladder*, (cystitis, stone, enlarged prostate, stricture), it is of more serious import, and may be known by the history of the case, the frequent calls to urinate, the alkaline and ammoniacal state of the urine, and the rapid formation of the pus into a viscid mass. In less severe cases urination may be less frequent, and the urine remain acid.

If it be derived from an *abscess* that has discharged into the urinary passages, (perineal, perivesical, perirenal), it is more difficult to determine, and we have to rely more on the history of the case and the peculiar symptoms present. Generally, the rupture of the abscess is followed by a large quantity of pus in the urine.—Its derivation from the *kidney*, will be presently considered under the description of the several affections of this organ in which the presence of pus in the urine forms a symptom.

When pus exists in urine, it renders this fluid milky and opaque when passed, and subsequently forms a yellowish-white deposit. If the urine be acid, the pus globules are discrete and the deposit loose; if it be alkaline, the pus forms a viscid glairy mass, which may be drawn out into long tough strings. Liquor potassa or liquor ammonia always gives this latter character to pus.—Under the microscope, pus-globules are observed to be spherical and about a third larger than a red blood globule, yellowish, opaque, and granular; a drop of acetic acid added to the drop of urine under examination causes the granules to disappear, the pus-globule becomes more transparent, and exhibits a nucleus with two, three, or four nucleoli. An excess of the acid causes the cell wall and its contents, with the exception of the nuclei, to disappear altogether. As pus contains albumen,

more or less of this latter substance will be found in purulent urine, but always in proportion to the amount of pus present. If there exists a much larger amount of albumen than can be accounted for by the quantity of pus present, the detection of renal tube-casts in the freshly-voided urine will aid in solving any doubts.—The renal lesions giving rise to purulent urine, are the following:

1. *Suppuration from Morbid Conditions of the Blood*, etc. According to Johnson, certain depraved conditions of the blood may gradually modify the renal secreting or epithelial cells, by the passage through them of materials different from those which they naturally secrete, so that ultimately these cells become converted into pus. The *symptoms*, in nearly every respect, are the same as those of Bright's disease, with the addition of purulent tube-casts in the urine; and, in the later stages, a quantity of free and scattered pus-corpuscles. Johnson describes three cases of this kind, one associated with boils and carbuncles; another with erysipelas of the face, legs, and scrotum; and the third with gout and intemperance. I am much inclined to doubt whether the conditions stated by Dr. Johnson can be considered true cases of what he terms "suppurative nephritis," inasmuch as the *post-mortem examination* revealed the presence of Bright's disease of the kidney, and the *treatment* pursued was similar to that advised for this last-named disease. Besides which it must be recollected that the renal epithelial cells sometimes greatly resemble pus-corpuscles, with nuclei and nucleoli, especially when these cells are generated with rapidity.—While, again, it is by no means uncommon for the bladder, in nearly every form of renal disease, from irritation arising from contact with unhealthy urine, to shed more or less of its epithelium together with a number of scattered or irregular clusters of pus-corpuscles, which are *never moulded in tubes*, like the renal purulent-casts.—And even when the kidneys are healthy, pus-corpuscles may be observed in the urine, in connection with phosphatic deposits, being derived from the bladder irritated by an alkaline urine.

However, should Dr. Johnson's view of the matter prove to be correct, it may be proper to state that, when a highly albuminous urine, with tube-casts and pus-corpuscles, is present, indicating the co-existence of Bright's disease and renal abscess, (a very rare complication), and a further evidence of the depraved condition of the blood is manifested by the presence of boils, carbuncles, etc., on parts of the external surface of the body, but little hope can be entertained of recovery, and the *prognosis* must necessarily be unfavorable; more especially when we find an increased manifestation of pus-corpuscles, and a disappearance of the renal epithelium.

Tonics, stimulants and alteratives are required only after all inflammatory symptoms have been subdued.

2. *Suppuration from Mechanical Injury or External Violence*, etc. Severe blows or fall on the loins may occasionally give rise to phlegmonous inflammation of the kidney of the injured side, followed by an abscess. The *symptoms* are, more or less severe pain in the affected kidney, febrile reaction, hematuria recurring at shorter or longer intervals, followed by the pain becoming duller, and successive attacks (sometimes regular) of rigors. If the accumulation of pus be quite considerable, a fluctuating tumor may be detected in the region of the affected kidney. As no purulent tube-casts will be observed in the urine, except, perhaps, at the very commencement of the suppurative process, the *diagnosis* must be based upon the character and location of the symptoms, and the previous history of the case. In standing cases, hectic symptoms are apt to be present. Instead of bursting into the infundibula, the abscess may open into the intestines, and the pus be discharged with the stools.

These cases are attended with considerable risk, but the *prognosis* will be principally based upon the severity of the injury and of the subsequent symptoms, together with the condition of the patient's health, constitution, and resisting power. If the suppurative process can be prevented, a careful watchfulness for a long time, and a close adherence to hygienic measures continued for several years, will remove any further tendency to disease, and the patient be thus relieved from any further apprehension of danger.—When a renal abscess opens into the pelvis of the organ, the pus passing through the ureters, it is more favorable than when it discharges through other parts. If the patient is not carried off by the severity of the first symptoms, nor by the exhaustion consequent upon a suppurative drain, the cavity of the abscess contracts, being partially filled with adipose tissue, or other matters, and the kidney becomes inactive; while the other kidney increases in size, and, in a great degree, assumes a functional activity compensating for the want of action in the contracted and inactive organ.

The *treatment* consists, at first, in preventing the occurrence of suppurative inflammation; the patient should keep quiet in bed for several days,—his diet should be low, avoiding even the mildest stimulants; cups or leeches, followed by Stramonium fomentations should be applied to the loins over the painful part; the bowels should be kept open by laxative enema, or doses of Castor Oil;

and inflammatory action be kept down as much as possible by Tinctures of Gelseminum, Aconite, Veratrum, etc.

If, notwithstanding the continued and energetic employment of these means, suppuration occurs, we must then change our treatment, encouraging the pus to the surface by means of warm cataplasms; and if the abscess points externally, it should be discharged by an artificial opening made at the proper period, in order to prevent it from forming communications with the peritoneum or thorax. At the same time, during the whole of the suppurative period the strength of the patient must be sustained by a non-stimulating nutritious diet, tonics, iron, mineral acids, alteratives, etc., to suit the particular exigencies of the case.

Should we succeed in checking or preventing suppurative inflammation, the patient must be informed that all danger is not yet over, as the kidney will suffer for months or years from the injury, and, by imprudence on his part, ultimately suffer from suppuration. He should use all the necessary hygienic measures to protect himself from sudden changes of temperature, dampness, overexertion, fatigue, etc.; should avoid rich and stimulating articles of food or drink; and whenever any unpleasant sensations are felt in the renal region, he should apply counter-irritants over the affected parts, as, sinapisms, Compound Tar Plaster, Croton Oil Liniment, etc.

b. The lodgment of a *calculus* in the substance of the kidney may also give rise to inflammation terminating in an abscess; so also may suppuration of the lower urinary passages, the inflammatory action extending by sympathetic action, or by continuity of tissue to the kidney.

Uric acid, and oxalate of lime calculi, are among those more frequently met with in the kidneys, the continued presence of which may disorganize the greater part of the glandular tissue, and convert the kidney into a suppurating cavity, which may discharge either through an orifice in the loins, into the intestines, into the abdominal cavity, into the thorax, or through the ureter into the bladder. The early *symptoms* are those common to renal calculi; in the suppurative stage, the urine will present pus-corpuscles, as in the preceding variety, and similar symptoms will be present.

The *prognosis*, as well as the *treatment*, are also similar during the suppurative stage. And after recovery the kidney becomes converted into a membranous cyst inclosing the offending concre-

tion. In the early stages, before suppuration occurs, the treatment will be that usually employed for Renal Calculus.

c. When the abscess is due to *disease of the lower urinary passages*, it is frequently of difficult diagnosis, requiring the most careful investigation; and not unfrequently its presence may not be suspected until a post-mortem examination reveals its existence. A *retention of urine* is frequently due to stricture of the urethra, and sometimes to enlargement of the prostate gland, in which the walls of the bladder and ureters become thickened, and that part of the urethra behind the obstruction, as well as the ureters, pelvis, infundibula, and calyces of the kidney, become dilated, in proportion to the duration and degree of the impediment, and pus is often secreted, to a greater or less extent, from the inflamed mucous membranes of these several parts. And the kidneys may eventually become involved, as already explained.

d. Embolism of the arteries of the kidney occasionally gives rise to renal suppuration. The plugs or emboli that lodge in these blood-vessels are yellow fibrinous formations, that are carried away by the current of the arterial circulation from their original seats in the aortic and mitral valves, and become lodged in the renal vessels, or in those of other organs. These fibrinous vegetations frequently exist in rheumatic endocarditis, being loosely located in the valves; and sometimes they are encountered in atheromatous erosions of the valves and aorta. Occasionally, part of the fibrous lining of an aneurism may be detached, and swept away by the circulation, to be lodged in the cerebral, renal, or other arteries.

It is only when a large artery is entirely obstructed by these emboli, and which do not become removed, that suppuration and serious results are to be apprehended; this is by no means easy of diagnosis, though it may be suspected in those cases, where a more serious primary disorder exists, (of the heart), and when there occurs a sudden hyperemia of the kidney, accompanied with an intense pain in the loin, shooting down the course of the ureter. Usually, however, the effects of renal embolism pass off without being noticed by the patient.

e. Pyemia in other parts of the body, as from chronic suppurations, carbuncles, gangrenous maladies, or after surgical opera-

tions, etc., sometimes produces secondary or metastatic abscesses in the kidneys, as well as in the lungs, liver, and other organs. There are no positive symptoms whereby we can determine the existence of these multiple abscesses during life, though we may suspect their presence, when, with unmistakable pyemia, the urine contains considerable albumen, with, perhaps, a little pus, but no tube-casts, and pressure upon the region of the kidneys occasions more or less pain. The *prognosis* and *treatment* in emboli, and in secondary abscess, is based entirely upon the much more serious primary lesion.

3. *Pyelitis*, or Inflammation of the Mucous Membrane of the Renal Pelvis and Calyces, may exist either in the acute or in the chronic form, and may attack only one kidney or both.

The *causes* of pyelitis are various, and the inflammation is intimately associated with its cause; in some instances, the inflammation itself is the most important feature of the attack, while in others, it is of much less importance than the more serious primary disease. The following conditions may give rise to pyelitis:

a. In both the acute and chronic forms of Bright's disease, and in diabetes, pyelitis, in a greater or less degree, is often present.

b. It may arise from exposures to cold, sudden changes of temperature, or dampness.

c. From an improper use of stimulating diuretics, as, cantharides, turpentine, etc.

d. From mechanical irritation resulting from the presence of a foreign body in the renal pelvis, or infundibula, as, calculi, clots of blood, tuberculous deposits, hydatids, or other parasites.

e. The worst forms of pyelitis arise from an inflammation of the bladder extending upward into the kidney,—the cystitis being produced either by a urethral stricture, a prostatic enlargement, a urinary calculus, a fungous, a tuberculous disease of the bladder, or a sudden suppression of the discharge in catarrh of the bladder or in gonorrhea, by an improper employment of astringent injections,

f. A sudden stagnation of the urine in the renal pelvis and infundibula, from an obstruction in the ureter, together with a decomposition of the urea into carbonate of ammonia. If no decomposition of the urine occurs, there is generally only dilatation, (hydronephrosis.)

g. Pyelitis is sometimes complicated with certain general diseases, as, eruptive fevers, scorbutus, diphtheria, pyemia, carbuncle, cholera, etc.

h. Cases may be occasionally met with in which there is no known cause for the pyelitis.

The *symptoms* of pyelitis are always associated with those of its exciting cause, and which are referred to under their appropriate headings. The more immediate symptoms of the inflammation itself, are, an aching pain over one or both kidneys, which is aggravated on pressure; a sense of weakness in the back; and, not unfrequently, attacks of nephritic colic. But these symptoms bear no proportion to the actual amount of structural lesion in the kidneys, and it is by no means rare for alarming symptoms of uremic poisoning, quickly followed by fatal typhoid collapse, to be the first indication of serious renal disease. The calls to urinate are often more frequent than natural, and, during an attack of nephritic colic, they are constant and painful. The bowels may be obstinately constipated, from compression of the colon by the tumor, or, there may be an intractable diarrhea resulting from inflammatory adhesions between the dilated kidney and the colon. Rigors are usually present when there is tumor, coming on regularly every evening; and, in the latter stages, hectic symptoms will be present.

The urine, however, affords the most reliable indications. In the first stage of pyelitis, this fluid is usually acid, and contains more or less blood, sometimes in very minute quantity, together with mucus, and the irregular, fusiform, caudate, trigonal, elongated, and rudely circular epithelial cells from the renal pelvis and infundibula, and but a small amount of albumen in proportion to the mixed blood and pus present.—As the disease advances, these epithelial cells disappear, and in their place is more or less pus; and eventually the urine loses its acidity, and becomes ammoniacal from decomposition of the urine and the pus. Tube-casts or purulent-casts are not found in the urine, or, at least their presence is extremely rare, and which is due to the fact that the destruction of the tubes commences in the anterior parts and advances backward into those more deeply situated.

The presence of pus in the urine is constant and regular, when the uriniferous canals are free; but, as often happens, should a calculus, a clot of blood, or other foreign body or debris, obstruct the ureter, the purulent flow will be temporarily arrested, and then, should but one kidney be affected, the urine will again assume and retain its transparent and normal characters, until the obstruction is removed, and the pus re-appears. "A decidedly low specific gravity of the urine, with a scanty secretion, would be suspicious symptoms; and especially so when they are associated with any

indications of uremic poisoning, such as, drowsiness, headache, vomiting, and a brown, dry tongue, with an excess of urea in the blood." (*Johnson.*)

At an advanced period of pyelitis, a tumor may be observed in the loin, or in the space between the crest of the ilium and the false ribs. It may be so large as to extend across the median line, but more generally it only occasions a fullness in the part. It is usually painful and tender on pressure, dull on percussion, except where it is crossed by the colon, and is the seat of fluctuation, frequently obscure.

The *diagnosis* of pyelitis without tumor, or in its first stage, is made out by the presence of the epithelial cells of the renal pelvis and calyces, in the urine, with more or less blood or pus, and the pain in the loin being aggravated by pressure. In the advanced stages, the diagnosis may be greatly assisted, by observing the presence of a large amount of pus in the urine, say two or four ounces per twenty-four hours, the urine being slightly ammoniacal, the loins painful on pressure, the apparent disproportion existing between the debility and other symptoms, and the urethral or vesical lesion, and the previous existence for several years of urethral stricture, vesical disease, etc., or of attacks of nephritic colic.

In pyelitis with tumor (pyonephrosis), there is an enlargement of a fluctuating character in the flank of the affected side; a large amount of pus is discharged with the urine, which may vary in quantity from time to time,—the tumor or fullness increases and becomes more or less painful as the pus diminishes in the urine, and this fluid becomes more transparent accordingly; and when the purulent discharge becomes large, or is re-established after a temporary arrest, the tumor becomes rapidly lessened in size, with less pain and a more purulent condition of the urine. When both kidneys are affected, a temporary or permanent obstruction of one ureter may lessen, but will not entirely remove, the amount of pus in the urine.—Ultimately the sac may burst, and discharge its contents, the symptoms varying according to the direction this may take; or, more frequently, there will be no rupture, the patient dying from the exhaustion consequent upon the purulent drain on the system. Again, the discharge may gradually diminish, until it ceases entirely, the sac contracting and drying up, and the patient recovers, the urinary function being performed by the opposite healthy kidney.

The *prognosis* is much more favorable when the pyelitis is confined to one kidney, as recovery, with or without destruction of

this kidney, may occur; when both kidneys are diseased (double pyelitis), with purulent discharge, the chances of recovery are doubtful.—Much, however, will depend upon the character of the original exciting cause of the disease. If it be the result of urethral stricture of long standing, enlarged prostate, obstinate disease of the bladder, or cancerous or tuberculous disease of the kidney, the case is hopeless. The removal of retention of urine by a cure of urethral stricture, may at an early period, be followed by favorable results; and, in cases, depending upon renal calculus, or hydatids, or which follow pregnancy, recoveries sometimes occur.

When the pyelitis is secondary to other diseases, as, zymotic fevers, diabetes, Bright's disease, etc., the prognosis must be based upon the character of the primary disease; in acute disease, it usually disappears with the recovery from the primary affection; in Bright's disease, etc., the pyelitis is a secondary consideration, being overshadowed by the gravity of the primary malady.

If the pus be discharged externally, the patient may die from exhaustion, though recoveries often occur, even in the most unpromising cases; but if the sac ruptures into the thoracic or peritoneal cavities, or into the intestine, a fatal result will take place more or less speedily. If symptoms of uremic poisoning manifest themselves, the prognosis is decidedly unfavorable.

The *post-mortem appearances* in *acute* pyelitis are, a vivid red injection of the mucous membrane; and sometimes, minute dots of ecchymosis may be observed on its surface, or, effused blood. The mucous membrane may be thickened, friable, and softened; its epithelium more or less freely shed, and, at a later period, pus is formed. Occasionally, ulceration may be present, or, the mucous surface may be lined with false membranes, that may become detached during life and block up the ureters.

In *chronic* pyelitis the mucous lining membrane is thickened and presents a dead-white, gray, or slate color; it may not be at all injected, or else be traversed by dilated veins. There is dilatation of the pelvis and infundibula, which, as it proceeds, encroaches more and more on the substance of the gland, flattening or obliterating the papillæ, then the pyramids, and at last the cortex, and the kidney is wholly sacculated, and transformed into a multilocular pouch filled with pus. Sometimes, the surface of the pelvis is covered, more or less, with small vesicles resembling sudamina. Ulceration of the mucous membrane may be present, especially when renal calculus is the exciting cause of the disease, and even perforation, with purulent discharge into the surrounding tissues or cavities.—In the interior of the pelvis, according to the cause

of the inflammation and the character of the urine, may be found calculi, calcareous crusts, blood, tubercle, cancerous material, pus, uric acid, urates, phosphates, and other foreign substances. Sometimes, the kidney will be found reduced to a mere shrivelled pouch.

When the ureter has been blocked up by thickened pus, a calculus, a clot of blood, etc., preventing the free discharge of urine and pus, these fluids accumulate behind the obstacle, and dilate the organ forming an abscess-like cavity (pyonephrosis) which frequently may be felt as a tumor in the loin. And the matter thus inclosed may eventually discharge itself through the loin, under Poupart's ligament, into the peritoneum, duodenum, thoracic cavity, etc.—Most generally, chronic inflammation of the bladder will be present, with dilated, thickened, suppurating ureters. And, sometimes, the renal substance itself will become involved forming a chronic Bright's disease, with the usual changes in the urine, dropsy, etc.

The *treatment* consists, firstly, in removing the primary lesion or the exciting cause of the pyelitis, as, urethral stricture, diabetes, scorbutus, etc., by the appropriate means for such maladies—several of which are treated upon in this work; and, secondly, to diminish or arrest the discharge of pus, and give support to the patient.

In acute pyelitis, with pain in the loins, painful and bloody urination, febrile symptoms, etc., cupping should be practiced over the painful parts, followed by warm baths, and hot Stramonium and Lobelia poultices over the renal region. Internally, Tincture of Gelseminum, of Veratrum, or of Aconite should be administered, with the free use of warm diluents; and if much pain and suffering remain, opiates or other anodynes may be required. Should the loss of blood by the urine become threatening, astringents and styptics internally will be demanded.

In chronic pyelitis, to lessen the purulent discharge, astringents will be required, as Tannin, Geraniin, Marsh Rosemary, Oil of Erigeron, Alum Root, Alum, and mineral acids. In some cases, the Tincture of Chloride of Iron has proved decidedly beneficial. In the advanced chronic stage, when stimulants to the affected mucous membrane are required, balsamic and terebinthine substances, as, Queen of the Meadow, Oil of Golden Rod, Oil of Juniper Berries, etc. will be found useful.

To sustain the strength of the system in the chronic stage, and also aid in lessening the discharge of pus, Elixir of Cinchona and Iron; the preparation on page 774, containing the soluble Pyrophosphate of Iron; Sulphate of Quinia; or, a Solution of Bro-

mide of Potassium (thirty-two grains to the fluidounce), one fluidrachm, Solution of Perchloride of Iron five minims; mix for a dose, to be repeated three times daily, etc.,—may be administered, in conjunction with nourishing diet, pure air, and, if possible, sea-bathing.

We should be very careful not to attempt artificial evacuation of the sac through the integuments, unless there be decided indications of pointing, or, when the sac becomes so greatly distended that its internal rupture might lead to a speedy fatal result. The opening should then be made in the lumbar region, where the sac is most prominent, and where there is the least danger of wounding the peritoneum.

As the several renal, urethral, and other affections that may occasion suppuration have been referred to in the preceeding remarks, the more important ones will now be taken up and considered separately, along with other maladies of the kidneys, bladder, urethra, etc.

HYDRONEPHROSIS.

This malady consists in an atrophy or complete absorption of the substance of the kidney, so that the organ forms a cavity or sac, of which the fibrous capsule of the kidney forms the envelope or walls. This condition may exist with or without the presence of pus from the lining membrane; when pus is present, it is termed pyonephrosis. Hydronephrosis has been described by authors under the names of "hydro-renal distension," and "dropsy of the kidney." It may occur in either sex, at any period of life, and even during intra-uterine existence; and it may affect either one or both kidneys.

The *cause* of hydronephrosis is an obstruction to the passage of the urine from the kidney to the bladder, in consequence of which this fluid accumulates behind the obstacle, gradually dilating the parts in which it is retained, and causing absorption of tissue by its compression. The obstacle may be due to a congenital malformation of the urethra, the ureter, the kidneys, or the renal artery, or, it may arise from the presence of a calculus, or other foreign body, in the ureter or other parts, occurring during life. It may also be produced, but generally in a minor degree, by compression of the ureters during pregnancy, by an ovarian enlargement, or by a cancerous or other pelvic growth. Congenital hydronephrosis is apt to be accompanied with malformations in other parts.

The *symptoms* of hydronephrosis vary according to its cause and the size of the sac or tumor. If but one kidney be affected, and

the cavity be small, there may be no symptoms whatever to indicate the lesion, or to shorten the duration of life. The healthy kidney enlarges, and compensates, by an increase of its secretory function, for the absence of this function in the opposite one.

When the hydronephrotic tumor becomes very large, it will be found located in the flank, from which point, according to its size, it may extend posteriorly to the lumbar vertebræ, superiorly into the hypochondrium, inferiorly into the iliac region, and anteriorly to the umbilicus; and as it encroaches upon these several regions, the small intestines, are forced to one side, and the tumor may be mistaken for some other malady, especially when its anterior projection is large and well marked. The colon generally remains in front of the enlargement. The tumor has a soft, undulating, and sometimes lobulated, feel, with more or less marked fluctuation, and is occasionally tender on pressure, but more generally there is no pain, the only annoyance being its size. And, should there at any time, from a dislodgement of the obstruction, be a sudden and copious flow of urine, the tumor will diminish in size or disappear altogether.

The bowels are usually irregular, being more commonly disposed to constipation. The urine is generally normal, occasionally containing a small quantity of pus. Should the obstacle be an impacted calculus, there will be symptoms of nephritic colic, with vomiting, retraction of the testicle, painful micturition, and the urine may contain blood. When both kidneys are affected, uremic symptoms may present themselves.

If the obstruction becomes dislodged, so that the fluid may be discharged, and the kidney has not become wholly obliterated, it may regain its functions, at least in part, provided there be no subsequent impediment with re-accumulation of fluid. If, however, the renal secreting tissue has, from long-continued pressure, been wholly or nearly absorbed, it will collapse into an empty pouch, after the fluid has been discharged. In these cases, the patient may live to old age, more especially if the healthy kidney remains free from any disease that will interfere with its function, or, death may result at any period from other diseases. Death from spontaneous rupture of the sac is rare; yet it may happen when the tumor is large, from pressure upon the thoracic organs, from exhausting suppuration or peritonitis following tapping, from compression of the digestive organs, from dysenteric diarrhea, and, in double hydronephrosis, from suppression of urine with uremic symptoms.

The *diagnosis* depends upon the detection of a fluctuating swelling in the renal region, without any symptoms of suppuration, and the diminution or disappearance of the swelling when an abundant

flow of urine occurs suddenly; in the absence of these symptoms the diagnosis is difficult. Hydronephrosis may be determined from an *ovarian cyst*, by the colon remaining in front of the tumor, and by percussion over the affected lumbar region yielding no intestinal resonance.

From *ascites* which yields a dullness on percussion, in *both* flanks; but when the hydronephrosis is double, dullness is also observed in both flanks,—yet by changing the patient's position, the fluid in ascites will be found to have changed its level; while in hydronephrosis the dullness is stationary no matter what posture may be assumed by the patient.

A *hydatid cyst* is rarely double, and its discrimination from hydronephrosis is difficult, if not impossible, unless some of the hydatid vesicles be found in the urine. The commemorative symptoms may afford some aid.

Circumscribed renal abscess has a more acute course, with pain and symptoms of suppuration. The same may be said of *perinephritic abscess.*

Pyonephrosis affects the system more severely, pus in quantity occurs at some time in the urine, with recurring attacks of rigors.

The *prognosis* is more favorable when but one kidney suffers, than when both are affected; though, a double hydronephrosis does not necessarily imply a speedy death, as, a patient may exist for years before the atrophy of the renal tissue becomes so great, or the uremic symptoms from suppression so severe, as to prove fatal.

The *post-mortem appearances* are, a more or less complete obliteration of the renal secreting tissue, with more or less distension of the kidney, the pelvis, and the ureter. The renal sac may be composed of one single cavity, or it may be divided into two or more chambers, separated from each other by strong membranous septa. When the renal tissue has not become wholly absorbed, the effects of the urinary compression may be noticed in the flattened and more or less atrophied condition of the papillæ, the pyramidal bodies, and the gradually diminished cortical tissue. If one kidney only is obliterated, the other will, if healthy, be found more or less enlarged.

The fluid contained in the hydronephrotic cysts is generally urine, more watery than natural, more or less albuminous, and variously colored by blood, pus, and epithelium; urea, uric acid, and other urinary deposits may also be present. In rare cases, the cysts have contained a gelatinous substance resembling colloid matter. In one case thirty gallons of fluid were removed from the cyst; and in another, sixty pounds,—but these cases of enormous distension are not common.

The *treatment* consists in endeavoring to remove the obstruction, or, if this can not be done, to favor the flow of urine past the impediment. For this purpose, the renal tumor should be carefully shampooed and manipulated in every direction, applying some oil or ointment to the surface to prevent irritation or abrasion; and repeating these operations every day or two, and continuing it until the swelling subsides immediately after the sudden evacuation of a large amount of urine. If but one kidney be affected, and, from the presence of nephritic colic, etc., we believe the obstacle to be an impacted calculus, means should be employed to prevent a similar attack on the opposite side, by measures adapted to overcome the peculiar calculous character of the urine. Much animal diet should be avoided in these latter cases, and the urine should be kept well diluted by the free and systematic use of fluids, especially decoctions or infusions of agents that will exert a sanative influence upon the condition of the urine. (*See Gravel.*)

In the case of failure by these means, we are not justified in any more severe measures, until the size of the tumor becomes so enormous, as to threaten danger from its compression upon vital parts, or by obstructing circulation, etc., when we may discharge more or less of the fluid by tapping, bearing in mind, however, the serious consequences that may follow this operation, heretofore referred to. The point preferred for the introduction of the trocar, is in front, near the anterior extremities of the two last (floating) ribs, directing its point somewhat forward,—thus avoiding any danger of wounding the kidney, the peritoneum, or, the intestines. An exploring trocar should first be passed, to ascertain whether any fluid be present. If no untoward symptoms follow the operation, life may thus be prolonged for some time.

TUBERCULAR OR SCROFULOUS DISEASE OF THE KIDNEY.

Tubercular deposits in the kidney are occasionally met with, more especially among tuberculous children, and, heretofore, according to statistics by Rilliet and Barthez, in the proportion of about one in seven, or, about one in twenty-one among tuberculous adults. In the Pathological Institution of Prague, it was found to occur in the proportion of about one in nineteen, including children and adults. Rayer believes the disease to be more common during middle life, than in childhood or old age. The affection may be *primary*, and located principally in the kidney and its appendages; or, as is more frequently the case, it may be *secondary*, or associated with and dependent upon a general tuberculous disposition. The

disease is almost invariably met with in persons disposed to scrofula or tubercle, but its direct exciting *cause* is not satisfactorily known, though cold, and renal inflammation have been named as among these causes. Both kidneys are more apt to be implicated; and one case has been recorded in which the tumor formed by the disease, occupied the whole side of the abdomen,—but this can only happen when there is an obstruction in one or both ureters. The disease may terminate fatally in a few months, or, not until two or three years have passed.

It is very difficult, if not impossible, to positively detect renal tuberculous disease during life, and more especially when it is present in the secondary form; in most cases, the *symptoms* observed are those of chronic pyelitis, and which are often complicated with those of chronic cystitis. More commonly, when symptoms are observed, dull pain or tenderness in the lumbar region of one or both sides is complained of, the urine being turbid and often containing some blood; as the disease progresses, emaciation and hectic symptoms manifest themselves, the same as when other organs suffer from tubercle. If the disease be associated with a general tuberculous disposition, evidences of this tendency, will sooner or later be observed, by symptoms of tubercle in the lungs, intestines, or other organs. If the bladder becomes involved in the affection, there will be pain and tenderness in the region of this organ, with frequent and painful micturition, and other symptoms of chronic cystitis. When, from any cause, as for instance, an obstructed ureter, the urine accumulates in the pelvis and calyces, the kidney becomes dilated, forming a more or less painful multilocular sac or tumor, which may frequently be detected by palpation and percussion of the abdomen, and of the flank; as soon as the obstacle in the ureter becomes removed, the urine suddenly flows freely, the tumor diminishes, and is less painful. The tuberculous matter may be discharged through the ureter into the bladder, or, it may likewise form a communication with the rectum, vagina, peritoneal sac, or with the external surface in the lumbar region.

The primary form of the disease can only be suspected, after the tuberculous deposits have softened, when an abundance of pus-corpuscles will be found in the urine, mixed with a quantity of amorphous granular organic matter insoluble in acetic acid, broken masses of softened tubercle, shreds of connective tissue and meshes of elastic fibres, and sometimes blood. If the bladder be involved, shreds of mucous membrane will also be observed, with epithelium from the bladder, ureter, pelvis, etc. The albuminous condition

of the urine, which fluid is more commonly of a feebly acid reaction, is proportioned to the amount of pus present. Tube-casts are rarely found in the urine. In severe cases, the urine is scanty, of a brown or smoky color, and its sediment reddish-brown. The above symptoms, conjoined with a distinctly marked tuberculous diathesis afford pretty conclusive evidence of secondary renal tuberculous degeneration; but, if this diathesis be absent, we can only suspect the existence of the primary form of the disease.

The *prognosis* is unfavorable,—and much more so, when the already serious renal malady is associated with tuberculous disease in other organs. When but one kidney is affected, and especially in the primary form of the disease, the renal appendages not being involved, recovery may possibly occur. If both kidneys are involved, death may ensue from uremic poisoning, but at all events, recovery can not take place. Generally, in the primary form, the exhaustion consequent upon the abundant suppuration is the immediate cause of death.

The *pathological appearances* are, tubercles in some portion of the kidney, or throughout its entire tissues, varying from a very minute size to that of a cherry, or, they may coalesce, and form large crude tubercular masses, composed of amorphous, finely granular matter. Fragments of uriniferous tubes may also be observed in the midst of this matter, and the neighboring tubes will present more or less unhealthy appearances under the microscope. Subsequently these firm tubercles soften, and form larger or smaller abscesses in various parts of the organ, which may sometimes coalesce and form one large cavity. The granular-tuberculous softened material rarely contains any well-defined pus-corpuscles. Not only may a less or greater part of the kidney be destroyed by the disease, but the pelvis, infundibula, ureter, bladder, prostate, and other parts may also be found more or less involved in the general renal degeneration. The kidney retains its normal size, or may even be contracted, unless there be an impediment to the free passage of the urine, pus, and tubercular debris.

The *treatment* is the same as that ordinarily pursued for tubercle in other organs. (*See Scrofula, Tubercular Meningitis, White Swelling, Consumption*, etc.) Every means should be pursued to strengthen and nourish the system by nutritive diet, a moderate allowance of stimulants, and a general attention to hygienic measures. Of course, we must be governed by the influence that all these means exert upon the patient, avoiding whatever appears to be useless, injurious, or debilitating. Tincture of Chloride of Iron in doses of fifteen or twenty drops, three times a day, will often

lessen the abundant secretion of pus. Severe pain in the renal region may be mitigated by warm anodyne fomentations over the renal region, warm bath, and opiates; and other urgent symptoms must be promptly met with appropriate treatment.

CANCER OF THE KIDNEY.

Cancer of the Kidney is likewise a disease not frequently encountered. It may be *primary*, confined to the kidney; or, as more frequently observed, it may be *secondary*, or associated with cancer in other parts. The most usual variety of cancer met with in the kidney, is the encephaloid (fungus hæmatodes); scirrhus is very rarely observed, as well as colloid and epithelioma. The disease, the same as with most other forms of renal degeneration, generally begins in the cortical substance,—subsequently involving the medullary cones, and, perhaps, the walls of the pelvis, and the ureters. The disease sometimes assumes the nodular form, at others, the infiltrated; the former is more apt to produce irregularity in the shape and position of the affected organ than the latter. No period of life is exempt from the disease, though aged persons are the most liable to it; it has also been stated that children under four years of age are greatly liable to it. The disease may terminate fatally in a few weeks or months, or it may continue three or four years before death ensues. The *cause* of cancer is not yet known.

The *symptoms* of cancer of the kidney are rarely observable until the disease is somewhat advanced. More or less deep-seated severe pain is experienced in the hypochondrium and loin, frequently on both sides, shooting along the course of the ureter to the inside of the thigh, and without any retraction of the testicle; yet frequently pain is absent for a long period even after the tumor is observed. As the disease advances derangement of the digestive organs ensues, as, nausea, vomiting, anorexia, and flatulency. The skin assumes the pale-yellow tint peculiar to the cancerous cachexia, emaciation rapidly occurs, with debility, and frequently an œdematous condition of the legs, which may ultimately become general. There may be an obstinate diarrhea, or constipation, or, these may alternate. Death may occur from exhaustion, from uremia owing to obstruction of the ureters by coagulated blood, or, from a sudden bursting of the tumor.

Renal cancer, however, may be more readily detected at an advanced stage, by the presence of a tumor in the abdomen, and blood in the urine. The tumor will first be observed in the anterior

lumbar region, between the borders of the crista ilii and the ribs; as it increases in size it advances forward toward the umbilicus, upward into the hypochondriac region, and downward into the iliac and inguinal regions, occasionally occupying the whole abdomen. The colon, as in most renal tumors, lies in front of it; and percussion over the tumor elicits dullness, except over the colon,—unless this intestine be flattened between the tumor and the abdominal wall. Palpation detects a soft, smooth, or irregularly-lobulated surface, with rounded obtuse margins, the lobulations being of unequal hardness and sometimes yielding a deceptive sense of fluctuation.

Hematuria is another important symptom, though, it must be remembered that a renal calculus may occasion it; and again, that cancer may exist without any blood being discharged, until near the fatal termination, even though a tumor has been known to exist for a long time. The hematuria usually manifests itself without any apparent cause, is moderate or profuse, and comes on frequently, at irregular intervals. When excessive, the usual constitutional symptoms of loss of blood are observed. Coagula are often formed in the ureters and in the bladder, causing much irritability and suffering. Albumen is always present in proportion to the amount of blood in the urine; and epithelium from the ureter and renal pelvis will not unfrequently be observed along with the blood. If portions of the encephaloid pulp be detected, the diagnosis would then be positive. The hemorrhage, presence of tumor, and other symptoms, together with the general history and condition of the patient, must all be carefully considered. Cancer in some other organ will materially aid us in our diagnosis.

From the difficulty of positive *diagnosis* in renal cancer, it has been frequently confounded with other enlargements, as, of the liver, spleen, ovary, and uterus, also with ascites, aortic abscess, renal hydatids, hydronephrosis, etc.—In the determination of cancer, we must at first be fully assured that renal calculus does not exist, nor urethral stricture, nor prostatic enlargement, and that the lungs are wholly free from tuberculous disease. These having been satisfactorily determined, then, in addition to what has already been stated, we will derive valuable aid from a knowledge of the following points:

Renal cancer, when the tumor is on the right side, may be distinguished from *enlarged liver*, by its seldom rising as high in the chest as the latter does, and by the possibility in many cases of tracing its upper borders below the costal margins, also by the well-defined lower edge of the liver being readily detected. A moderate-size renal tumor will almost always be found located in a plane below

the liver. Hepatic tumors rarely have any intestine in front of them, and always yield a dullness over their entire surface when percussed; a renal tumor has the ascending colon in front of it, passing from below upward, and obliquely from right to left, and over this intestine percussion will elicit a more or less clear tympanitic sound,—flatus may also be detected passing along the gut. When there exists a morbid adhesion between the renal and hepatic tumors, or, when the right lobe of the liver becomes displaced by the advancing renal tumor, the diagnosis becomes more difficult. But the position of the colon in front of the tumor, the detection of the thin margin of the liver as it lies applied to the wall of the abdomen, and the fact that an enlarged liver frequently rises very high in the chest, may aid us materially.

In cancer, there is a peculiar leaden or sallow appearance of the skin; in liver disease, the skin has more of a yellowish hue, the conjunctiva is yellowish, and bile may frequently be detected in the urine. If *ascites* be present, it is still further indicative of hepatic disease. In ascites, both flanks are dull on percussion; in renal tumor, one is dull, and the other resonant, unless the tumor occupies the entire abdomen.

An *enlargement of the spleen* extends more forward and upward into the chest, in proportion to its backward direction, than a renal tumor; the descending colon in front of the splenic tumor is absent; its borders are rigid, thin, and not rounded; it is very movable; its direction is downward and inward to the epigastrium and umbilicus, and not toward the iliac fossa. A leucocythematous condition of the blood may be observed under the microscope; or, there may have previously existed intermittent or remittent fever, or, an impediment to the circulation in the heart, lungs, or liver.

An *ovarian tumor* begins in the iliac fossa, and ascends, while a renal tumor commences in the flank, between the crest of the ilium and ribs, and descends. In ovarian tumor there is no bowel in front of it; it is movable; can generally be detected by examination per rectum; an examination per vaginum will manifest its connection with the uterus; it yields a dullness in front with a resonance on either side of it, or in the lumbar region at the point where dullness exists when the tumor is renal,—and this sign will also serve to determine *uterine enlargements* from renal.

Acephalocyst hydatids in the kidney, can only be positively known by the presence of some of the hydatids in the urine. The hydatid tumor yields a frémissement, a vibration or trembling, when palpated or percussed, and, not unfrequently, there is a discharge from the urethra, of a greenish, pus-like fluid.

Having determined the renal character of the tumor, the next thing will be to ascertain its malignant or non-malignant nature. The symptoms of renal cancer, made known above, will aid in determining the former, taken in connection with an absence of those indicating kidney enlargement from other causes.

The *prognosis* of cancer of the kidney is always unfavorable, the disease generally proving fatal in from two to ten months. Where there is much severe pain and profuse hemorrhage, it runs its course rapidly.

The *post-mortem appearances* show that, as in most other forms of renal degeneration, the cortical substance is the first attacked, and then the pyramids, etc. There may be an extensive tumor, with more or less irregularity in the shape of the kidney, or this organ may not have undergone much change in its form or size; the tumor will generally be found to have contracted adhesions with neighboring tissues, and, according to its size, to have displaced other of the abdominal organs. The disease may be confined to only parts of the kidney, or the whole of this organ may be involved, having its form and structure completely destroyed. The cancerous parts of the organ will be found to vary greatly in consistence and vascularity, being hard at first, then soft, or about as hard as human brain, smooth or more commonly irregularly lobulated, and cavities will often be found containing cancerous detritus and fluid or clotted blood. The tunica propria is usually thickened, and the lymphatic glands, blood-vessels, etc., of the kidney will be found to have suffered more or less from the disease. In most cases, the ureter will be found permanently obstructed from compression of the tumor, from an extension of the malignant tumor into it, or from the presence of impacted coagula of blood. More commonly but one kidney is affected, especially the right.

The *treatment* consists in sustaining the patient's strength, and relieving urgent symptoms. Good nutritious food, easy of digestion, with tonics, especially preparations of iron, are indicated. It is useless to punish the patient's stomach with specific remedies against cancer, they will prove useless; though, Hyposulphite of Lime, or of Soda may be employed, without any injury to the gastric organ. This, or some other harmless tonic and alterative, may be used as a placebo, to divert the patient's mind, and sustain his spirits, as there is almost invariably an injurious amount of mental and physical depression when the character of the malady is known by him. Severe pain may be relieved by opiates; Belladonna; anodyne plasters, fomentations, or applications of Chloroform across the loins; warm hip baths; and mild counter-irritants. Profuse

hemorrhage may be controlled by the internal use of Tincture of Chloride of Iron, Solution of Perchloride of Iron, Gallic Acid, Gallic Acid and Oil of Erigeron, and other astringents; and, sometimes, pounded ice applied, in a bladder, to the loins has proved serviceable. Retention of urine is frequently caused by the urethra being obstructed with blood-coagula, fibrinous clots, etc., giving rise to great suffering; these obstructions should be pushed back into the bladder by means of a catheter, and then be broken down and washed out from the bladder by injections of warm water. Febrile symptoms may be removed by the Compound Powder of Ipecacuanha and Opium, Compound Tincture of Virginia Snakeroot, and, in some cases, Tincture of Aconite.

RENAL CALCULI.

Calculi in the Kidney or Ureter are not unfrequently a mechanical cause of renal disease. There may only be one calculus present, or there may be two or four hundred, or more; they may vary in size from that of a small pinhead to a large bean, and, in the pelvis, they have been found so large as to weigh even three or four ounces; and great diversity will also be found in their shape. Various changes may be effected in the renal tissue by the presence of these concretions, according to their number, size, and position; as, pyelitis, abscesses, pyonephrosis, and hydronephrosis, all of which have already been treated upon. The varieties of renal calculus are more commonly met with in the following order: 1st. Those which are composed of *uric acid*, and which may appear at any age, but more commonly after middle life, and especially among the gouty, and those who indulge in beer, porter, wine, etc. 2nd. Those consisting of *oxalate of lime*, also termed, from their external appearance, "mulberry calculi," and which are usually associated with dyspeptic symptoms. 3rd. *Phosphatic*, and *cystic oxide* renal calculi, are rarely observed.

The *symptoms* of calculi in the kidney, are, a more or less severe pain in the region of the affected kidney, sometimes amounting to severe paroxysms of nephritic colic. The pain is usually constant, and is ordinarily attended with a sensation of burning heat in the painful part. Sometimes the pain is of an intermittent character, appearing especially after considerable exercise; indeed, in any case, exercise greatly increases the pain. Pressure over the painful part, in some cases occasions much tenderness; in other instances, considerable relief is obtained by a firm and moderate pressure upon the part. In very rare cases, no pain has been felt. The oxalate of

lime concretions usually occasion more pain than those of uric acid; and the pain is also apt to be more considerable in organic lesion of the kidney than when the organ is healthy.—The pain frequently shoots along the course of the ureter, down to the testicle, of the same side, which is often retracted, and sometimes more or less painful and swoln. Pain, or a sense of numbness, is also frequently experienced along the front and inside of the thigh. A feeling of faintness, with nausea and vomiting, are by no means uncommon attendants.—Urination is frequent, and the patient often complains of pain at the end of the penis; the urine will more or less frequently be found to contain blood, pus, and epithelium from the renal pelvis. The hematuria may be absent in a very few exceptional cases, but its presence is the rule; it may be constant, or appear at intervals, and is apt to be more frequent and profuse in the rough, irregular mulberry calculi,—and is always brought on or increased by active exercise, sudden jolts, etc.

The painful, colicky attacks are generally owing to the passage of one (or more) of these concretions from one of the infundibula into the cavity of the renal pelvis, or from one part of the pelvis to another. But its impaction in, or descent along the ureter, is usually attended with the greatest amount of suffering, especially if it be large enough in the latter case, to come in contact with the walls of the ureter, or to distend it. An acute pain in the region of the affected kidney, is suddenly experienced, which shoots in various directions, but principally along the ureter to the groin, end of the penis, and the testicle, which latter is retracted or drawn upward by spasmodic contraction of the cremaster muscle. The pain is accompanied with a sense of deadly faintness, nausea, vomiting, feeble pulse, pale countenance, coldness of the extremities, and other symptoms of collapse, and sometimes epileptiform convulsions. There is a constant desire to urinate, the urine may be wholly suppressed, or be voided scantily or in drops, with burning pain, high color, and often mixed with blood. All these symptoms will continue, until the calculus passes into the bladder, when relief at once ensues,—and this may happen in a few minutes or hours, or not for several hours; when of long continuance, more or less severe febrile symptoms are apt to appear. Generally, a sense of soreness remains for a time after the escape of the calculus, and sometimes, in severe cases, swelling and inflammation of the testicle. If the ureter is obstructed by impaction of the concretion, the symptoms yield less rapidly and less permanently to treatment, and one of the forms of renal disease already

referred to may be induced, and prove fatal with or without uremic symptoms.

In forming a *diagnosis*, the urine should be examined both chemically and microscopically, to determine its acidity or alkalinity, and the character of the crystalline sediments that may occur in it; though, in some instances, the urine may not deposit any sediment. The character of the crystalline deposits, when present, are almost always the same as those of the renal calculi. Besides uric acid crystals, oxalate of lime dumb-bells, etc., the urine usually contains blood, and irregular, caudate, fusiform, etc., epithelial cells from the renal pelvis, ureter, etc. In some other renal affections the blood is moulded in the form of tubes, but in the present, it is in the form of disks scattered throughout the urine. In some cases, it will be impossible to accurately determine the nature of the affection, until the appearance of coagula, hydatids, or calculi in the urine solve the question. The previous history of the patient, taken in connexion with the result of repeated urinary examinations, the locality and extent of the pain, its recurrence in paroxysms, the presence of its usual attending symptoms, (nausea, vomiting, etc.), and the fact that exercise increases the severity of the symptoms, while rest diminishes them, will generally enable us to form a correct diagnosis.

The *prognosis* in renal calculi is by no means an easy matter, as it depends entirely upon the condition of the renal urinary passages, and the size of the stone. If the calculus passes into the bladder, there is an end to anxiety; but if the calculus be very large, occasioning violent, obstinate, and long-continued suffering, everything depends upon its ultimate descent into the bladder. If it becomes impacted, it may present a partial or complete obstruction to the flow of urine,—the patient may die from pain, from the sudden call for double duty upon the healthy kidney, or, at a later period, from the consequent production of one of the renal organic lesions heretofore referred to. If both kidneys are involved the prognosis is grave. Oxalate of lime calculi, are less apt to recur a second time, being usually met with single; while those of uric acid are more apt to form in numbers, and to present themselves at various periods.

The *treatment* of renal calculus is, firstly, to relieve the severe suffering of the patient during a paroxysm; secondly, to favor the removal of the concretions; and thirdly, to prevent their subsequent re-formation. To fulfill the first and second indications, the patient should be placed in a warm bath, and be allowed to remain there until some faintness is induced, which aids in the relaxation

of the spasm, of the ureter, and thus favors the passage of the stone, at the same time, lessening the pain. I have effected a similar object, by injections into the rectum of equal parts of warm Water and Compound Tincture of Lobelia and Capsicum, and the internal use of Tincture of Gelseminum, given so as to produce its relaxing effects. Some have advised Chloroform internally, in doses of ten or twenty drops, every half hour or hour; or else, to keep the patient in a state of partial anæsthesia, by causing him to inhale it, until the stone has passed,—but, this would hardly answer in cases where several days are required for this passage of the calculus, and especially in cases where it was impacted, cases which we can not positively determine beforehand. Hence, after using chloroform for a reasonable time without any desirable relief, its farther use should be dispensed with; or, as with the Gelseminum, it may be employed intermittingly.—Opium has been highly recommended as an internal remedy, or, by injection with warm water when the stomach rejects it, for relief of the pain, and is usually administered in full doses, frequently repeated until the system becomes fairly influenced by it. In case it disagrees, Extract of Belladonna may be substituted for it. The urinary secretion should be favored by a free use of warm demulcent diuretic drinks. And hot poultices of Stramonium, Lobelia, and Hops, or, of pounded Garlics or Onions, should be applied to the loins or abdomen, as the local symptoms indicate. Not unfrequently a change in the patient's position will afford relief; and manipulating or shampooing the abdomen along the course of the ureters, has been known to facilitate the descent of the calculus.

After the attack has passed, we must endeavor to prevent the subsequent formation of more calculi, by the means pointed out under Gravel, *which see.* Any renal lesion that may remain, must be treated by the appropriate means therefor.—When a renal abscess is formed and points toward the loins, it has been advised to open it and remove any calculi that may be detected by a careful exploration, by means of suitable instruments; and instances of this operation having been successfully performed are on record.

HEMATURIA.

Hematuria or Hemorrhage from the Kidney, may occur as a primary, or as a secondary affection; in the first instance being unaccompanied with any other evidence of disease; in the second, being manifested only as a symptom of some renal disease or injury. The

presence of the blood in the urine, colors this latter fluid from a barely perceptible reddish-smoky tint to a deep port-wine color, according to the quantity of blood discharged; and the urine will be found more or less albuminous, according to the amount of blood present. Sometimes, from the abundance of the hemorrhage, coagula will be observed. It must be recollected that certain articles of medicine and food impart a bloody aspect to the urine, as, madder, cochineal, red beets, etc.; it also has a dense reddish color in several forms of disease, with a considerable deposit on standing; and, it is also apt to be bloody, during menstruation, and vaginal or uterine hemorrhage. Bloody urine imparts a red stain to linen; high-colored urine does not. The only certain method of detecting blood in the urine, is by a microscopical examination, which will show us the corpuscles; but, as the presence of ammonia in the urine, a low specific gravity of this fluid, or its retention for several days, may occasion a disappearance of the blood-corpuscles, or a non-recognizable change in their form, the urine should always be examined as soon as it has been voided. As a general rule, blood is more common in the urine during acute renal maladies, and much less so during the chronic; and mostly occurs in the form of "blood-casts," the blood having been moulded in the uriniferous tubes, and mixed with epithelial-casts.

Hematuria may be owing to a variety of causes, the principal of which will be found included in the following classification: 1. *Local causes.* These are, exposure to cold and moisture; use of stimulating diuretics, as, oil of turpentine; cantharides, etc.; falls or blows upon the loins; violent exercise; calculous formations; ulcers; abscesses; tubercle; parasites; cancer; active or passive congestion; and Bright's disease.—2. *Symptomatic*, or Secondary. From a morbid condition of the blood, in which its presence in the urine is an unfavorable symptom, as, in purpura hemorrhagica; scurvy; cholera; intermittent fever; continued fever; exanthema; excessive and continued mental emotion, etc.—3. *Vicarious*, or supplementary to menstruation; hemorrhoids; asthma. And sometimes cases will be met with in which there will be no known attributable cause for the hemorrhage. A dark-colored blood in the urine, mixed with putrid offensive matters, is indicative of a malignant affection, and will prove fatal.

With those cases of hematuria due to active hyperemia of the kidney from the use of turpentine or cantharides; and to malignant acute maladies, we have nothing to do in this work, and shall simply consider this symptom in its connection with such maladies as may be presented to the specialist in chronic diseases.

The important point in hematuria, is, to determine the exact source of the blood; and this is not generally a difficult matter. If the blood proceed from the *substance of the kidney*, as in injuries, renal congestion, Bright's disease, etc., tube-casts will always be observed in the urinary deposit, together with tubular blood-casts; and symptoms of renal disease will likewise usually be present. If the hemorrhage is profuse, and recurs frequently, and a tumor be detected in the loins, it is due to renal cancer. In abscess, renal embolism, hydatids, and tubercle, no great amount of hemorrhage is apt to occur.

If the blood proceed from the *pelvis of the kidney and ureters*, it is more usually the result of calculous formations; occasionally, of cancer, tubercle, and parasites. Epithelium of the pelvis and ureters may be found in the deposit, and should the blood coagulate in the ureter, these clots when found in the urine will present a long, worm-like appearance. The presence of pain (nephritic colic) from the passage of the calculus, or of the clots, will aid in the diagnosis.

If the blood proceed from the *bladder*, there are no renal tube-casts, nor blood-casts present, and the symptoms are entirely those of the bladder, as, dull pain in the region of this organ, sometimes accompanied with painful erections, and considerable heat in the glans-penis, there is a frequent desire to urinate, with more or less pain at the neck of the bladder, the color of the urine is pinkish or vermillion, and the blood is more apt to be in small flaky clots and does not mix intimately with the urine. The urine is apt to be ammoniacal, with much tenacious mucus, and phosphatic deposits in those cases in which the constitution is enfeebled. Vesical hemorrhage may be due to stone in the bladder, to prostatic fungoid disease, to cancerous ulceration of the bladder, to varicose enlargement of the veins of the mucous membrane of the bladder, and to inflammation of this organ from urethral stricture or other cause.

If the blood proceed from the *urethra* it is passed in drops, or in a small stream, and escapes during the intervals between urination. And there may also be a soreness at the point from which it issues.

The *prognosis* of hemorrhage will greatly depend upon the *profuse character* of the discharge, its duration and amenability to treatment, its *source*, and the accompanying symptoms. It is unfavorable when due to a calculus, to lesions of degeneration, malignant affections, or, when very profuse, in which latter instance the patient may die from the resulting debility and exhaustion. When not profuse, and the affections, just referred to are not present, it is more favorable. Hemorrhage from the renal substance is

always of serious import, and especially when it is long continued, recurs frequently, and is accompanied with tube-casts.—It must not be forgotten that coagula remaining in the pelvis of the kidney, or in the bladder, may become nuclei for subsequent calculous formations.

The *post-mortem appearances* will be those already alluded to under the head of the particular disease that may give rise to the bleeding. If the hemorrhage be primary, or vicarious, no lesion of the lining mucous membrane of the urinary passages will be observed.

The *treatment* of hematuria will depend, in a great degree, upon its causes, or the conditions under which it appears. When it occurs as a symptom of acute renal disease, astringents internally are rarely necessary; rest and quiet, with counter-irritation over the loins, and Tincture of Veratrum, of Digitalis, or, of Black Cohosh and Aconite internally, will most commonly be found sufficient. Warm anodyne poultices over the region of the kidney have frequently proved beneficial; and so likewise has a cold wet bandage applied around the loins and abdomen, and then covered with warm, dry blankets. It is only when the hemorrhage is so profuse, in these acute cases, as to threaten life, that astringents will be required.

If the hemorrhage be due to the action of irritants (turpentine, catharides), it is best relieved by the free use of diluents, and a dose of Castor Oil to remove any morbid or irritating accumulations in the intestines. A cold infusion of Marsh Mallow Root and Cleavers may be drank freely; and to lessen pain or febrile action, a dose of the Compound Tincture of Virginia Snakeroot may be administered whenever required. Warm anodyne poultices over the renal region, as, of equal parts of Stramonium Leaves, Hops, and Lobelia, will often prove useful, in addition to the other measures.

If the bleeding be the result of violence, (blows on the loins), the patient should be kept in a state of quiet in bed; leeches or cupping over the loins, followed by hot anodyne poultices, will frequently be found useful; and, if the patient be of full habits, a cathartic may be administered every two or three days, as a derivative to relieve any tendency to congestion. The skin should be kept warm, and the diet be moderate and composed of very digestive articles. Unless the discharge be very profuse, astringents will not be needed. Great prostration may be overcome by small doses of brandy, of Carbonate of Ammonia, or, in many cases, the Compound Tincture of Virginia Snakeroot. As the hemorrhages are apt to return, in these cases, at longer or

shorter intervals, and often from very slight causes, a Compound Tar Plaster worn intermittingly over the region of the kidneys, keeping up the discharge for a considerable time on each application, will be apt to overcome or greatly diminish this tendency, as well as to lessen the chances for any subsequent renal organic lesion, and, especially, if appropriate alteratives be used in conjunction therewith. If the hemorrhage be due to renal calculi similar measures, conjoined with those advised for calculi, will be required.

If the hematuria be vicarious, we must endeavor to restore the original discharge by appropriate measures, and at the same time guard against a too abundant flow.—When the bleeding is periodical, or connected with malarial influence, Sulphate of Quinia; Tincture of Muriate of Iron; Black Cohosh, Geraniin, and Quinia; or the mineral acids (White Liquid Physic), will prove serviceable.—When the hematuria is passive, of a secondary character, and not associated with Bright's disease, the mineral acids, especially Sulphuric Acid; Tincture of Muriate of Iron; or Oil of Turpentine in doses of ten or twenty drops every two or three hours, will be of great efficacy, aided by rest and dry cupping over the loins.

When, in any of the above varieties, with the exception of passive hematuria, the flow of blood is abundant, astringents will be required; those which have been found the most serviceable, are, Gallic Acid; solution of Alum; infusion of Beth Root, of Geranium, of Rhatany, of Logwood, or of Matico, etc.; Oil of Erigeron; Oil of Erechthites, etc.

When the hemorrhage is from the bladder, a strong infusion of Peach Leaves and Trailing Arbutus, equal parts, may be used freely with advantage; if much mucus be deposited, Uva Ursi may be employed; if pus, Peach Leaves and Pareira Brava; the Compound Infusion of Trailing Arbutus may also be advantageously used, in all these instances, as well as in the several forms of renal hemorrhage. Ice-cold water, or ice introduced into the rectum, has been highly recommended in cases where active hyperemia exists, and may prove serviceable, however, I have never used it. But injections of mild astringent infusions into the bladder are always useful, as, a solution of Alum (twenty to forty grains to the pint of water), or, infusions of one of the above-named vegetable astringents.—If clots form in the bladder, or if this organ becomes so distended, that neither the urine nor blood can be voided, a catheter with a large eye should be introduced into the bladder, and an injection of cool water, or some cool astringent solution be made, and be repeated several times per day, in order

to break down and remove the clots; and this course may also be pursued when the hemorrhage is of renal origin.—Whenever painful erections occur, the application of cold water to the parts will afford relief.

In order to prevent future attacks of hemorrhage, the cause must be removed by appropriate treatment, whatever it may be, as, stricture, prostatic disease, disease of the bladder, the kidneys, the blood, etc.

There are some other abnormal conditions of the kidneys that require a passing notice, the principal among which are the following:

Parasites or *Entozoa in the Kidney*, are occasionally met with. The one more frequently met with in the northern temperate latitudes, is the *Echinococcus hominis;* this hydatid has recently been found to constitute the *encysted phase* in the development of a very minute tape-worm (*Fœnia echinococcus*), which infests the dog, pig, monkey, sheep, and ox. In certain hot climates, another entoozoon, (the *Bilharzia Hœmatobia*), is often encountered not only in the kidneys, but also in the branches of the portal system, the minute pelvic veins, etc. When existing in the urinary organs, it gives rise to hematuria, hydronephrosis, pyelitis, etc.—The *Pentastoma Denticulatum*, and the *Strongylus Gigas*, are also occasionally observed in the kidneys, as well as intestinal worms, and spurious worms.

The left kidney appears to be more frequently the seat of hydatids, and males more subject to them than females. They are more common with those who are much among dogs, who use meats rare or underdone, and are especially common among the Icelanders. The hydatid is contained in a cyst formed in the renal substance, which grows in size, frequently forming adhesions, or causing inflammation and abscess. The parent cyst may burst spontaneously, or, more usually, from some external violence to the lumbar region; it usually contains numerous secondary cysts.

The *symptoms* of hydatids are an enlargement in the flank, round, of an elastic sensation, more or less fluctuating, and, on percussion, yielding a peculiar thrill or fremitus, resembling the vibrations of a repeater watch held in the hand. Pain may or may not be present; but is more apt to exist in the loin, shooting along the course of the ureter to the thigh, at the period when the cyst ruptures, and the inclosed hydatids escape by the urethra. There may likewise be, at this time, symptoms of irritability of

the bladder, retention of urine, with blood or pus in this fluid.—The urine presents its usual characters until the cyst ruptures.

The *diagnosis* of hydatids is not always easy; the tumor in the flank may be confounded with hydronephrosis, or other renal disease. The diagnosis is still more difficult when no tumor can be discovered. When the hydatid vesicles are discharged per urethra, either entire or in fragments, the diagnosis is positive, and, in such cases, should a tumor have been detected in the loin, it may decrease in size, or wholly disappear. It is very rare that hydatids exist in any of the lower urinary passages.

The *prognosis* is much more favorable in those cases where hydatids are passed, without any tumor having been observed in the abdomen. And generally speaking, renal hydatids produce much less serious mischief than hydatids in other organs, excepting the uterus; and this is due to the facility by which they may be discharged through the urinary passages.—A discharge of hydatids may be followed by similar subsequent discharges, but the longer the intervals between these attacks, the less likely are they to recur. Hydatids may be passed for one, two, ten, or thirty years, and then the patient recover; indeed this is the more frequent termination.

The *treatment* consists in destroying the parasite, when the cyst more readily undergoes rupturing. Various means have been advised for this purpose, as, the administration of Oil of Turpentine; Ethereal Oil of Male Fern; Hyposulphite of Potassa, or of Soda; Iodide of Potassium; and Nitrate of Potassa in doses of twenty grains in some diuretic infusion. Phenol Sodique has also been highly recommended, to be taken internally, diluted. Tobacco poultices applied over the region of the kidney, answer a very good purpose, in cases where they are not followed by too much nausea or prostration; they appear to promptly destroy the parasite.—Any painful symptoms must be relieved by the measures heretofore advised, when similar symptoms are present in other organs.—When the tumor formed by the cyst is so large, as to exert dangerous pressure on the organs of the chest, or, when it tends to rupture in some unfavorable direction, it has been advised to puncture it either through the flank, or, through the abdomen, and thus evacuate its contents. This operation is always a dangerous one, and should be performed with much caution. After the evacuation of the fluid, the cavity or cyst may be injected with solutions of iodine; or, a solution of Chlorinated Soda should an offensive odor exist.

Cysts are met with in the kidneys, either scattered throughout the otherwise healthy organs, disseminated in the atrophic form of Bright's disease, or, existing in what has been termed *Cystic Degeneration of the Kidneys*, which degeneration may also be congenital. These cysts vary in size from that of a small pin head to that of a walnut, though they may be larger than this, or even so minute as to require the microscope for their detection. They may be of various shapes, as, round, elongated, irregular, etc., and are usually filled with an aqueous, albuminous, saline, or gelatinous fluid, of a yellowish or yellowish-green color, and sometimes quite clear.

Their *causes* are unknown, although in the congenital cases, there is almost always some co-existing malformations of some part of the urinary organs, or in some other part of the body. By some these cysts have been considered as being at first obstructed and dilated Malpighian capsules, and, by others, as being formed by dilatations of sections of the uriniferous tubes, and occlusion and atrophy of the intermediate tissues.

The *symptoms* are only present in cases where the tumors formed by the cysts are very large, or where there is degeneration of the kidneys, and are similar to those of other renal affections, as, more or less severe pains in the loins, profuse urination, symptoms of great gastric derangement, debility, albuminaria, hematuria, uremia, etc. In long-standing cases there is almost invariably a low specific gravity of the urine. In some cases, when the cysts are of enormous size, a tumor may be detected, the same as in renal tumors from other lesions; and in these cases, as the disease progresses, the ducts of the pyramids become occluded by coagula, or, perhaps, from inflammatory adhesion of their walls, and the tubes of the cortex become formed into saccular dilatations, with more or less numerous cysts. In some parts of the kidney, all traces of the proper tissue of the organ have disappeared. It is very difficult to *diagnose* this malady during life; and the *treatment* is merely of a palliative character; puncturing the cyst, when the tumor formed by it becomes so large as to threaten life. It appears to prove ultimately fatal by convulsions, delirium, or coma, unless some other disease, or some complication should be the cause of death.

Abnormal conditions of the kidneys may exist, with or without accompanying pathological states of these organs; to which states, however, they are more exposed, under certain circumstances.

The kidney may be *fixedly placed in an unnatural situation*, which may be congenital, or acquired, (from neighboring tumor, etc.), and more commonly the misplacement is within or upon the brim of the pelvis,—sometimes forming a tumor in the abdomen, or, in the female, presenting an impediment to the advance of the fetal head,—the left kidney being thus located in the majority of instances. Its *diagnosis* is difficult, but we may suspect it when there is a want of fullness in the corresponding renal region, with a moderate size, smooth, somewhat elastic tumor, in the pelvic vicinity. Nothing can be done for it.

Abnormal forms of the kidneys are sometimes met with, but are difficult to detect during life; the same may be said where there is only *one kidney*, or where *three or four* are present. Of course these are irremediable.

Movable kidneys are also observed occasionally, in which the organ or organs become freed from their attachments, and, being held only by their blood-vessels and excretory ducts, float loosely amid the abdominal viscera. This condition is more common among females, and the right kidney is more liable to it than the left. Among its *causes* have been named tight lacing, blows and falls upon the loin, displacements of other internal organs, hydronephrosis, removal of the capsule of adipose tissue, etc., and it may also be congenital.

The *symptoms* are rather obscure; more or less heaviness and dragging sensations are experienced, or a dullness, especially after exercise or a prolonged standing; in some instances the motions of the misplaced kidney can be readily felt by the patient, and may be mistaken for fetal movements, etc. The tumor can often be felt by the practitioner, especially among those whose abdomens are flaccid; it is oblong; has the shape and feel of the kidney; is generally located between the margin of the ribs and the umbilicus; is not painful, but causes a sickening sensation of faintness when compressed; changes its position with that of the patient, as well as during deep expiration or inspiration; and the tumor can, in most cases, be, at will, pushed in and out of its lumbar space, by the thumb and fingers. A want of fullness may be observed in the loin, in the region of the kidney, and if the space left by the movable kidney becomes occupied by intestine, percussion will elicit a tympanitic, instead of a dull sound. Urination is usually normal. The mobility of the organ becomes more or less destroyed should it contract adhesions with the parts in its vicinity. As more serious diseases may be confounded with movable kidney, a careful examination should be made whenever an

enlargement or tumor in the abdomen is brought under observation, in order that the patient may not be necessitated to undergo treatment for a difficulty that is generally harmless.

The *treatment* required in these cases is usually very simple; the bowels must be kept free from accumulations, and regular in their evacuations, and tight lacing, horseback riding, running, dancing, or other violent kinds of exercise must be wholly avoided. To relieve the dragging sensations, as well as those of motion, a tight elastic bandage should be worn around the loins, and the tone of the abdominal muscles be restored, by careful kneading or shampooing once or twice a day. Severe pains, when present, may be relieved by rest, hot anodyne poultices, or the wet bandage, etc. Anemia, or other unhealthy state of the system, must be combated by the appropriate remedies therefor.

Chronic Diseases of the Ureters are very rarely met with, and when present are commonly due to an extension of morbid action from the kidneys or from the bladder. Obstruction from some cause in the ureter itself, or in the lower urinary passages, with more or less dilatation of the ureters above the obstruction, is more usually observed. Sometimes this enlargement becomes so great that it may be detected by careful palpation. Ulceration of the ureters, thickening, as well as perforation of their walls, and even abscess, may also exist. Occasionally cysts have been observed in them, of various sizes, and containing various fluid or hard substances; tubercle has also been met with; as well as complete closure of the canals, or, entire obliteration. The obstruction may be due to compression by a tumor, coagulum of blood, calculus, inflammatory action, adhesions, retention of urine in the lower passages, etc., and which should always be carefully sought for. The chief *symptoms* are pain between the bladder and kidney, along the course of the ureter, and sometimes a swelling in the same situation. Hair-like filaments of pus, floating in the urine, are indicative of ulceration of the ureters. Diseases of the ureters are more important on account of their secondary influence upon the kidneys, giving rise to serious affections of these organs, which may rapidly terminate existence. In actual disease of the ureters, the *prognosis* is always unfavorable; and especially so when an obstruction in them can not be overcome.

When we can determine the cause of the disease, as, urethral stricture, prostatic enlargement, renal calculus, etc., our *treatment* must be directed to its removal. In other respects the therapeutical and hygienic measures must be adapted to the morbid conditions ascer-

tained, both local and general, and to the more urgent symptoms, and which have already been referred to in the preceding renal affections, rendering a repetition of them here unnecessary.

DISEASES OF THE BLADDER, URETHRA, ETC.

CHRONIC INFLAMMATION OF THE BLADDER.

This disease is also termed "Chronic Cystitis," "Cystorrhea," and "Catarrh of the Bladder." It is a catarrhal inflammation of the mucous lining membrane of the bladder, and although it may occur at any period of life, it is more commonly met with among the aged, being generally associated with some impediment to the discharge of urine, as, from enlarged prostate, and among whom it is very apt to prove fatal. Pathologically, it is different from a common inflammation of the mucous membrane, which is more rarely met with.

The *causes* of catarrh of the bladder are various; and it is important for the practitioner, in every case, to satisfactorily ascertain its exciting cause, in order that he may institute the requisite treatment therefor,—and this can only be accomplished after having learned the history of the affection, and by a careful exploration of the urethra and bladder, to determine the presence of stricture, prostatic enlargement, stone in the bladder, etc. The disease usually manifests itself gradually, and may be due to cold, injuries, irritating diuretics or injections, severe horseback riding, recession of cutaneous affections, or, of gout, neuralgic and other diseases of adjacent organs, as of the vagina, rectum, etc.; but its more frequent causes are, urethral stricture, enlarged prostate, stone in the bladder, diseased condition of the bladder, and extension of gonorrheal or renal disease to the bladder. It is also frequently caused by intemperance, a constant habit of retaining the urine for a long time before voiding it, occasioning thereby an overdistended condition of the bladder; by excessive venery, sedentary habits, and is often associated with the more severe results of masturbation.

The *symptoms* of chronic catarrhal cystitis are generally, readily recognized. At first, there will be observed a deposition of more or less mucus on allowing the urine to stand for a time, and which is frequently confounded with seminal discharge; or the discharge in

prostatorrhea; but the semen may be detected by the microscope; and the prostatic discharge by its viscidity, its resemblance to the white of egg, and its property of being soluble in the urine. As the disease advances, as well as when it is more severe from the first, the mucus increases in quantity, to even several pints per day, and is apt to be accompanied with more or less considerable pus, derived from the kidneys, ureters, or prostate, and even from the bladder itself. This mucus discharge is very viscid, adhering tenaciously to the sides of the vessel containing it, and when we attempt to pour it out, it forms long, tenacious threads. I have treated several cases, in which nearly the whole of the urine was converted by the action of cold into a glairy and thready substance resembling the white of egg; and in one patient, the urine was passed of a white color, very thick and tenacious, becoming nearly solid in a few seconds after it had been passed, and containing triple phosphates in great abundance, together with large corpuscles.—The urine is always alkaline, and more or less acrid, and from the moment it leaves the bladder, it exhales a strong ammoniacal odor, which upon standing becomes extremely penetrating, and often insupportably fetid. Blood may occasionally be observed in the urine, more especially when ulcerations or abscesses have formed.

At first the urinary flow may be natural or increased, but as the disease progresses, the urine becomes scanty, altered in its character, and of more or less difficult evacuation, and the calls to urinate increase in frequency; with these symptoms there is apt to be a dull pain in the region of the bladder, a spasmodic contraction of this organ, or painful tenesmus, and a painful, burning sensation along the urethra.—Usually, there is a persistent sense of uneasiness in the region of the bladder, a degree of heaviness in the perineum, pain and weakness in the back and loins, sometimes extending into the testicles, with irritability of the rectum, and more or less constitutional debility. Sometimes the symptoms are much more severe, and are accompanied with dry and hot skin, thirst, coated tongue, restlessness, and other manifestations of febrile reaction. Impotency, with nocturnal emissions, softness and flaccidity of the penis, and even loss of sexual desire, may arise from this affection.

From what has been stated, the *diagnosis* may readily be determined. The principal difficulties with which the catarrhal cystitis may be confounded, are, renal abscess, and uterine or vaginal disease, but the proper examination for the detection of these maladies will prevent such a mistake. The urethral canal, prostate, and bladder, should always be carefully explored, in order to detect any lesions in them. If these are not present, we must inquire into the

previous history and exposures of the patient, as, to colds, excessive fatigue or labor, employment of irritating injections, suppression of habitual discharges, recession of cutaneous eruptions, etc.

If the disease be allowed to progress, ulcerations and other lesions of the bladder occur, the system becomes greatly debilitated, the various excretory and secretory organs become deranged, debility and emaciation supervene, with hectic fever, nervous irritability, and finally, dissolution.

The *prognosis* of chronic catarrhal cystitis depends upon a variety of circumstances. It is more readily curable in the young than in the old, and long-standing cases are much more difficult of cure than those of more recent date. The danger is proportioned to the intensity of the pains, the abundance of the matters excreted by the bladder, and the degree of suffering, agitation, sleeplessness, and febrile reaction accompanying the local lesion. In case of prostatic disease, ulceration, hypertrophy, cancer, or other incurable lesion of the bladder, the cystorrhea will ultimately prove fatal; if it be due to urethral stricture, or calculus or foreign body in the bladder, the removal of these will generally be followed by a disappearance of the catarrhal affection under proper treatment. Aged persons may, however, labor under chronic vesical catarrh, when not severe in its character, for a long time,—and even die from some other malady. A change in the urine from alkalinity to acidity, occurring suddenly, is considered a fatal indication.

The *post-mortem appearances* vary, according to the extent and duration of the disease. The cavity of the organ is more or less diminished, so much so in some cases as to be hardly capable of holding an ounce or two of fluid; the mucous membrane is often injected, presenting red patches or streaks, and is generally thickened, with an enlargement of its follicles. Not unfrequently, from a softening of this membrane, it may readily be detached from the muscular coat. In more advanced stages, there will be ulcerations, which may even extend into the muscular coat, and nearly penetrate to the peritoneum. The muscular coat having acted with increased energy, its fibres become more voluminous, and project into the interior of the organ, giving rise to a sacculated appearance of the bladder, and which is often accompanied with a dilated condition of the ureters. In some instances, the walls of the bladder are much thinner than usual; and in others, the hypertrophy may render them an inch in thickness. The mucous membrane may, in some cases, be pale, in others, it may present almost every shade of color, as red, violet, gray, green, black, etc., usually in spots. False membranes may also be observed on the mucous membrane, either free

or adherent, and which when voided with the urine during life, have been mistaken for detached pieces of mucous membrane. The principal morbid alterations are, thickening, hypertrophy, sacculation, contraction of the cavity, change of color, false membranes, softening, and ulceration. The morbid action generally extends, in advanced cases, to the adjacent urinary organs.

In the *treatment*, after having determined the disease to be due to certain lesions, we must first remove them, as, calculus in the bladder, prostatic disease, urethral stricture, disease of the rectum, etc.; using the necessary precautions in so doing, and allaying any inflammation by means of warm baths, demulcent diuretics, anodyne injections or suppositories into the rectum, leeches to the perineum and groins, rest, rigid diet, Gelseminum, Aconite, etc. And these means should be continued with a perseverance equal to the seriousness and obstinacy of the symptoms. Should the catarrh continue, after the exciting cause has been removed, it must then be treated as named below.

In the absence of inflammatory symptoms in this disease, stimulating diuretics will be found valuable, and, as the system becomes habituated to their use, it will be found advisable to employ them alternately. Among the most valuable diuretics are, Uva Ursi, Buchu, Trailing Arbutus, and Queen of the Meadow. The Compound Infusion of Trailing Arbutus will be found a very excellent agent; I have used it for the last thirty years with great success; in cases of febrile manifestations, the Gin in it should be omitted, employing only a simple infusion of the articles. A decoction of Button Snakeroot (*Liatris Spicata*), with or without the addition of Chimaphila, will also be found a very useful remedy.

Considerable advantage may frequently be obtained from the internal administration of the following mixture: Dissolve Alum ten grains in Water four fluidounces, to this add Benzoic Acid ten or twenty grains, and mix for a dose. This dose may be repeated three times per day, and will be found more especially useful in cases of excessive mucus discharges with phosphatic deposits. In similar instances, I have likewise witnessed the most decided and permanent effects from the daily use, for some days or weeks, of the Compound Balsam of Sulphur, as well as of the genuine Harlem Oil; using freely, at the same time, of an infusion of equal parts of Dioscorea, Queen of the Meadow, and Dwarf Elder.—In many cases, where Copaiba, Cantharides, Uva Ursi, Buchu, etc., were of no service, I have advised the free infusion of the pods or hulls of the common Bean, and which has been followed by the most happy results. Various other agents have been employed with

success, as, the Fluid Extract of Hydrangea; the Compound Copaiba Mixture, as a stimulating diuretic; Tincture of Chloride of Iron, in cases of anemia and debility; and Compound Tincture of Colchicum, where gouty or rheumatic tendencies are manifested. And when there is much pain or irritation, Opium or Morphia may be administered internally, or be introduced into the rectum in the form of suppositories.

Retention of urine requires the introduction of the catheter to evacuate the bladder, and thus avoid a troublesome complication; but if the attempt to pass the catheter causes pain, spasms, and contractions of the urethra, or if it occasions a flow of blood,—in a word, if the operation produces too much suffering, and increases the irritation, we must abandon it, and have recourse to sedatives and anodynes, which may so far diminish the local irritation as to re-establish the urinary flow, or, permit the passage of a wax bougie. I have frequently overcome the difficulty, in similar cases, by injecting into the urethra every one, two, or three hours, or according to the urgency of the symptoms, a small portion of a mixture of Extract of Belladonna half a drachm or a drachm with a fluidounce of Glycerin,—at the same time applying cataplasms of pounded Stramonium Leaves to the perineum, or, of Stramonium and Lobelia, aided in obstinate cases by anodyne suppositories.—When it is positively required that the catheter be passed into the bladder, and the above-named symptoms prevent us from attempting the operation, we may often succeed, after having produced complete anæsthesia by ether or chloroform.

The direct application of medicinal fluids to the affected mucous coat of the bladder will be found exceedingly beneficial in all chronic cases; and great care should be taken to filter these fluids, or to have them clear, so that no minute particle of solid matter may be passed into the bladder, to form the nucleus for a future calculus. The fluids that may be injected into the bladder, through a silver or gum-elastic cather, should vary in quantity from one to four fluidounces, and they may be allowed, each time, to remain in the bladder as long as no pain or uneasiness is occasioned thereby. A tepid infusion of Golden Seal and Solomon's Seal Root, will be found to exert a very beneficial effect on mucous membranes laboring under chronic catarrhal inflammation. Or an infusion or decoction of equal parts of White Indian Hemp, Black Cohosh, and Golden Seal. If much pain or irritation is caused by any of these fluids, a small portion of Solution of Sulphate of Morphia may be added to them; in many cases the addition of common Salt to the

fluid employed (three or four drachms to the pint), will be found to have a remarkably soothing effect.

When pus or blood appears in the urine, astringent liquids should be employed, as, an infusion or decoction of equal parts of Golden Seal, Geranium, and Witch Hazle Bark; of Logwood; or, of equal parts of Rhatany, Cinchona, and Barberry Bark.—Various other fluids may be employed in this affection, as, dilute solutions of Chlorate of Potassa; Chlorate of Soda; Permanganate of Potassa; very dilute Carbolic Acid or Phenol Sodique; Chloride of Zinc; weak solution of Malic, Citric, or Tartaric Acids, etc. These agents will always exert a much better influence, if the bladder be thoroughly washed out just before their employment, by tepid water,—using for this purpose a double-channelled catheter. The injections should be passed immediately after the urine has been evacuated from the bladder, and may be repeated two or three times a day, as the patient can bear, or according to the symptoms produced.

The following have been highly recommended for injections into the bladder: 1. Take of Nitrate of Silver from five to eight grains, Tincture of Hyoscyamus two fluidrachms, Distilled Water four fluidounces; mix, for an injection. In all cases where Nitrate of Silver is injected, the bladder should be thoroughly washed out in a few minutes afterward with tepid water, in which some common salt has been dissolved. 2. Take of an infusion of equal parts of Elm Bark and Solomon's Seal four fluidounces, to which add Oil of Cajuput five minims dissolved in one fluidrachm of Alcohol; agitate together, and inject. 3. Carbonic Acid Gas, in quantities of from two to four ounces, injected, and retained for an hour or two if possible; repeating it two or three times a day, or, once in every two or three days, according to circumstances.—I place no confidence whatever in cauterization of the bladder, or of its neck.

When the chronic catarrh obstinately persists, counter-irritation may frequently be employed with benefit. The Compound Tar Plaster applied intermittently over the inferior part of the hypogastrium, to the perineum, and to the lumbo-sacral region, will be found a superior remedy; while, at the same time, some other irritant may be applied to the inside of the thighs, as, the Compound Tincture of Camphor, Croton Oil Liniment, etc.

In addition to these means, the bowels must be kept regular; the surface of the body be frequently bathed with a stimulating alkaline solution, and a Spirit Vapor Bath be administered every week or two. The diet should be light but nutritious, easy of di-

gestion, avoiding fats, stimulating drinks, and other irritating articles. In exceedingly depressed conditions of the system, Wine may be needed, or, Tincture of Prickly-ash Berries in milk or mucilage, etc. Exposures to cold and damp, and to sudden changes of temperature must be carefully avoided; the body must be well clothed, wearing flannel next the surface, and especial attention should be paid to keeping the feet dry and warm. The bladder should be frequently evacuated, at regular intervals; and coition and horseback riding must be positively prohibited. A scrofulous or syphilitic taint, or, a suppressed cutaneous eruption, should, in addition, have the appropriate remedies used in conjunction with the above measures. If the disease can not be cured by these means, we may have the satisfaction of relieving the patient, and indefinitely postponing the sorrowful period of disorganization of the affected parts.

Ulceration of the Bladder may follow the acute or chronic forms of cystitis, and is not always readily detected in the earlier stages. But in cases of long standing, where there is a severe and constant pain, increased by micturition, which is difficult, and the urine contains pus streaked with blood, we may suspect the presence of ulceration, especially in the absence of any symptoms of renal or prostatic disease. The ulceration may destroy more or less of the mucous coat of the bladder, and even lead to perforation of its several coats, forming fistulous communications with adjacent organs. The coats of the bladder not destroyed by the ulceration are apt to be more or less hypertrophied or thickened. The disease is generally fatal in the more severe and extensive ulcerations; in milder cases, the only chance for the patient, is the injection two or three times a day, into the bladder, of a strong decoction of equal parts of Golden Seal and Geranium; demulcent diuretics, with a small proportion of Alum dissolved in them; and anodynes, etc., according to indications, to relieve urgent symptoms. Rest and quiet are necessary, and the diet should be light, unirritating, and nutritious. Any morbid quality of the urine must be removed by the usual means.

IRRITABLE BLADDER.

Irritability of the Bladder is sometimes met with, either as a primary or a secondary affection; occasionally, it is very severe in its character, and quite difficult of removal. It may occur at any period of life, but more frequently from eighteen to forty years of age.

The *causes* of irritable bladder are numerous, and, in some instances, are very difficult of detection. In the very young, it is more commonly observed among those of nervous, irritable habits; and in those more advanced in life it usually appears to be a secondary or sympathetic malady. Exposures to cold, or to sudden changes of temperature, stimulating diuretics, error in diet, premature or frequent sexual excitement, venereal excesses, masturbation, or an abnormal condition of the urine, may, independently of any existing lesion, occasion an increased sensibility of the nervous system of the mucous membrane of the organ; while on the other hand, this sensibility may be augmented and kept up by a chronic cystitis; disease of the kidneys; prostatic disease; gonorrhea; urethral stricture; stone or foreign bodies in the bladder, or other disease of this organ; gout; rheumatism; gastric and intestinal affections; abnormal states of the brain and spinal cord; disease of the reproductive organs, etc.;—and, sometimes, the irritability may be induced by hardened feces; lithotomy; pressure of the enlarged womb; pelvic tumors; and, occasionally, it follows as a sequel of some of the more severe febrile affections. It is very important, in order to effect a successful treatment, that the cause of the irritability be correctly determined.

The *symptoms* of this affection are frequent calls to urinate both during the day and the night, and the evacuation is either accompanied or succeeded by (perhaps both), great pain, sense of burning and of spasm at the neck of the bladder, frequently extending the whole length of the urethra. The urine may be natural in quantity and quality; it may be augmented or lessened in quantity, and its chemical characters may be changed. More commonly, it is of a high color, often having a light-greenish tint, acid, of low specific gravity, and containing considerable mucus, but not so tenacious as in catarrh of the organ, and, perhaps, diseased epithelium from the bladder. The deposit is of an ashy color, and consists of phosphates, and occasionally some urates. In connexion with these symptoms more or less pain is generally experienced in the bladder, shooting in various directions, and from the excessive sensitiveness of the parts, especially among young adults, erections, and spontaneous seminal emissions frequently occur. When the disease is primary, being due to exalted nervous sensibility of the parts, the pain being very severe and the symptoms coming on periodically, it is termed *Neuralgia of the Bladder*, and is treated upon as a separate and distinct disease by several authors.

That form of the disease, termed *Spasm of the Bladder*, the same as neuralgia of this organ, is more common to persons advanced in

years, and may be known by the spasmodic or cramp-like contractions of the bladder, which generally occur suddenly, with violent pain and a feeling of constriction, constant desire to void urine, but no ability to do so, and likewise a frequent desire to evacuate the rectum, or more or less tenesmus, and sometimes a protrusion of the bowel. Fever is absent, unless the spasm accompany acute cystitis, but great anxiety, restlessness, and clammy perspiration are frequent.

If the disease be not removed, the general health becomes ultimately involved, with more or less debility, emaciation, gastro-intestinal derangements, impaired cutaneous functions, etc., and, in some instances, even hectic fever.

In the primary or idiopathic variety, the *prognosis* is generally favorable, as, however obstinate the symptoms may be, they eventually give way under proper treatment. In scrofulous, debilitated patients, the disease is peculiarly obstinate to treatment. In the secondary or sympathetic variety, the prognosis is favorable when the causes of the irritation can be removed. But if these can not be overcome, the prognosis will then depend upon the nature of the cause, the character of the symptoms present, and the general condition of the patient.

The *treatment* of this disease will depend entirely upon its cause, and every endeavor should be made to satisfactorily ascertain this, not forgetting to make a careful examination of the urine passed.

If the irritability is due to exposures, resulting in hyperemia or inflammation, rest and quiet, purgatives, low diet, spirit vapor baths, diaphoretics, demulcent diuretics, warm hip baths, anodyne suppositories, and, in very severe cases, leeches to the perineum, are the remedial means to be pursued.—If stimulating diuretics, (cantharides, turpentine, etc.), be the cause of the malady, their use must at once be discontinued, and recourse be had to warm hip baths, anodyne suppositories, demulcent diuretics with or without anodynes, according to the symptoms, and hot anodyne applications to the perineum and across the region of the bladder.—If error in diet be the cause, the use of the offending articles should immediately be stopped, and the proper measures be taken to correct the secretions and remove any digestive disorder that may exist; keeping the bowels regular by laxatives; administering anthelmintics if there be indications of worms, and at the same time, employing the hip bath, demulcent diuretics, (anodynes if necessary), as well as carefully regulating the diet.—With regard to venereal causes, coition, or masturbation, must positively be discontinued, and sexual excitement be avoided as completely as

possible. The evil consequences resulting from these causes, as, nocturnal seminal emissions, prostatorrhea, gleet, etc., must be overcome by the appropriate treatment for these difficulties.

If the patient is rheumatic, gouty, or scrofulous, or if the system is tainted with syphilis, the proper means for these maladies should be at once and perseveringly employed.—If the urine be abnormally acid, alkalies, as the Bicarbonate of Soda, or of Potassa, should be given, with such other treatment as may be required to effect a healthy condition of the system; if it be alkaline, or neutral, the treatment named hereafter for Phosphatic Gravel, may be pursued,—and it is in these cases, that washing out the bladder by demulcent, soothing fluids, will be found especially useful.—Indeed, in all cases, any peculiarity observed in the chemical nature of the urine, should be obviated by the means named for these conditions, under the head of Gravel, Diabetes, etc.

When the vesical irritability occurs with young females emerging into womanhood, it may be dependent upon some menstrual derangement, upon spinal irritation, or, perhaps, upon both combined; preparations of Iron, regularity of bowels, Compound Syrup of Partridge Berry, counter-irritation along the tender parts of the spinal column, warm hip baths, cold douches along the spinal column, regularity of diet, and exercise in the open air, will generally effect a cure, unless the irritability be dependent upon some other functional or organic lesion. The presence of hysteria may be overcome by the means generally employed for this symptom.

In cases where the irritability is dependent upon other disease, as, anal fistula, hemorrhoids, stricture, enlarged prostate, pelvic tumors, uterine displacements, renal disease, etc., the primary malady must first be removed or materially improved, and the irritable condition of the bladder will disappear, or be greatly relieved. But in conjunction with these means, treatment must also be pursued to alleviate as much as possible the sufferings caused by the vesical irritation, as, the use of hip baths, demulcent diuretics, anodyne suppositories, etc.—When urethral stricture is the cause, not unfrequently the careful passage of an elastic catheter into the urethral canal, will afford prompt relief; though, in some cases, it will augment the irritability. The bougie or catheter should be allowed to remain in the urethra, five or ten minutes each time, and its introduction should not be repeated again until two or three days afterward, and so on. Anointing the catheter with Glycerin in which Extract of Belladonna has been dissolved, previous to its introduction, will, in most cases, facilitate the desired result.

In cases of irritable bladder, associated with retention, or incontinence of urine, much benefit has followed the use of the following preparation; Take of Tincture of Cantharides, Tincture of Colchicum, Tincture of Digitalis, each, four fluidrachms, Tincture of Lupulin six fluidrachms; mix. The dose is from twenty to thirty drops in a little water or mucilage, three or four times a day. In other instances, the following has been of service: Take of Atropia one grain, Distilled Water four fluidrachms, Hydrochloric Acid two fluidrachms, Alcohol one and a half fluidounces; mix. The dose is ten minims in an ounce of water, to be repeated every night and morning. Of course the effects of this preparation should be carefully watched, diminishing the dose if required, or suspending its use entirely for a time, and then recommencing it in much smaller doses. A pill composed of one-eighth of a grain of Extract of Belladonna, one-twentieth of a grain of Strychnia, and one grain of Alcoholic Extract of Aletris, and given two or three times a day, has also afforded permanent relief in many instances.

In the spasmodic and neuralgic varieties, if the measures just named do not afford relief, the internal use of Tincture of Chloride of Iron, together with the application of the Compound Belladonna Plaster to the lumbo-sacral region, or to the perineum, will frequently afford prompt relief.—In neuralgia of the bladder the following pill, employed in conjunction with the Compound Tar Plaster to the lumbo-sacral region, will be of benefit: Take of Strychnia one grain, Extract of Aconite eight grains, Sulphate of Quinia forty-eight grains, Extract of Hyoscyamus eight grains; mix thoroughly together, and divide into sixteen pills, of which one pill is a dose, to be repeated three times a day. I have likewise derived much benefit from the internal use of Tincture of Kalmia, in conjunction with a rather free employment of an infusion of Peach Leaves, or Wild Cherry Bark. A very excellent preparation for irritability of the bladder in almost all instances, is composed of Fluid Extract of Buchu two fluidounces, Tincture of Gelseminum five fluidrachms, Tincture of Sheep Laurel three fluidrachms; mix. The dose is a teaspoonful, in some mucilaginous diuretic, to be repeated three or four times daily. Or, the treatment heretofore recommended for Neuralgia may be pursued. (*See Vesico-urethral Neuralgia*, page 300.)

In this affection, the body should be warmly clad; exposures to cold and sudden changes of temperature must be avoided; the diet should be properly regulated, using but little animal food, no acids, cheese, nor stimulants of any kind; the bowels should be kept regular; the calls to urinate should be postponed as long as possible,

because a frequent micturition often becomes a habit very difficult to overcome; and coition must positively be avoided. Among the agents that have been found of value in this affection, may be named,—Tincture of Poke Root in doses of a fluidrachm every three or four hours; infusions of Uva Ursi, Wild Carrot, Trailing Arbutus, Cleavers, Pareira Brava, Couch Grass (*Triticum Repens*), Cutting Almond (*Parthenium Integrifolium*), Thimble Weed (*Rudbeckia Laciniata*), or False Gromwell; Fluid Extract of Hydrangea; Harlem Oil; Tincture of Stavisagria; and injections into the bladder of a solution of Nitrate of Silver, (from half a grain to two grains to the fluidounce), used especially in atonic or relaxed conditions of the mucous membrane. Occasionally much relief will follow injections of a weak solution of Malic, Citric, or Tartaric Acid.

PARALYSIS OF THE BLADDER.

Paralysis of the Bladder may be partial or complete; it is due to a partial or complete loss of the contractile power of the bladder, as well as of its organic sensibility. Want of power of the abdominal muscles is frequently associated with it. It is a very common affection among aged men, though it may occur at any age.

Like other organs, when exposed to the causes of disease, the bladder is liable to have the exercise of its functions more or less impaired; it loses its strength and contractile power, is unable to expel the whole of the urine contained in it, and thus gives rise to a retention of this fluid. All old men do not experience the infirmities arising from weakness or paralysis of the bladder; but still, very few are exempt from it. Those aged persons who do labor under this malady, not being commonly much disturbed by it, especially in its early and more easily curable stages, pay but little attention to it, believing it to be a necessary consequence of their age; consequently, they neglect consulting a physician, until the difficulty has so far advanced as to be nearly, if not wholly, irremediable.

The *causes* that may induce vesical paralysis are numerous; among the principal ones may be named, a too free use of diuretics, long-standing gleet, repeated attacks of gonorrhea, stricture of the urethra, prostatic disease, sedentary occupations, long-continued intellectual labors, venereal excesses, and masturbation. The habit that many persons have of retaining their urine for a long time, is a very common cause. Paralysis of the bladder often follows

blows, or other injuries upon the hypogastrium; exhausting diseases; lesions or injuries of the brain and spinal cord; uterine displacements; vesical inflammation; constitutional debility; rough and improper employment of catheters or bougie; and surgical operations in the neighborhood of the organ. The mind also exerts considerable influence in occasioning the paralysis, as is frequently observed in hysterical females. Urinating while lying upon the side of a bed, is an unfavorable position for this evacuation, and will eventually lead to weakness of the bladder. Those who practise coition in a standing position, are very apt to be attacked with vesical catarrh and paralysis. A temporary paralysis of the bladder may follow the frequent use of anodyne suppositories, pressure of the fetal head during labor, as well as morbid growths in the neighborhood of the organ, and a rectum distended from any cause. Gouty and rheumatic persons are liable to the the disease in old age.

The *symptoms* of paralysis of the bladder manifest themselves more or less rapidly, according to their cause. The first symptom generally noticed is a difficulty in expelling the urine at the start; it does not flow promptly, and when it commences the flow is feebly ejected, or is voided in jets; sometimes, the person will have to wait a considerable time before the urine commences to flow; and at other times, he can expel it only by making efforts to do so, contracting the abdominal muscles which compress the bladder, and thus making amends for the insufficiency of the contractions of this organ. As the disease progresses, the urine, instead of passing in a full, long stream, falls vertically between the patient's legs; from the more feeble vesical contractions, much less urine is evacuated, and more and more of this fluid remains in the reservoir after each evacuation, and the calls to urinate become more and more frequent. If the hypogastrium be examined, the tumor formed by the distended bladder will be found above the pubes, frequently extending as far upward as to the umbilicus. There are some persons, however, in whom the bladder is so small, that this tumor in the lower part of the abdomen does not occur, unless there be a complete suppression of the urinary flow. Owing to its retention in the bladder, the urine becomes changed in its quality, more especially in those cases originating from lesions of the spinal cord or brain; it becomes very acrid and irritating—alkaline, turbid, and phosphatic, with considerable mucus,—destroying the sensibility of the internal lining membrane of the bladder, and occasioning a thickening of its walls, as well as rendering the patient very liable to vesical calculus.

In many cases, the patients experience a sense of heaviness and uneasiness in the region of the bladder, perhaps pain, often extending to the glans penis; but more commonly, no particular symptoms of this kind are felt. When pain and uneasiness are the commencing symptoms, they eventually disappear.—Among those who suffer from venereal excesses or masturbation, there is a sense of weakness in the loins and lower extremities, and paraplegia may result, with complete vesical paralysis.—When the urine accumulates in the bladder, and is not evacuated by the catheter, it eventually occasions such a distension of the organ, that its contractions become impossible, and there is then complete paralysis with retention, or, if there is not enough opposing power at the neck of the bladder to prevent the flow of urine, this fluid dribbles away involuntarily by regorgement. And if not relieved by catheterism, nausea, vomiting, profuse perspiration of a urinary odor, small, frequent pulse, and swelling of the extremities, may occur,—and even delirium, coma, and death.—We may know when the urine flows by regorgement, by its passing away continually in a small stream or by drops, and when the vesical tumor produced by the distension can be felt above the pubis, and especially by catheterism which evacuates an abundance of this fluid.—Hysterical paralysis of the bladder, is met with among females during their menstrual life, and more especially during the first ten or twelve years; it is owing to want of volition in most cases, and generally requires no interference by catheterism;—the urine in these cases, presents the same appearance as when the urinary retention is absent, undergoing no change at all.

Paralysis of the neck of the bladder may occur independently, and is known by an inability to retain the urine; or, this fluid may pass away involuntarily, on laughing, coughing, sneezing, lifting, or on any sudden exertion. Females who have undergone several severe labors are very apt to suffer from this affection.

The *prognosis* depends entirely upon the cause of the malady. It is much more favorable among young persons, especially when prompt treatment is pursued. In advanced age the causes are generally incurable, and the bladder having a greatly diminished tone and energy, responds but feebly to treatment,—yet life may be prolonged by appropriate measures. In cases where the cause is curable, the disease of the bladder may be cured, by not allowing its overdistention during the remedial treatment for its cause. If the bladder be permitted to remain distended four or five days, it is very doubtful whether catheterism would then be of much avail,—though it should be undertaken, nevertheless. Organic lesions, and espe-

cially of the nervous centers, are almost invariably beyond the resources of art; and the paralysis may extend to other parts of the system, producing paraplegia, or hemiplegia, etc.

The *post-mortem appearances* are a dilated condition of the bladder, its walls being thin, and its mucous lining membrane pale; at times there will be ulcerations, or softening of its coats. Sometimes, inflammatory patches, or a red, or even slate-colored appearance of the inner membrane will be observed.

In the *treatment*, after having fully assured ourselves that the urethral canal is free throughout its extent, there being no stricture, nor prostatic disease, and that there are no calculi nor foreign bodies in the bladder, the first point to attend to is, to evacuate the bladder by the gentle and careful introduction of a catheter, being very careful, when there is considerable distension of the organ, not to allow the urine to pass away too rapidly, as well as not to remove all the fluid at once,—the sudden abstraction of a large quantity of urine has been followed by rapid collapse and death. The catheter must not be allowed to remain after the necessary amount of fluid has been removed; it is preferable to re-introduce it every time it is required to empty the bladder, say every four or five hours. However, when there is great difficulty and pain in passing this instrument, it may be allowed to remain in the canal after its introduction, unless too much irritation be occasioned by its presence,—removing and cleansing it after twenty-four or forty-eight hours, and then, if required, re-introducing it,—its outer extremity should be closed with a cork or plug to prevent the urine from constantly passing away. But, it must be borne in mind that the organ may become accustomed to this artificial aid and remain in a state of permanent weakness, if we rely too much upon it; consequently, the patient must be required from time to time to test the contractile power of the bladder, so that the use of the instrument may be needed only occasionally, or be dispensed with altogether.

Patients should be taught to introduce the catheter themselves, employing as large a one as can be introduced with facility, and should likewise be instructed to empty the bladder thoroughly each time, for if a small portion of urine remain, its decomposition will influence the urine subsequently discharged into the organ, and thus occasion abnormal changes in the mucous lining membrane. In many cases, the prompt employment of the catheter will alone effect a cure.

The medical man can readily determine that the bladder is recovering its elasticity, and may even be able to evacuate itself naturally, by the urine flowing in a full, rapid stream through the catheter.—

When the patient urinates without the aid of this instrument, the evacuation being made slowly and in small quantity, and especially, when it is accompanied by a feeling of heaviness in the neighborhood of the neck of the bladder, this organ has not yet recovered its contractility, and the catheter will still be necessary.

Other measures must however be employed, in most cases, in conjunction with the catheterism. In the early period of the disease, diaphoretic drinks rendered slightly diuretic will be found of much service, aided by stimulating alkaline baths, frictions, stimulating liniments over the loins, and especially frictions over the hypogastrium, the groins, the perineum, and inner part of the thighs. Where there is debility, tonics will be required; and preparations of Iron for anemia. In all cases the bowels must be kept regular, and much benefit will be derived from gentle purgatives, repeated at given intervals. Sometimes, emetics will prove useful, especially among old men, when indicated by the state of the tongue and the color of the skin. Cool douches to the lumbar and sacral regions will also often be found of value.

These means must be favored and sustained by moderate exercise, nourishing food, and properly regulated sleep. The best time for exercising is in the morning before breakfast, in the open air, the air being dry; if it be cold, more clothing should be worn so as not to expose one's self to colds or other inconveniences. Frictions every morning and evening, and walking, are the only exercises to be allowed, until the strength will permit more active exercise. Hair mattresses, or those made of cotton, or other rather firm material, should be used for beds to sleep upon; feather-beds must be prohibited. Sedentariness, as well as fatigue must be carefully avoided; nothing is so well calculated to increase the weakness of the bladder than lying in bed for a long time, or sitting on warm stools or cushions; while thus sitting, or lying in a warm bed, a desire to urinate is hardly felt.—Studious and literary men are subject to weakness of the bladder, not only from their sedentariness, but also from the tense, concentrated condition of the brain, the influence of which organ is necessary to animate the action of all the other organs of the body. Thus, when a person is occupied in close meditation, or active study, all the functions languish, perspiration diminishes, urine is secreted more abundantly, and, the general sensibility becoming greatly lessened, the person does not feel the stimulus the urine excites in the bladder, or, if it be felt, the call is apt to be neglected until the bladder becomes more than usually distended.

In more advanced cases, and especially in the vesical paralysis of

old men, various remedies have been used to impart tone to the bladder, and restore its contractile power. Injections, into the bladder, of cold water, or of cold infusion of Prickly-ash Bark, or of Bayberry Bark, have sometimes proved successful; injections of Tannic Acid, of Alum, of infusion of Geranium, have likewise been found serviceable, as well as the following: Take of Strychnia one grain, Water from three to five pints, Nitric Acid ten drops; mix and dissolve the Strychnia. Of this, from three to four fluidounces may be injected at a time, repeating the operation two or three times a day. If the paralysis be dependent upon some incurable disease, this injection should not be employed.—Ergot of rye has also been recommended, in doses of twenty or thirty grains of the powder, or, a fluidrachm of the tincture (six ounces to a pint), repeated two or three times a day; but its use should not be continued for too long a period at any one time. Tincture of Arnica in doses of forty to sixty drops, three times a day, carefully watching its effects, has likewise been advised. Considerable benefit may be derived from the use of the following pills: Take of Strychnia one grain, Extract of Arnica from forty-eight to eighty grains, Cantharides two grains; mix thoroughly together, and divide into sixteen pills. One pill is a dose, which may be repeated three times a day,—if they cause gastric irritability, strangury, or spasmodic twitchings, suspend their use for a time, employing some other preparation in the meanwhile. In order to give size to these pills, that they may be more easily swallowed, a sufficient quantity of some Extract should be added, as, of Aletris, Indian Hemp, Black Cohosh, Cypripedium, or, Water-pepper, etc. Or, the following will be found useful in many cases: Take of Alcoholic Extract of Queen of the Meadow two scruples, Xanthoxylin (oleo-resin) one scruple, Strychnia one grain; mix thoroughly and divide into twenty pills, of which one may be given two or three times a day.

Galvanism, cold douche, hip baths, stimulating embrocations, firing along the lumbo-sacral region, Croton Oil Liniment, and especially the intermittent use of the Compound Tar Plaster to the perineum, and to the lumbo-sacral region, are among the useful and advisable means of local stimulation and counter-irritation, to be employed in conjunction with the internal medicines. An injection into the rectum, in cases where there is an obstinate vesical paralysis, with a lack of nervous energy of adjacent organs, will frequently prove beneficial,—the following may be employed: Take of strong infusion of fresh Horse-radish Root eight fluidounces, Tincture of Prickly-ash Berries four fluidounces, Tincture of Nux Vomica three fluidrachms; mix. Inject into the rectum about half

a fluidounce, repeating it three or four times a day, as may be required.

Diseases of neighboring parts must be properly attended to in all cases; for, if permitted to remain uncured, we can not hope to remove the vesical affection. Lesions of the nervous centers, as well as of the kidneys, may be relieved and life be prolonged, by conjoining the appropriate treatment for these lesions, with that adapted to relieve the bladder, although a cure is ordinarily out of the question. When there is an imperforate urethral stricture, or an excessive prostatic enlargement, the only chance for the patient is puncture of the bladder.

If the disease is of an inflammatory form, it must be treated upon general principles, meeting the various symptoms according to their indications.

Hysterical paralysis is rendered worse by catheterism; it should never be undertaken. The usual treatment for hysteria is all that will be necessary, tonics, antispasmodics, and measures to strengthen the mind and general system.

RETENTION OF URINE.

Retention of Urine differs from Suppression of Urine (*Ischuria Renalis*) in having this fluid excreted by the kidneys, but from some cause in the ureters, the bladder, or the urethra, it is not discharged externally. In *suppression*, the urine fails to be excreted by the kidneys, and if the functions of these organs fail to be restored, the patient, in the course of from thirty to forty hours, dies suddenly in a comatose condition, or in convulsions, (uremia). Suppression is generally due to some renal affection, or to gout.

Retention of urine is more commonly *caused* by paralysis of the bladder; enlargement of the prostate; and stricture of the urethra. It may also be owing to vesical inflammation; vesical irritation from gravel or stone in the bladder, or from cantharides or turpentine taken internally, or, absorbed from a blister or embrocation; injuries to the bladder; tumors; a calculus in the urethra, etc.— When the retention is complete it is termed *Ischuria Vera*, or, *Ischuria Vesicalis;* when the urine is voided drop by drop, with great difficulty, being attended with a hot or scalding pain, and tenesmus of the neck of the bladder, it is termed *Strangury;* when it is passed with considerable difficulty, pain, and scalding sensation, it is termed *Dysuria*, and which is apt to be the first stage of a complete retention.

The *symptoms* of retention of urine are, an inability to void the urine on attempting to do so, and after several ineffectual attempts the patient becomes fatigued with his efforts, and also alarmed. An uneasiness and pain is experienced in the region of the bladder, which extends to the thighs and loins, the distended bladder forms a tumor above the pubes, hard and enlarged, which can be felt, and which is more or less painful on pressure. In some cases the urine may dribble away by drops, or in occasional small streams when the patient makes an effort, but this does not relieve the sufferings. The desire to urinate becomes more and more urgent, the patient strains, but accomplishes nothing in the way of urinating. As the difficulty progresses, the pulse becomes hard and frequent, the face flushed, the skin hot, the heart beats rapidly, the tongue is covered with a white fur, and the countenance of the patient expresses anxiety and alarm. As the kidneys continue to excrete urine all the time, the danger lies in a rupture of the bladder, in peritoneal inflammation, or, in death from absorption of the noxious elements of the urine. The bladder has been known to contain a gallon of of urine without rupturing, but when this accident does occur it is usually on the third or fourth day.—When there is paralysis of the bladder, there may be no uneasy sensations experienced, and the urine may accumulate to a dangerous extent, without the patient having any suspicions of his true condition.

A retention of urine, when not due to obstruction of the ureters, may readily be *determined* from *suppression*, by the vesical tumor felt above the pubis, and by the flow of urine when a catheter is passed into the bladder, both of which are absent in suppression. It must be borne in mind, however, that a retention may exist, and at the same time even more or less urine be discharged by regorgement or overflow. But if the catheter can not be passed to the bladder, from obstruction in the urethra, this will generally be found owing to prostatic enlargement, to urethral stricture, or to a calculus or foreign body in the urethra. To determine which of these is present, it will be necessary for the physician to institute a careful examination as to the previous history of the patient, and the character of any symptoms connected with the urinary organs.

The *prognosis* of retention of urine is usually favorable; it is unfavorable in those cases where the catheter can not be introduced to remove the accumulated urine, where the retention has not been suspected, or where it has been improperly treated.

The *treatment* of retention from renal calculus, from prostatic disease, from urethral stricture, or from paralysis of the bladder, is that appropriate to these affections themselves, and which will be

found under their respective heads. The obstruction must in all cases be removed, when it exists in front of the bladder, and if this can not be accomplished, or if it be impossible to introduce a catheter to evacuate the bladder, a surgical operation (puncture of the bladder), may have to be resorted to, an operation which is very seldom demanded under proper management. In some serious cases, however, hydragogue cathartics and sudorifics (Spirit Vapor Bath), will have a tendency to relieve the dangerous constitutional symptoms from urinary poisoning, thus affording more time for the employment of curative measures.

In all cases, congestion must be diminished—inflammation overcome. If the retention be owing to inflammation about the neck of the bladder, or irritation from cantharides, turpentine, etc., the patient should be promptly placed in a very warm hip bath, and be kept there for twenty or thirty minutes; and, on coming out of it, a hot fomentation of equal parts of Hops, Lobelia, and Stramonium Leaves should be applied to the perineum,—or, if fresh Stramonium Leaves can be had, they should be bruised, moistened with hot water, and then be applied to the perineum. If, after an hour, the urine does not pass, a catheter should be introduced; but the length of time we should wait before practicing catheterism, will depend greatly upon the degree of accumulation of fluid in the bladder, and the length of time the patient has been suffering. It is better, generally, to employ an elastic catheter well oiled, not too small, nor too large, passing it in with great care and gentleness, lest the urethra should become inflamed or injured, effects which are very apt to follow unskillful and rude attempts.

In some severe cases, it may become necessary to produce perspiration by administering a dose or two of the Compound Tincture of Virginia Snakeroot, and, also to effect relaxation of any spasm that may be present, by injections into the rectum of equal parts of the Compound Tincture of Lobelia and Capsicum, and warm water, having the patient to retain the injection as long as possible. If the bowels be constipated a purgative should be administered. In cases where the feces are hard and impacted in the rectum, and can not be dislodged by purgatives or injections, I have had to scoop out a portion of the fecal matter before an alvine operation could be procured.

In cases where there are no contraindications to the immediate introduction of a catheter, this operation should be performed at once, even though it should occasion irritation. And its use should be continued once or twice every day, until the urine becomes of a healthy character, and the cause of the retention is removed. It

must not be forgotten that when from irritation, spasm or other cause, it is almost, if not wholly, impossible to introduce the catheter, this operation may frequently be performed with success by the production of complete anæsthesia by chloroform or ether. It is not so much the evacuation of the bladder only, that requires the subsequent continuance of catheterism, as it is to prevent the vesical mucous membrane from becoming irritated by the presence of alkaline urine. And so long as the urine continues ammoniacal, so long will the operation be necessary. Besides, the mucous membrane will be less apt to become irritated if the urine be withdrawn before it has attained a great degree of alkalinity.

Strangury from irritating diuretics, cold, or other causes aside from actual obstructions, may generally be overcome by warm hip baths, warm fomentations, and a free use of cooling and mucilaginous diuretics, as, infusion of Water-melon Seeds, Pumpkin Seeds, Marsh Mallow Root, Cleavers, Parsley, etc. The Tincture of Chloride of Iron will frequently be found very useful in cases of retention, especially when it is associated with anemia, or much debility. Among infants and young children, retention of urine may be cured in most cases by the warm bath, application of pounded Garlic or Onions over the region of the bladder, and the use of Sweet Spirits of Nitre, in appropriate doses, in some one of the above-named diuretic infusions.

In dysuria, and ordinary urinary difficulties, where the urine is high-colored, scalding, or in diminished quantity, much benefit may be derived from the use of Compound Infusion of Trailing Arbutus; Compound Pills of Soap; cold infusion of Cleavers, or Sickle-grass; or, Oil of Pumpkin Seeds, six or twelve drops, four or five times a day.

In cases of hysterical retention of urine, catheterism is seldom if ever demanded, though we may threaten to use it, in the hearing of the patient; indeed, catheterism, in these cases, is generally of more disservice than benefit—but we must be careful not to allow the patient to suffer, when the operation is really needed. A cold douche to the genitals will usually be found all that is necessary.

INCONTINENCE OF URINE.

Incontinence of Urine or Enuresis is a disease which may occur at any time of life, but is common to children and aged persons, in which they involuntarily discharge their urine, especially at night. And sometimes instances are met with in which the patient has no

ability, whatever, to retain the urine, which is more or less constantly escaping.

The *causes* of incontinence of urine are various; it may be owing to a distension of the bladder with irritability; to paralysis of the bladder; to prostatic enlargement; to injuries or lesions of the spinal nerve; to mechanical pressure, as from tumors, pregnancy, etc.; to masturbation; to the presence of gravel or foreign bodies in the bladder; and to a rheumatic or gouty habit.

The *symptoms* are, a constant dribbling of the urine as fast as it enters the bladder; or, it may pass away involuntarily, whenever a certain quantity has been retained in this organ, either in an ordinary stream, or by drops. Children are especially liable to void their urine during sleep, and when lying on their backs.

The *prognosis* is favorable, unless there be some incurable abnormal condition present. And great care must always be had to discriminate between the various causes of the incontinence, as well as not to confound it with the "flow from regorgement," which often occurs in retention of urine.

The *treatment* of enuresis will vary somewhat, according to its causes; if it be due to irritable bladder, vesical paralysis, gravel, prostatic disease, urethral stricture, lesions of the brain and spinal marrow, or vesical inflammation, our remedial measures must be chiefly directed to the removal of the primary affection, without which we can expect no permanent relief.

In cases due to debility or relaxation of the bladder, with morbid irritability, as is often met with among masturbators, and persons given to sexual excesses, high living, and irregular habits, as well as among delicate and weakly children, I have found the following simple and pleasant remedy very efficacious: Take of Isinglass (*long staple*) one ounce, Water a pint; boil together until the isinglass is dissolved, then strain, add good sweet Milk a pint, put the whole over the fire again, and allow it to "just boil up," remove from the fire, sweeten with loaf-sugar, and grate nutmeg upon it. When properly made it resembles custard. The dose of this for an adult is an ordinary tumblerful four or five times a day.—The Compound Infusion of Trailing Arbutus will frequently remove the irritation, either with or without the free use of a strong infusion of equal parts of Beth Root, Bayberry, and Wild Cherry Bark; and in some instances, among adults, the following mixture will be found useful: Take of Tincture of Cantharides, Tincture of Digitalis, Tincture of Colchicum Seed, each, one fluidounce, Tincture of Lupulin, one fluidounce and a half; mix. The dose is twenty or thirty drops, three or four times a day.

To give tone to the bladder, the following preparations have been advantageously employed: 1. Take of Tincture of Acetate of Iron, Tincture of Nux Vomica, each, equal parts; mix. The dose is ten or fifteen drops in water, to be repeated twice each evening, at intervals of two or three hours.—2. Take of Tincture of Chloride of Iron half a fluidounce, Tincture of Cantharides one fluidounce; mix. The dose is thirty or forty drops, two or three times a day.—3. Take of Black Oxide of Iron forty-eight grains, Extract of Nux Vomica one grain; mix thoroughly, and divide into twenty powders, of which one may be given every night and morning.—4. Take of Tincture of Chloride of Iron two fluidrachms, Balsam Copaiba one fluidounce, Strychnia, dissolved in a little Alcohol acidulated with a drop or two of Nitric Acid, one grain, Infusion of Quassia twelve fluidounces; mix, and administer a fluidounce three times a day,—for aged persons.

When the disease is associated with irritation of the spinal nerves, the cold douche should be applied to the lumbar and sacral portions of the spinal column twice a day, counter-irritation should also be applied along the same portions of this column, as, firing, or rubefacient embrocations, and the electro-magnetic current may be passed through the bladder and along the spinal column daily. In some cases, the Compound Tar Plaster over the lumbo-sacral region, or over the tender parts, will be useful.

Incontinence in children has been cured by Cantharides, Belladonna, Extract of Nux Vomica, etc. The Isinglass custard, heretofore referred to, in conjunction with a Belladonna plaster over the lumbo-sacral region has effected cures. In a few cases I have effected cures by the administration of a compound Fluid Extract of equal parts of Water Eryngo, Button Snakeroot, and Queen of the Meadow.

Among children enuresis is often the result of habit, or carelessness in not being made to urinate immediately before going to bed; it will, therefore, be necessary to attend to this, as well as to awaken the child at certain periods through the night, for the purpose of evacuating its bladder.

In some cases, it will be found that the urine is passed during sleep, while lying in one particular position, as for instance, on the back—by changing this position, some benefit may, at times, result.—Where children are in the habit of taking suppers, very little fluid should be allowed them, and tea and coffee must be abstained from, even for some time after a cure has been effected. The diet should be principally boiled milk, and wheat flour, with a little cinnamon or nutmeg to flavor it. Sometimes a stimulating

strengthening plaster will be found a valuable auxiliary, when worn over the lumbo-sacral region.—In cases where no cure can be effected, contrivances must be resorted to (portable urinals), to receive the urine as it passes, and to prevent it from soiling the clothes, as well as to protect the neighboring parts from becoming excoriated by contact with it.

GRAVEL.

The debris or disintegrated elements of the several tissues of the body, are to a considerable extent removed from the system in a soluble state, through the urine, under the form of several acids, alkalies, calcareous matters, salts, etc. But from certain causes, one or more of these urinary elements may exist in excess, and will be deposited in greater or less quantity upon allowing the urine to stand for a short time; not unfrequently, these deposits will be found to consist of foreign substances, or matters that are not found in normal urine. Occasionally, however, this deposition is made in the kidneys or ureters (renal calculus), or in the bladder, in the latter instance occasioning gravel, or, vesical calculus. In perfect health no deposit is found in the urine, until after it has been voided and undergone decomposition. Stone or vesical calculus is the result of urinary deposits formed upon a nucleus in the bladder, as, some foreign body introduced into the organ from without,—a nucleus formed by deposits from the urine while in the bladder,—or, a renal calculus, which having entered the bladder becomes the nucleus for future depositions.

It is not my intention to devote any attention to stone or vesical calculus proper, which, for its removal, involves a surgical operation; but to those smaller and more numerous formations of calculi, to which the term "Gravel" is applied, and which are nothing else than renal or vesical calculi, of small size sufficient to enable them to escape through the urethra when urine is voided.—The *causes* of the formation of calculi have not been satisfactorily determined; the more commonly received opinions as to these causes will be named hereafter under each variety. It may, however, be proper to state that no age is exempt from these concretions; they have been found in suckling infants, even along the various periods of life to extreme old age. And they are more frequently met with among those whose habits dispose to debility and disease, aside from any hereditary predisposition, as, among sedentary persons, those who are exposed to cold and moisture; who

have insufficient food; who are irregular or intemperate in their habits; who are obliged from location to drink calcareous or other impure waters; who stimulate the kidneys too much by stimulating drinks; or who are laboring under any affection that can exert an unhealthy influence upon the kidneys and the blood, as, gout, rheumatism, repeated colds, prostatic disease, urethral stricture, renal disease, or lesions of the spinal cord, etc.

The *symptoms* of gravel may be the same as those described for Renal Calculus; or, the only symptom observed may be the passage of a sandy or gravelly deposit with the urine, which is either formed in the bladder, or in the kidneys; in the latter instance, being so small as to readily pass through the ureters and without causing pain. The gravel passed may consist of one, two, or more calculi of various sizes, or it may form a layer of numerous minute calculi, very much resembling sand. If these gravelly deposits are not expelled with the urine, they form a nucleus upon which layer after layer of urinary deposits is formed, eventually developing a *stone* or vesical calculus. These layers may consist of the same kind of deposit throughout, or, they may be formed of different materials, according to the character of the urine at the time they were deposited. And, as the gravelly deposits, as well as the urine, vary considerably in their chemical characters, I will now consider the principal varieties under their respective heads. (*See Urea*, pages 108 and 856.)

URIC ACID GRAVEL. (*Lithic Acid.*)

Uric acid and urates are found in urine, when they exist in excess in this fluid, and when the solvent power of the urine on uric acid or on the urates is greatly reduced, by a too acid condition of the urine, by a deficiency of chloride of sodium, and by the presence of alkaline phosphates in this fluid.—In addition to the remarks on Uric Acid, pages 110 and 856, I will state that intemperate persons, those who indulge in lying long in bed, who have a habit of retaining the urine in the bladder for a long time, who are exposed more or less continually to changes of temperature, or, who use much animal food with but little exercise, are liable to an excess of this acid in the urine.—In the *treatment*, the Compound Infusion of Trailing Arbutus will, probably, be found one of the best agents for the removal of this kind of gravel, yet offered to the profession. It may be used in conjunction with the use of Acetate or Citrate of Potash, suspending the employment

of the alkali whenever the urine becomes ammoniacal, or deposits phosphates.—For the solution of uric acid, the above-named alkaline salts are given to an adult in doses of forty or fifty grains dissolved in three or four ounces of water, and repeated every three hours; for children, the dose is from fifteen to thirty grains.

Among the remedies that have been successfully employed in uric acid gravel may be named, the Compound Pills of Soap; cold Infusion of Cleavers, Broad-leaf Cactus, or, Sickle-weed; Infusion of Wild Carrot Root; Syrup of Apple-tree Bark; Oil of Pumpkin Seeds, etc. No great success has yet followed the solvent treatment by injection of alkaline solutions into the bladder for stone; but when the calculi are small, and known to consist of uric acid, they may be so far dissolved and reduced in size as to permit them to escape through the urethra,—but the process is a slow one. Alkalies internally answer a much better purpose—and particularly in renal calculus where the calculus becomes obstructed or impacted. Nine-tenths of renal calculi are composed of uric acid.

Urates, when in excess, are frequently due to some derangement in the functions of the skin, to intemperance in eating or drinking, and may be found associated with the same conditions as named under Uric Acid. They require a similar treatment. (*See Urates*, pages 111 and 857.)

PHOSPHATIC GRAVEL.

When the urine is alkaline, phosphates are apt to be present; if the alkalinity be due to fixed alkali, the basic phosphate of lime, as well as carbonate of lime, may be precipitated; if it be due to carbonate of ammonia, the deposit will consist of the triple, mixed or secondary phosphates. (*See Phosphoric Acid and Phosphates*, pages 114 and 858). In addition to what has been heretofore remarked concerning *treatment*, I will observe that dilute acid solutions injected into the bladder have been found useful in phosphatic deposits. Syrup or sugar, used at meal-time, has been found to prevent a phosphatic deposit in the urine, in many instances. Infusions of Buchu, of Pareira Brava, and Fluid Extract of Hydrangea, have also proved beneficial. Tonics and alteratives are usually required, with attention to the skin, bowels, etc.; moderate exercise, nutritious diet; and, if necessary, anodynes to allay any general or local irritation.

As uric acid and phosphatic conditions of the urine, frequently

alternate with each other, the urine must be frequently examined, so that we may vary the treatment to suit the character of the deposit prevailing at the time.

OXALATE OF LIME GRAVEL.

I have but little to add to what has already been stated on pages 123 and 861. A pill composed of Aletridin, Leptandrin, Hydrastin, each, one grain, Extract of Nux Vomica one-twentieth of a grain, and given three times a day, will be found very advantageous, in conjunction with dilute Nitro-hydrochloric acid, in cases where gastro-hepatic derangement is present.—Any accompanying lesion should be removed or relieved by appropriate treatment, in all cases where oxalate of lime is present in the urine; and the use of calcareous water as a drink, as well as of articles containing oxalic acid, as sorrel, rhubarb plant, salad, onions, etc., as well as saccharine substances should be avoided.

CYSTINE DEPOSITS.

In addition to the *treatment* named on page 122, I will observe that alkaline solutions, as just referred to under Uric Acid Gravel, when they render the urine alkalescent, dissolve cystine much more readily than they do uric acid. Weak solutions of Nitric, Muriatic, or Phosphoric Acid, injected into the bladder, also dissolve it, but more slowly.

Hippuric Acid, and other deposits will be found referred to on page 113.

GONORRHEA.

Gonorrhea, vulgarly called *Clap*, is an inflammation of the mucous membrane lining the urethra, generally of the anterior portion, and is accompanied with a muco-purulent, or purulent discharge of an infectious nature; it is a specific urethritis, due to the application of a morbid matter, generally, at the time of an impure cohabitation. Yet it may be due to an application of gonorrheal matter to the meatus, without cohabitation; or, to sexual contact during menstruation, which is occasionally met with. I have known gonorrhea to result from the meatus coming in contact with gonor-

rheal matter, partially dried, on sheets upon which the persons lay while sleeping in steamboats,—and though this mode of contracting the disease has been denied by some medical men, I have the most satisfactory evidence of its correctness.

An acrid leucorrhea may also give rise to a gonorrhea; indeed, instances are frequently met with where the husband has contracted a severe urethritis from his wife, who was affected with only a leucorrhea, or, perhaps, some vaginal inflammation; great care is, therefore, necessary, before pronouncing upon the disease, as the health and character of the parties, as well as the reputation of the physician, may be jeopardized by too premature or hasty conclusions. The urethritis thus produced may be infectious or not; in many instances, I have had positive reasons for knowing that the inflammation thus caused, was as infectious as the gonorrhea from an impure coition. I can see no reason why an acrid discharge from acute vaginitis, or an acrid leucorrhea, when it does develop urethritis in the male, may not be of an infectious nature. Indeed, I consider these affections, together with uncleanliness of the parts, as the true and original source of gonorrhea. I have likewise no doubt but that many persons who have cohabited with females, at the period of menstruation, or when laboring under leucorrhea or vaginitis, might have escaped the subsequent attack of gonorrhea had they not aided the cause by excessive drinking of stimulating liquors immediately before or after the sexual acts, thereby rendering their urine more acrid and irritating.

I know of three instances in which immoral married women not laboring under gonorrhea or leucorrhea, imparted severe gonorrhea to their paramours; in each instance the men were married, and had not been with other women; and each of the females was affected with a constitutional syphilitic taint derived from her husband,—these women remained free from gonorrhea, while the other parties suffered. In one of these three cases, after the cure of the gonorrhea, the paramour continued cohabitation with the female for some time, without a renewal of the disease.—With some persons, a drop or two of a saturated solution of sal ammoniac let fall into the urethra, and allowed to remain there, will cause a severe urethritis, with a discharge that will prove equally as infectious as that from gonorrhea. We may have a non-infectious or an infectious gonorrhea (urethritis), the same as we may have an infectious or non-infectious ophthalmia.

A free indulgence in vinous and fermented liquors, internal use of turpentine or of cantharides, masturbation, and the introduc-

tion of foreign bodies into the urethra, are all occasional causes of gonorrhea.

The *symptoms* of gonorrhea more generally appear in from two to four days after an exposure; but, with some persons, they will not be developed until after two or three weeks. Sometimes, the first symptom observed will be a more or less severe burning pain on urinating; but, more commonly, the disease commences with an uneasy, itching sensation in the glans penis, with a fullness and redness of the lips of the meatus, and a soreness and tingling along the whole course of the urethra; a drop or two of a whitish purulent matter may be observed at the orifice, and micturition is attended with a scalding or burning pain, which, in first attacks, is frequently most acute. In a day or two, and sometimes later, this first stage is followed by an increased discharge of muco-purulent matter, which is sometimes thick, and at others very fluid, and of a yellowish color, often tinged with green, from the presence of blood-corpuscles. The glans penis presents a red and inflamed appearance, the urethral canal is quite sensitive and tender on pressure, the lips of the meatus are much swoln and red, the stream of urine becomes smaller, and, whenever voided, occasions much pain and scalding. In connection with these symptoms there may be soreness or pain in the groins, tenesmus, and most commonly an irritable condition of the bladder, with frequent calls to urinate, and a constant uneasiness about the scrotum, perineum, and anus. Sometimes febrile symptoms are present; and, the patient becomes pale and loses flesh rapidly. If the inflammation of the urethra be severe, more or less blood will be observed in the matter discharged. Most generally, after a person has had the disease one or twice, subsequent attacks are apt to be much milder, being, as it were, of a chronic character from the start.

"When the disease is located in the fossa navicularis—that portion of the urethra within the glans penis—the pain of micturition is confined to this part, and the discharge is comparatively small in quantity; when in the spongy portion, extending from the glans to the bulb, chordee is frequent, and the discharge abundant; when the bulbous portion is affected, there is pain in the perineum, chordee, and considerable irritability of the bladder; while, when the membranous part has to bear the brunt of the disease, there is most severe pain in the perineum, a frequent desire to micturate, tenesmus, and perhaps swelling of the prostate and testicles." (*Tanner.*)

Chordee or painful nocturnal erection, is a very common symptom, especially when the urethritis is acute; it usually comes on

while the patient is in bed, sleeping and warm. It is more generally met with in the first attacks of gonorrhea; at the time of the erection the penis is curved downward, and the pain is so severe as to awaken the patient, and sometimes it occasions an involuntary emission of semen. Occasionally, it gives rise to hemorrhage from the urethra, owing to laceration of the mucous membrane, and which, when not too profuse, is of benefit. As in these cases of nocturnal erection, plastic lymph is effused around the urethral canal, the chordee may remain, after the urethritis has been removed, but with less severity, and may continue until absorption of this plastic matter has taken place.

Phymosis, or a swelling of the prepuce over the glans penis, so that it can not be drawn backward; and *Paraphymosis*, in which the prepuce becomes swoln behind the glans penis, so that it can not be drawn forward,—may be a consequence of the inflammation; though they frequently occur from various irritating causes. I have known them to be occasioned by masturbation.—The glands of the groin often become swoln and indurated from the excessive inflammation present, giving rise to *Sympathetic Bubo*.—Not unfrequently *gonorrheal epididymitis*, or *orchitis* exists, either from extension of the inflammation; or from sympathy, in which a testicle swells and becomes hard, with inflammation, and occasioning more or less excruciating pains, extending from the testicle upward to the inguinal canal, and into the small of the back, with symptomatic fever. The left testicle is the one more commonly affected; and not unfrequently the inflammation will leave one testicle and affect the other, and then perhaps return again to the first.—Sometimes small, hard swellings may be observed on the lower surface of the penis, along the course of the urethra, which may suppurate and give rise to troublesome fistulous ulcers.

If gonorrhea be properly attended to, it may be generally cured in from three to seven days; some persons, however, will require as many weeks, or even longer, especially in those cases where the cure is attempted by medicines, by mouth, alone. The disease is very apt to prove obstinate among those who have masturbated considerably, frequently requiring several weeks or even months for a cure. It will also be found more difficult of cure among persons of a scrofulous habit of body, and those who are anemic, as well as among those who continue using intoxicating liquors, high-seasoned food, much exercise, coition, etc., during treatment. With such persons a chronic gonorrhea or *Gleet* is very apt to ensue, and, in some instances, especially where there has been a neglect of proper cleanliness, the constitution becomes somewhat affected, as

manifested by rheumatic pains, excoriations or ulcers on the glans penis, sore throat and mouth, sores on the body and head, loss of hair, etc. (*See* the remarks at the close of the treatment of this affection.)

Long-standing, or improperly-treated gonorrhea, is very apt to be followed by *Stricture of the Urethra.*—And from the contact of gonorrheal matter with the neigboring parts, as, the corona glandis, perineum, etc., *Warty Excrescences* are apt to arise.

A primary chancre in the urethra may give rise to symptoms that may be mistaken for gonorrhea, but it may be known from gonorrhea by the following circumstances: It is more liable to be accompanied with a suppurating bubo; on everting the edges of the meatus, or opening the canal by means of a small forceps, the ulcer may be seen; we may also see it by means of an endoscope; the discharge is usually small in quantity, sanious, and bloody; a circumscribed induration will generally be felt at the part of the urethra where the ulcer is seated; a piece of lint attached to the end of a probe, will, when passed into the urethra, produce a soreness on coming in contact with the chancre, and when withdrawn will be found stained with the chancrous matter.

Among females gonorrhea is apt to cause similar symptoms, but usually of less severity,—as, heat and soreness in urinating, a discharge of colored matter, slight pain in walking, uneasiness in sitting, etc.

Cessation of pain and burning during micturition, diminution of the discharge, and of the vesical irritability, a gradual change of the matter discharged from purulent to mucous, and an improvement in the feelings and strength of the patient, are favorable indications, the forerunners of an approaching cure. (*See Gonorrheal Rheumatism*, page 429).

Treatment. As already remarked, when gonorrhea appears in the male for the first time, it is almost always accompanied with a greater degree of inflammation than in any subsequent attacks. When, therefore, we are called upon to treat the disease during its active inflammatory period, we should commence the treatment by the administration of an active purgative, as, the Compound Powder of Jalap, with Cream of Tartar added, or, Podophyllin and Cream of Tartar. The patient should also drink freely of some mucilaginous fluids, as, an Infusion of Marsh Mallow and Burdock Roots, with or without the addition of Alum, which addition will be found very advantageous in many cases, while with others, the addition of Nitre to the mucilaginous infusion will prove very serviceable. If the patient can remain at home, quiet, during the

first and second day of the attack, it will be much to his advantage. Fresh Stramonium Leaves, bruised, and applied around the penis, will be found most valuable; or, in their absence, a poultice of equal parts of the dried Stramonium Leaves, Lobelia Leaves, and Hops. With some, these poultices will answer a better purpose, if applied cold; with others, warm. In addition to these measures, injections carefully made into the urethra, immediately after each urination, will be found exceedingly useful; they may be composed of Glycerin one fluidounce in which is dissolved Extract of Belladonna half a drachm. What is termed the *abortive treatment*, by injections of Nitrate of Silver into the urethra, has often proved successful, but it is attended with considerable risk, and in my opinion is never required, and should never be used in any case.*

After the more active symptoms have been subdued, as well as in those cases where the disease is subacute or chronic from the commencement, injections should be used. For many years past I have entirely dispensed with the use of Copaiba and Cubebs in the treatment of this disease, and have in all cases, with but a few exceptions, effected cures without any internal medicines, save a purgative or two; using mild injections alone, and which have proved fully as efficacious as when similar solutions have been applied to an inflamed eye, or other inflamed mucous surfaces.

The injections should always be used immediately after urinating, and the patient should not urinate for at least half an hour afterward. A small glass syringe, or one made of hard rubber should invariably be used in preference to a metallic one; and the injections should be repeated three times a day. During their employment and until cured, the patient should support the scrotum and testes in a suspensory bandage, especially if he has to stand or move about much. The injections I more generally prefer, are the following:

1. Take of Sulphate of Quinia twenty grains, Elixir Vitriol one fluidrachm; mix, dissolve the Quinia, and then add to the solution, Camphor Water one fluidounce, Distilled Water three fluidounces, Solution of Iodide of Iron half a fluidrachm. I now make this injection known for the first time, and it will be found truly

*I have cured two cases of gonorrhea, in the early inflammatory stage, by hypodermic injections of solution of Muriate of Morphia. These injections will also be found very efficacious in the early stage of many inflammatory affections, as, Enteritis, Hepatitis, Nephritis, Pleuritis, Pneumonia, Conjunctivitis, Sclerotitis, Iritis, Choroiditis, Retinitis, Crural Phlebitis, Mammary Abscess, Pericarditis, Rheumatism, etc., and also in Asthma.

valuable. In case it acts too severely at first, it may be diluted with a little water, each time of using it.

2. Take of Strychnia two grains, strong Nitric Acid four drops, Distilled Water two fluidounces; mix, and dissolve the Strychnia.

3. Take of Chlorate of Potassa forty grains, Alum ten grains, clear soft Water three and a half fluidounces, Rose Water half a fliudounce; mix.

4. Take powdered Geranium two drachms, powdered Golden Seal half an ounce, Glycerin two fluidounces, Boiling Water two fluidounces; mix, let them stand for several days, frequently shaking, filter, and add from four to eight grains of Acetate of Zinc. This is especially useful in obstinate chronic cases, and in gleet.

Occasionally, other injections will be found serviceable, and, indeed, many have been recommended, but I will only name those that I have found useful, as:

5. Chloride of Zinc one grain, Distilled Water a fluidounce; mix.

6. Sulphate of Zinc two grains, Distilled Water a fluidounce; mix.

7. Acetate of Zinc from one to three grains, Distilled Water a fluidounce; mix. Iodide of Zinc may be substituted for the Acetate in scrofulous patients. A grain or two of Hydrochlorate, Sulphate, or Acetate of Morphia may be added to these solutions, if required.

The strength of the solutions may be increased as long as no irritation is produced. As an injection taken at bed-time favors chordee, it will be better to use the last injection about two hours before retiring for the night. The first and second formulæ for injections may be beneficially passed into the bladder, when the neck of this organ is inflamed or irritable, as manifested by frequent desire to urinate; and, in which case astringent injections should not be used. It may be proper to observe here, that sometimes injections appear to keep up the discharge; this may be obviated in most cases, by diluting the solution used, or by injecting only once or twice a day. A stricture of the urethra, or irritation at the neck of the bladder, will also keep up the discharge; the presence of stricture may be ascertained by the introduction of a bougie, and its cure by appropriate treatment will be followed by a gradual disappearance of the discharge. Vesical irritation may be removed by mucilaginous or alkaline drinks, sedatives, anodyne suppositories, quiet, etc.; Tincture of Sheep Laurel added to the mucilages, will also be found of essential service.

Soft pledgets of lint, introduced within the urethral canal to the

length of an inch or two, to keep the inflamed walls from contact with each other, and constantly kept moistened with one of the above solutions for injection, will often effect a cure. A new pledget should be introduced after each urination. It should not be too large in diameter, or it will increase the pain; a fine thread passed through the pledget, will prevent it from passing downward to the bladder, and will also enable the patient to withdraw it, whenever it is desired.*

Should internal remedies become necessary, as is apt to be the

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* I have just noticed a statement taken from the *London Lancet*, relative to a new mode of cure for gonorrhea, by Mr. H. Thompson, at University College Hospital, and which I should deem an effectual method, from the fact that I have cured several cases by anointing the pledgets of lint, referred to above, or cotton-wick, with medicated ointments, and then passing them into the urethra. The statement is as follows:

"Believing that the imperfect action of injections depends upon the very short time that they are in contact with the mucous membrane, Mr. Thompson conceived the idea of applying the astringent in such a form as would enable it to remain for a much longer period in contact with the inflamed surface. Under his direction Messrs. Bell & Co. have constructed 'soluble bougies,' two or three inches in length, made of cacao butter, containing the drug it is wished to apply. They are cast in moulds, are perfectly firm and smooth, and may be used in any length, but that named has been deemed the best. A soluble bougie is equal in size to about No. 8 or 9 of the catheter scale, and may be introduced (having been previously oiled) by the patient himself into the urethra, where the material gradually melts in the space of about ten minutes. The patient is directed to slip one of these bougies into the passage on going to bed.

"After trying many methods of retaining the bougie *in situ*, Mr. Thompson has adopted the following: A piece of adhesive plaster is cut, nearly an inch wide and five inches long. A piece of Taylor's stout lint, of the same size, is rolled up into a little pad and laid on the center of the plaster, which is warmed and applied along the lower surface and dorsum of the penis, the prepuce meanwhile being fully retracted. A second strip of plaster, half the width of the first, is then put closely around the glans penis transversely. The bougies are made to contain either a quarter of a grain of nitrate of silver, a grain of tannin, two-thirds of a grain of acetate of lead, or ten grains of nitrate of bismuth, as astringents; while others are sedative also, and contain two grains of opium, or two of belladonna. Other materials can, of course, be employed. By this plan Mr. Thompson has satisfied himself that the active agent is kept for several hours in contact with the urethral surface, and is moreover, necessarily squeezed into the lacunæ, which often, doubtless, escape being acted upon by injections. It is by many supposed that these lacunæ, from harboring the discharge and escaping treatment, are the main cause of the persistence of gonorrhea. However that may be, there would seem little doubt that this mode of treatment permits the effectual application of the astringent, and thus promises better results than can be attained by the transitory action of injections. It is as yet too early to pronounce a decisive opinion of this process; but it is very ingenious, and we shall watch the results with interest." (*Lancet.*)

case when there is obstinate irritation at the neck of the bladder, and among certain strumous constitutions, I prefer the following:

1. Take of Canada Balsam half a fluidounce, Spirits of Nitre Dulcis two fluidounces, Oil of Turpentine one fluidrachm, pulverized Camphor thirty grains; mix well together. The dose is a teaspoonful three times a day. When the inflammatory symptoms have subsided, as well as in gleet, pulverized Kino half a drachm, may be added to the above.

2. Citrate of Iron and Quinia in doses of twelve grains, three times a day.

3. Take of Tincture of Chloride of Iron, Tincture of Cantharides, Tincture of Opium, each, two fluidrachms; mix. Dose from half a teaspoonful to a teaspoonful, to be taken in mucilage.

4. Take of Oil of Erigeron two fluidrachms, Oil of Sassafras one fluidrachm; mix. The dose is fifteen or twenty drops on sugar, to be repeated every three or four hours.

If Copaiba is preferred, the Compound Copaiba Mixture will be found equal to any.—A pill composed of equal parts of Sumach Gum (the gum that exudes from the bark of Rhus Glabrum) and Canada Balsam, and pulverized Iron by Hydrogen, a sufficient quantity to form a pill-mass, will be found quite efficacious; it should be divided into five-grain pills, and one be taken every three hours. If the patient be of full habit or strong, pulverized Witch Hazle Bark may be substituted for the Iron.

Chordee is a very troublesome symptom, for which various means have been recommended; among them I prefer the following: Take Lupulin twenty grains, pulverized Camphor ten grains; mix for a dose—to be taken an hour before going to bed, and repeated at bed-time. The penis should also be well rubbed, along the direction of the urethral canal, with a mixture of Extract of Belladonna one drachm, Glycerin one fluidounce; or the following may be substituted: Take of Oil of Stillingia twenty minims, Oil of Lobelia forty minims, Tincture of Stramonium Seeds, Olive Oil, each, two fluidrachms; mix. Other compounds have also been successfully used, as, for instance, take of pulverized Opium a grain or two, pulverized Camphor ten grains; mix for a dose, to be taken at bed-time. Or, in cases where opium disagrees, the Camphor may be made into two or three pills with about five or six grains of Extract of Hyoscyamus. Ten grains of Camphor with two-thirds or one-fourth of a grain of Extract of Belladonna, is likewise beneficial. An injection into the urethra of a teaspoonful of a solution composed of Extract of Belladonna half a drachm, Glycerin, Water, each, half a fluidounce, will often prevent chor-

dee, especially if used some twenty or thirty minutes before going to bed. An ice-cold compress to the perineum will be very effectual. A suppository of Extract of Belladonna and Butter of Cacao, worn in the rectum during the night, has also afforded much relief. The patient should not lie upon his back, should sleep upon a hard mattress, and not be covered too warmly, and, when the chordee comes on, he should have a basin of cold water near, that he may at once arise and cold douche the organ. In all cases, the patient should not eat or drink anything for two or three hours before bed-time, and should have both the bladder and rectum evacuated before retiring. If very thirsty, at this time, he may relieve it by sucking a small piece of ice.

After a gonorrhea, that has been accompanied by a severe and obstinate chordee, is cured, there sometimes remains a contraction at the frenum, by which the penis is drawn downward, when erect, the same as in chordee, and which is sometimes termed "chronic chordee,"—a hardness will also usually be felt on the anterior surface of this portion of the canal, through the external coverings of the urethra; I have found the following preparations very efficacious in removing this condition,—they should be well rubbed over the part three or four times a day, or else be applied on lint: 1. Take of Extract of Conium (or of Belladonna) half an ounce, Oil of Stillingia one fluidrachm, Camphor, Laudanum, each, half an ounce; mix, and triturate thoroughly together. 2. Take of Oil of Sassafras half a fluidounce, Camphor, Opium, each, half a drachm, Iodine twenty grains; mix, and triturate thoroughly together.—Sometimes, from the inflammation and the chordee there will be an obliteration of some of the cells, (from rupture, or lymph deposit), in which case the patients will never afterward have perfect erections.

If *phymosis* or *paraphymosis* attends, an operation is not necessary. Apply over the swoln part, a warm or cold fomentation, as appears to answer best, of equal parts of Lobelia, Stramonium Leaves and Hops; and if the symptoms are obstinate, leeches may also be applied. If necessary, the means named for phymosis, etc., *in the Note*, page 449, may be employed.—When either of these difficulties are of long-standing, the following means should always be tried before resorting to an operation: Rub well upon the swoln and indurated part, a strong solution of Iodide of Ammonium, and then apply over it the following astringent poultice: Take of Lobelia, Bayberry Bark, Witch Hazel Bark, and Bloodroot, each, in powder, half a drachm, pulverized Elm Bark half an ounce; mix,

and form a poultice with water a sufficient quantity. Sometimes, an operation may be required,—but rarely, however.

Sympathetic Bubo may generally be relieved by a plaster of Extract of Belladonna, worn constantly upon the enlargement, the patient keeping as quiet as possible; or, the following may be kept constantly applied to the tumor by means of lint: Take of Tincture of Conium Maculatum, Water, each, a fluidounce, Muriate of Ammonia two drachms; mix, and make a lotion. If the bubo be severe, or tends to suppurate, as is sometimes the case with scrofulous subjects, treat as named *in Note on* page 451. Iodized Oil of Juniper will be found an excellent local application for syphilitic bubo.

Gonorrheal epididymitis or *swelled testicle*, requires that the patient should remain in bed, in a state of quiet, and a poultice of equal parts of Lobelia and Stramonium Leaves should be applied to the parts, renewing it two or three times a day. Each time before applying the poultice, have the scrotum thoroughly rubbed with the following liniment: Take of Camphor, Olive Oil, Oil of Anise, each, half an ounce; mix. In the early part of the attack, especially when it is very severe, leeches should be applied to the scrotum, before the other measures are adopted. It has been advised to apply them just below the external ring of the abdomen, over the cord, instead of to the scrotum, as being much more advantageous. If the constitution suffers much, give the Compound Powder of Ipecacuanha and Opium. When the inflammation is very severe, nauseating doses of Lobelia will be found highly beneficial.—A strong solution of Hydrochlorate of Ammonia in Water applied to the scrotum on a single thickness of muslin, so that it may evaporate and keep the part cold, and even the application of ice-cold compresses, have been used with advantage, but I have never had occasion to employ them.

When the swelling has continued for some time, febrile or active inflammatory symptoms being absent, continue the poultices, and instead of the above liniment use the following: Take of strong Aqua Ammonia, Oil of Sweet Almonds, each, a fluidounce, Tincture of Capsicum two fluidrachms; mix. And internally give the following pills, one or two a day, gradually increased: Take of Extract of Conium half a drachm, Iodine fifteen grains; mix thoroughly together and divide into thirty pills.—An indurated condition of the epididymis may follow swelled testicle, resulting in sterility, the fluid discharged during coition containing no spermatic filaments—of course this only follows double epididymitis. Iodide of Ammonium, in solution, to the part, the use of a

suspensory bandage, regular bowels, attentions to the skin, and Iodide of Ammonium internally, are the means to pursue to remedy this difficulty.

Warty excrescences may be removed by carefully touching them with Nitrate of Silver; strong Nitric Acid; Chromic Acid twenty-five grains to two fluidrachms of Water; or a mixture of Tincture of Chloride of Iron, dilute Hydrochloric Acid, each, two fluidrachms. In applying these articles, care should be taken not to permit them to come in contact with the neighboring healthy tissues, but only with the morbid vegetations. A saturated solution of Hydrochlorate of Ammonia; powdered Savin Leaves and Alum, equal parts; and Hydrochlorate of Ammonia dissolved in Vinegar, have all been found useful as local applications. Dr. Goddard has found an application of powdered Bistort or Tormentilla Root, to be very efficient. When the excrescences are large, they should be removed by ligature when their base is broad, or clipped off with a sharp scissors when it is small, and the portion left behind from which they spring should then be destroyed by the application of caustic to the cut or exposed surface.

The *eczema* on the glans, and even on the body of the penis, in the form of small red vesicles with heat and itching, which is often observed after coition, may be due to uncleanliness, leucorrhea, etc., and may be readily removed by cleanliness, and bathing with the Lotion of Borax with Morphia. It frequently occurs even among cleanly parties without any attributable cause. If the itching be due to lice, *pediculus pubis*, washing twice a day, for several days with undiluted Cologne will thoroughly remove them; or, with a dilute solution of Carbolic Acid.

Gleet or *Blennorrhea* is the result of an improper or unsuccessful treatment of gonorrhea, or of an entire neglect of treatment. It consists of a persistent slight discharge from the urethra, without any scalding or pain during urination. The discharge may be so small as merely to glue the lips of the meatus together every morning, or it may amount to a drachm or two per day; it may be clear and transparent, thin, thick, or purulent, and sometimes passes in coagulated shreds or masses. An itching sensation in some part of the urethral canal, and obscure, transient pains, generally accompany it. And when the prostate or vesical neck is irritated, there will be frequent calls to urinate. The urine usually contains more or less mucus, and sometimes a few pus-globules, with epithelial cells and free nuclei. Although gleety patients have had sexual intercourse without any infection, still, it has been fully demonstrated by past experience, that the discharge is infec-

tions, and that no woman is safe with whom they have sexual congress.

The conditions present during gleet, and which appear to be its sustaining cause are, a chronic granular inflammation of some portion of the urethral wall, or of the prostatic portion, as has been detected by the endoscope,—with, in many cases, granular ulceration; urethral stricture or growths within the canal; morbid irritation of the prostate and neck of the bladder; enlargement of the prostate, etc. And this discharge will be kept up by sexual excesses, overexercise, constipation, masturbation, indulgence in saccharine substances or, in stimulating drinks, more especially beer, ale, and other fermented fluids; it will likewise be maintained by constitutional debility, as well as by a strumous, or rheumatic tendency. A bougie passed over the affected part almost invariably produces a painful sense of soreness, and may, when withdrawn, be found tinged with blood. By means of the endoscope the character and the exact seat of the disease may be seen, and the remedies be applied directly upon the morbid spot.

When gleet depends upon stricture, prostatic enlargement, growths in the urethra, or vesical irritation, the removal of these by the appropriate means will generally be followed by a disappearance of the discharge. When it is due to a granular condition, or granulous ulceration of some portion or portions of the canal, it may be cured by direct applications to the part, through the endoscope, or by one of the following measures: for injections or local applications, Nos. 1, 2, 3, or 4, referred to under injections for gonorrhea, may be used,—and for internal remedies one of the following may be administered:

1. Take of Extract of Nux Vomica twenty-four grains, Sulphate of Quinia, Extract of Hyoscyamus, each, forty-eight grains; mix, and divide into forty-eight pills, the dose of which is one or two pills three times a day, about an hour previous to each meal.

2. Take of Tincture of Blue Flag, Tincture of Mandrake, each, seven fluidrachms, Tincture of Nux Vomica two fluidrachms; mix. The dose is from ten to fifteen drops in water, repeated two or three times a day.

3. Bromide of Potassium internally, with Compound Tar Plaster to the perineum, has effected cures in obstinate cases depending upon prostatic malady or obstinate irritability of the neck of the bladder.

4. Tincture of Sheep Laurel Leaves in doses of ten or twenty drops, three times a day.

5. Take of Sulphate of Quinia twenty grains, Elixir Vitriol, one

fluidrachm; mix, and dissolve the quinia. Then add Tincture of Chloride of Iron one fluidounce. The dose is twenty drops, in water, to be repeated every four hours. Used in debilitated constitutions.

Where there are tender spots or ulcerations in the canal, the following applications have been found beneficial: 1. Take of Tincture of Chloride of Iron two fluidrachms, Wine of Opium half a fluidounce, Rose Water two fluidounces; inject into the urethra, so as to come in contact with the tender part, and retain it there five or ten minutes,—and repeat the injection several times a day.—2. Take of pulverized Opium one scruple, Chloride of Zinc five or ten grains, Spermaceti Ointment one ounce; mix. Apply along the whole course of the urethra every night, continuing its use until it causes no smarting, spasm, or reflex pain.—3. Take of Chloride of Zinc three grains, Chloride of Gold and Soda one grain and a half, Hydrochlorate of Morphia four grains, Distilled Water two to four fluidounces; mix. This will be found especially useful in those cases where an extremely painful and irritable ulcer exists in the neighborhood of the fossa navicularis or near the meatus, applying it two or three times a day, and, in some cases, aided by the daily introduction and retention for about five or ten minutes, of a steel bougie. Indeed, the careful introduction of a bougie, medicated or not, and whether stricture be present or absent, is often followed by a cure; the bougie should be of as large calibre as possible to pass without difficulty or great pain. Its use should be omitted if it increases the discharge.

Much irritability of the neck of the bladder in either gonorrhea or gleet, may be removed by a mixture of one drachm of Bicarbonate of Potassa, half a fluidounce of Tincture of Hyoscyamus, and two and a half fluidounces of Infusion of Marsh Mallow, to be taken in tablespoonful doses every three or four hours.—In many cases of gleet the preparation of Tinctures of Chloride of Iron and Cantharides, named under Gonorrhea, No. 3., may be administered with decided benefit.

In gonorrhea, the patient should keep as quiet as possible, the more so the better for him, and after the more active period has passed, his diet must be light, but nutritious and easy of digestion, avoiding high-seasoned food, acids, fats, coffee, asparagus, tomatoes, pepper, saccharine articles, too much salt, and all intoxicating drinks, especially the vinous and fermented. A suspensory bandage should be worn all the time, especially if he moves about much, the bowels must be kept regular, and coition be positively prohibited. If he be weak or anemic, tonics and preparations of

Iron should be given in conjunction with the other treatment; if he be scrofulous, Iodide of Iron, Iodide of Potassium, or the Bromides, etc., may be given; if he be rheumatic, Colchicum, Black Cohosh, Iodide of Potassium, etc., should be administered, omitting, however, the Iodide of Potassium whenever it increases the discharge. The same rules are applicable to gleet.

Balanitis is an inflamed, excoriated, or ulcerated condition of the mucous membrane covering the glans penis, or the prepuce, with a discharge upon the surface, or, curdy flakes of matter, and heat and itching. Sometimes the ulceration will extend quite deeply. It may be caused by long prepuce, uncleanliness of the parts, matters from the vagina, gleety matter coming in contact with the parts, and secondary syphilitic matters. It may exist simple, or be complicated with phymosis or gonorrhea. It may be removed by cleanliness of the parts, and washing with a weak solution of Tincture of Chloride of Iron, Alum, Nitrate of Silver, Tannin, or Chlorate of Potassa. If phymosis be present, this must be removed by the appropriate means, injecting one of the above-named solutions between the glans and prepuce, three or four times a day. If gonorrhea, warty excrescences, gleet, or stricture be present, these must be treated by the usual means. When associated with, or due to a syphilitic taint, as from uterine discharges of a constitutional syphilitic nature coming in contact with the glans penis, constitutional treatment must be pursued.

Before closing my remarks on gonorrhea, I would state that in quite a number of instances I have observed the disease to be followed, in six or twelve months after its apparent cure, by one or all of the following symptoms, viz.; tenderness of the scalp, falling out of the hair, sore mouth and tongue, fissures in the mouth, balano-postitis, anal and nasal fissures, cutaneous eruptions, obstinate gleety discharge, stiffness of joints, tendency to orchitis, etc. In the majority of these cases I have satisfactorily ascertained that the females from whom the gonorrhea was derived, had no obvious syphilis, but were probably tainted with the disease from previous infections. Can it be that a syphilitic taint in the system can so far influence the gonorrheal or leucorrheal discharge from a female as to infect another party, in coitus, and give rise to the above symptoms? These cases are usually cured by Harlem Oil, in conjunction with the Iodide of Ammonium.

STRICTURE OF THE URETHRA.

Stricture of the Urethra is an abnormal contraction of some portion of the urethral canal, owing to organic deposit in or around the walls of the urethra (permanent or organic stricture); to local vascular inflammation or congestion (temporary inflammatory stricture); or to unwonted muscular action alone (spasmodic stricture). The last form may exist alone, or may complicate either of the two preceding ones.*

The *causes* of Organic stricture are various, the most common being a neglected or badly treated gonorrhea, in which it frequently exists as a cicatricial condition of the parts, following granular urethritis, or granular ulceration. However, stricture may follow inflammation of the urethral canal, whatever may be its cause, and is aggravated and occasionally caused by astringent injections during the period of active inflammation; the improper use of caustics; injuries to the parts; the forcible or improper introduction of foreign bodies into the urethra, as is often done by masturbators, unskillful or unqualified practitioners, etc.; riding on horseback; abuse of fermented liquors; a long continued irritation of the urethral walls, from acrid urine, presence of foreign bodies, growths, or deposits in the urethra, etc.

Inflammatory stricture may be occasioned by gonorrheal inflammation; exposures to cold and moisture; sitting upon cold or damp ground; or by whatever will occasion a vascular congestion of the urethra. This is due to a chronic inflammation of the spongy tissue, and may be located at any part of the canal where this tissue exists.—Spasmodic stricture may be caused by certain excitants when organic or inflammatory stricture is present; abrasion or ulceration of the mucous membrane at the part; rheumatic or gouty diathesis; cold; sexual excesses; horseback riding; violent exercise or straining; hemorrhoids; etc. It is more commonly met with among those who are laboring under permanent stricture, who have phosphatic deposits in the urine, or who have urethral irritability resulting from the use of acids, wines, fermented liquors, cantharides, exposures to cold and damp, improper use of injections, etc. Spasmodic stricture is generally located in that portion of the canal, nearly or entirely surrounded by the acceleratores urinæ and Wilson's muscles, that is, of the sphincters,

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* In the description of stricture I am greatly indebted to the excellent work of *H. Thompson on the Pathology and Treatment of Stricture of the Urethra*, which should find a place in the library of every medical man. (*K.*)

internal sphincter or vesico-urethral orifice, and external sphincter or muscular portion,—and, from the resistance presented to the free and rapid advance of the bougie at these points, they have often been mistaken and treated for organic stricture; and in highly irritable urethras affected with spasmodic stricture, the mucous membrane may be so greatly engorged as to arrest the bougie even at two, three, or four inches from the meatus.

The *symptoms* of organic or permanent stricture may or may not be preceded by a gleety discharge, more commonly this discharge is present in greater or less quantity, as well as an uneasy sensation in the urethra, itchings, or pricking pains. The patient having, as he supposes, thoroughly emptied his bladder, observes a few drops to leak out and moisten his linen. Urination occurs somewhat more frequently than before, and the stream of urine becomes more or less flattened, divides into two or more streams, or passes in a twisted or spiral manner, and gradually diminishes in size; ultimately urination becomes difficult and painful; the patient strains and draws out the penis with considerable force, for the purpose of facilitating the escape of the urine, which in the advanced stage passes drop by drop. Associated with these symptoms are soreness or smarting about the neck of the bladder, a constant but faint desire to void urine, pain above and behind the pubes, dull aching pain in the back, loins, and glans penis, and sometimes severe shooting pain in one or both testicles. Nocturnal emissions are by no means infrequent; and coitus is often accompanied with pain. Gleet is a common accompanying symptom of stricture. Frequently the urine will be mingled with pus, and at times becomes very thick, and accompanying this condition, there will be more or less severe rigors. Sometimes the urine will be white or bloody, indicating a serious character of the disease. From the great straining effort to empty the bladder, in the advanced stage, hemorrhoids, prolapsus of the rectum, and even inguinal hernia have been produced. Impotency, or a partial or complete loss of the erectile power of the penis, is often observed.—If the stricture be allowed to go on, dilatation of that portion of the urethra located behind the strictured part will ensue; the prostate gland, the bladder, and even the kidneys become irritated and inflamed; thickening and ulceration of the vesical coat may occur; and finally chronic urinary abscesses are formed, with fistulous canals in and around the perineum, scrotum, and adjacent parts, and the patient is eventually destroyed. Death may also occur from rupture of the urethra, rupture of the bladder, uræmic poisoning, irritative fever, etc.

The symptoms of inflammatory stricture are, an unusual heat, sense of fullness and tenderness of the perineum, the stream of urine becoming much smaller, and accompanied with great burning pain. It finally passes in smaller and smaller jets, with much straining and tenesmus, until it finally ceases to pass at all. There is inflammation and swelling of the mucous and submucous tissues, with an exquisitely sensitive condition of the urethra. Irritating or astringent injections increase the severity of the symptoms.

The symptoms of spasmodic stricture usually come on suddenly, but without pain, the patient being unable to void his urine, or it may pass with difficulty; the bladder becomes distended, there is an anxiety of countenance, a hot skin, and a quick pulse. It may follow a voluntary retention of urine, excessive coitus, violent exercise, free use of wine or other liquors, the use of cantharides, turpentine, and other stimulants, derangements of the chylopoietic viscera, etc.

Dimensions, etc., of the Urethra. According to careful observations it has been ascertained that the length of the urethra during life is about seven and a half inches, and after death eight and a half or nine inches; these are the average and more constant measurements, which may, however, occasionally be found greater or less. The diameter of the canal varies according to the part, though it must be recollected that in the state of vacuity it presents no cavity, its walls being applied against each other. This cavity is only formed by the introduction of foreign bodies, and, notwithstanding the variations in the diameter, the urethral walls may be dilated or expanded according to the size of the instrument introduced and the degree of force employed. In the natural state the diameters at various points are about as follows: at the meatus, two and three-fourths to three and one-tenth lines; at the fossa navicularis, three and nine-tenths to four and three-tenths lines; directly behind the fossa, three and one-half lines; middle of the spongy portion, three and nine-tenths lines; cul-de-sac of the bulb, four and seven-tenths lines; membranous portion, three and one-half lines; commencement of the prostatic portion, three and nine-tenths lines; center of the prostate, five and nine-tenths lines; urethro-vesical orifice, four and three-tenths lines.

The urethral canal, in an operatory point, consists of an extra-pubic, movable, or pendent portion, and an infra-pubic or slightly movable portion; the first comprises the spongy portion, which, however, is less movable in that part nearest the membranous region, and which, when the penis is flaccid, may be moved in almost any direction; the second, comprises the muscular or mem-

branous, and the prostatic regions.—The membranous region is about from eight to ten lines in length, and passes in a direction obliquely downward and backward, it connects anteriorly with the spongy portion, and posteriorly with the prostatic; at its posterior part it forms the bulbous part of the urethra, which, toward its termination and as far as the middle of the prostatic portion is very dilatable. The whole of the membranous portion is extensible by slow dilatation.—The prostatic region is from nine and two-thirds to eleven and one-third lines in length, passes subhorizontally, and a little obliquely upward and backward in the living body, owing to the contraction of the levator ani muscle. In this region is contained the veru montanum, prostatic and seminal ducts, and the sinus pocularis; this is the most capacious portion of the whole urethral canal.—The spongy region comprises all that portion of the canal between the meatus and the membranous region, and is more dilatable inferiorly than superiorly, because of the greater thickness of the spongy tissue in the first direction.

When the penis is in a flaccid condition, the urethra has two directions, forming a blunt angle with each other, that is vertical, from below upward, and horizontal from front backward, and yet, by bringing the first in the proper direction, the whole of the canal may be made equally horizontal so as to readily admit the passage of straight catheters, endoscope tubes, etc. In a state of erection of the penis, the urethra forms an angle of about 55° to 65° with the body, giving a curve to itself at its pubic portion, termed the subpubic curve, and which describes an arc of a circle three and one-quarter inches in diameter, the cord of the arc being two and three-quarter inches.

The different parts of the urethral canal, in a healthy state, furnish different sensations according to their degree of elasticity and extensibility, when a catheter or bougie is introduced; a bulbous bougie having a diameter of about two and a half lines is the best to use,—its arrest would indicate pathological conditions that a less diameter would not detect. The size of the bulbous part may be adapted to that of the meatus urinarius, as one that will readily pass the meatus can generally be introduced without trouble throughout the whole length of the canal.—In the spongy and prostatic portions a velvety sensation is imparted to the hand of the operator; in the fossa navicularis, the membranous region, and at the urethro-vesical orifice, a sensation of friction or rubbing, but not hard as in the case of strictures; and the muscular or membranous portion in particular gives a sensation of prehension. At the bottom of the cul-de-sac of the bulb, at the entrance of the

membranous portion, the instrument is often arrested, as if an obstacle existed there; there is also a slight arrest at the urethro-vesical orifice.

The person operated upon will experience a more or less sensitive condition of the mucous membrane of the fossa navicularis, so much so with some parties, that they faint or become convulsed as soon as the instrument enters this part. This sensibility becomes blunted after the catheter has passed beyond the fossa, but often re-appears at the subpubic curve, to be again lost as far as to the termination of the bulb. Upon entering the muscular portion, a special sensibility exists; the person experiences a desire to urinate, and throughout this portion he often experiences the same sensation as if he were urinating. These sensations are usually feeble in the normal state, but are increased in a pathological condition. The contact of an instrument with this portion often causes increased perspiration upon the surface of the body, a feeling of weakness, and even faintings; but this phenomenon is not exclusive to this region, being often experienced at the fossa navicularis. Pains in the infra-pubic portion are often reflected into the glans penis and the inferior surface of the fossa navicularis, where they occasion itchings or ticklings; on the contrary, these itchings in the glans may cause contraction of the perineal muscles. When the instrument has entered the bladder, all these sensations disappear.

A bougie may be arrested in its course through the urethra by the valvule at the posterior extremity of the superior wall of the fossa navicularis; at the termination or cul-de-sac of the bulb; and small instruments may likewise be arrested by entering one of the numerous openings along the inferior wall of the canal, the sinus pocularis, or one of the ejaculatory orifices. In such cases we slightly withdraw the instrument, and attempt its passage in another direction, in order to free it from the obstacle; in passing the cul-de-sac of the bulb it may become necessary to elevate the beak of the instrument a little, in order that it may pass, and which requires the introduction of a finger into the rectum.

Organic strictures of inflammatory origin commence insensibly, in such a manner that there exists between the healthy part and the maximum point of the stricture, an infundibulum that conducts to this point. Those of traumatic origin commence suddenly. The orifice of the strictured point may, in regard to diameter, run through the entire scale from the normal caliber of the canal to its complete obliteration; it may be central, or more or less eccentric, according as the band of inodulated tissue completely or incompletely surrounds the urethra.

Strictures are generally quite short, (linear), but often multiple. The orifices of the successive strictures pursue the same directions, or else opposite directions, in zigzag, or rather in a sinuous form, as the infundibulum that precedes strictures of inflammatory origin gives rise, between two points more contracted, to a pipe or passage that is a little smaller and that gradually unites them; in other words, successive strictures with opposed orifices are not abrupt like those of traumatic origin.

Occasionally, however, strictures are very long, and may even affect the whole length of the spongy portion. When they have a certain length, either they are not uniform, presenting points successively more strictured, which give to the bougie a sensation of jerkings, or else they are uniform and result from an atrophy, probably from induration of the spongy body following chronic inflammation; the urethra is then reduced to a hard, ligamentous cord with a narrow canal.

Incomplete strictures are generally dilatable, the complete or circular are not if all the spongy tissue is invaded. The less the spongy tissue is affected the more dilatable will be the stricture. Callous strictures are seldom dilatable. Strictures at the bulbous portion are exceedingly dilatable. Strictures attended by a highly irritable condition of the urethra, that are seated at the meatus, or at the fossa navicula, and sometimes those located at the middle of the spongy portion are hardly dilatable, and may require incision or internal division, more especially those of a circular form at the meatus, and those at the fossa. Old and extensive strictures usually require either internal division or external urethrotomy; internal division being more applicable to strictures seated in the anterior part of the urethra.

Organic strictures exist only in the spongy portion, and not in the membranous, nor in the prostatic. They occur more frequently at the subpubic curvature, that is, at the junction between the spongy and membranous portions, especially at the posterior or bulbous part of the spongy portion,—are less common as the junction is approached,—and are exceedingly rare behind the junction. The next most frequent location is at the meatus urinarius and the fossa navicularis; and finally at the peno-scrotal angle or center of the spongy portion, as well as along this portion to the fossa.

Organic strictures are met with under various forms, according to their location, and the amount of fibrinous deposit producing them, and have been classified (*Thompson*) as follows:

1. *Linear Stricture*, (bridle stricture, valvular stricture). This is

a thin membranous diaphragm stretched across the urethral canal, with one or more perforations, and embracing the whole canal like a narrow ring, or only a part of it like a crescentic septum. The septum may extend directly across the canal, and sometimes it runs obliquely. Occasionally several of these linear strictures, in the form of small narrow bands stretching across the urethra, may be met with. Bridles or valvules are often constituted by the development of the mucous follicles, and open either in front, or behind.

2. *Annular Stricture* is when the narrowing caused by the thickening of the mucous membrane embraces a larger portion of the urethra, not exceeding the fourth or the third of an inch. The strictured part appears as if a cord had been tied round that portion of the canal.

3. *Indurated Annular Stricture.* In this form the indurated deposit involves more or less of the corpus spongiosum and may be of any length not exceeding half an inch, the center of this space being the most contracted part, giving an hour-glass or infundibuliform appearance to the affected portion. The induration is generally thicker on the lower than on the upper part of the canal, and is often appreciable by the finger from the external surface.

4. *Irregular or Tortuous Strictures.* In which the induration extends deeply into the surrounding tissues, often involving the entire thickness of the spongy body, forming hard masses appreciable by the finger; the contraction may be of any length from half an inch to an inch or more, may be regular or irregular, and the canal generally deviates more or less from its proper direction.

Strictures have also been pathologically classified (*Thompson*) as follows:

1. *Simple Stricture*, in which there is diminution in the size of the urinary stream, with frequent micturition and great variation in the amount passed.—2. *Irritable Stricture*, attended with chilliness, irregular circulation, rigors on very slight irritation; and the gentlest employment of instruments causes great pain, and sometimes hemorrhage.—3. *Contractile* or *Recurring Stricture*, in which there is a constant tendency to become narrower in the absence of treatment; and contraction rapidly recurs after dilatation has been applied.

Complete obliteration of the urethra, although very rare, may exist; but it is always accompanied with fistula behind, and results from traumatic causes as well as from urethritis.

Diagnosis of Stricture. Although we may know of the existence of a previous urethritis, or of an injury, preceding the symptoms

above named, yet we should not rely too much upon them in determining the presence of a stricture; in every case, therefore, the urethra should be carefully explored by bougies or sounds, using at first one of a medium size, and increasing or decreasing the caliber according as the instrument selected passes through the canal, or becomes arrested at one or more points. It must be borne in mind that a complete exploration can not always be made at first, from the peculiar sensitiveness of the urethra, and that, consequently, it frequently becomes necessary to accustom the canal to to the contact of instruments, by passing wax or elastic bougies through to the bladder for six or eight days in succession. The object of the exploration is to ascertain the exact seat of the stricture, its diameter, extent, situation of its orifice, whether there are more than one, and whether any complications exist, as, false passages, foreign bodies, hyperæsthesia, prostatic disease, etc.

With regard to the introduction of the catheter or bougie for urethral exploration, the same rules are to be observed as named hereafter for dilating the stricture, carrying the instrument through the canal to the bladder. In introducing it for the first two inches, the beak of the instrument should be directed against the lower wall of the urethra in order to avoid its hitching in a large lacuna upon the upper wall. If the instrument passes readily onward until it reaches the subpubic curve, it may be arrested in its progress in this neighborhood without any stricture being present, but which may be overcome by gentle manipulation, as by withdrawing the instrument a little and then advancing it in another direction, and so proceeding carefully until it passes; it may also be arrested at the prostatic entrance, and after having advanced fifteen or twenty lines from this point, to the urethro-vesical orifice;—but by steadily and gently pressing the beak of the instrument against these parts, they will soon yield and the catheter will proceed until it enters the bladder, which may be known by the flow of urine, if a catheter be used.

The rules for the exploration are as follows: To avoid making a false passage, as well as to determine the existence of one if it exists, in order to avoid censure; to pass the instrument *gently*, using no force, lest a false passage be made; to pass the instrument beyond the sinus or cul-de-sac of the bulb, by gently withdrawing it a little, then with its beak resting on the upper wall to advance it, and, if necessary, stretching the penis by traction, or, perhaps elevating the beak by a finger placed underneath it; if stricture be present, a sensation of pain is developed at some part of the canal where none exists in a normal state, the beak pressing upon this

point; if we continue to advance the catheter when this pain is produced, it becomes increased, and the instrument is either arrested, or passes for a distance of from three to eleven lines, the usual length of a stricture, imparting a sensation of friction and as if going through a small, grasping orifice; if the instrument be arrested, it must be withdrawn and a smaller one be introduced, and so on until a size is obtained that will pass beyond the obstacle; after having passed the stricture the friction ceases, and we have the velvety sensation of the normal walls with cessation of the pain; the friction experienced as the instrument passes through the stricture, is of a rigid character, like penetrating a tube of parchment, and it is held tightly,—in a long stricture, the friction is irregular, giving inequalities, rugosities, jerkings, or as if the bougie were passing over granulations or sand; if several strictures exist and are more than three and a half lines from each other, they may readily be distinguished, but, if they are less than this distance there will be some difficulty in determining them by the olive bougie; in bringing the olive from behind forward, the resistance of the last stricture passed, and its compression can be clearly felt,—by continuing to draw, the ball suddenly penetrates, and we have the same sensations as before, but more distinct,—the extent of the stricture may be known by the distance at which the obstacle was observed from before backward, and that obtained from behind forward, being careful to subtract the length of the ball; the exploring catheter should be graduated, and the seat of the stricture will be known by the depth at which the instrument penetrates before causing pain, or before being arrested; its diameter may be known by comparing it with that of the instrument that will pass through it; their extent and number can only be determined when they are permeable, and may be better made out by bougies with olive-shaped extremity. These olive bougies should be carefully moved two or three times from before backward and from behind forward at the strictured point,—if the contraction commences and terminates by a funnel shape, which is peculiar to strictures of inflammatory origin, a certain increasing and decreasing friction will be experienced before the compression or arrest is felt, according as the instrument is carried from or toward the contracted part; if bridles exist, they will be indicated by the sudden jerk or jump the instrument undergoes at the part where they exist, and according as this jerk occurs from before backward or from behind forward will we know the direction in which the bridle is inclined.

The central or excentric situation of the orifice of the stricture

may be determined by impressions, except at the termination of the bulb where it is always excentric, even in the normal state. Wax bougies, or model (impression) bougies may be used for this purpose, allowing them to remain pressing upon the part for two or three minutes to obtain the impression of the stricture, its permeability or impermeability, and any false passage just anterior to it. A model bougie is formed by attaching to the beak of an ordinary bougie, a soft composition consisting of equal parts of beeswax, diachylon, and shoemakers' wax, working this into a cylindrical shape.—The presence of ulcers, granulations, or strictures in the urethra, their peculiar characters, etc., may also be readily ascertained by means of the endoscope.—It may be remarked here that, provided urine flows in a stream, the urethral canal not being impermeable, it is not essentially necessary to determine the exact number of strictures present, as the posterior ones can be correctly diagnosed as we continue to dilate or cure the anterior ones, or, in other words, we perfect our diagnosis of the condition of the canal as we proceed in our treatment.

With regard to the detection of false passages, ulcers, foreign growths, etc., in the urethra, as well as to their treatment, we refer the reader to surgical works, and those which specially treat upon them, among which Thompson's is, at this day, the best.

The *post-mortem appearances* of stricture are, a loss of the redness of the mucous membrane of the urethra, which is thickened, indurated, rough, or corrugated, with a few transverse bands of whitish fibres beneath the mucous membrane, encircling and narrowing the canal, and, in severe cases, the meshes of the submucous cellular tissue, and even the erectile tissue, are filled with lymph deposit, forming a hard, inelastic, and more or less unyielding mass. The substance forming the deposit is observed, under the microscope, to be the same as that met with in other inflammatory infiltrations, and possessing similar histological elements, instances of which are met with in the interstitial deposit producing cirrhosis of the liver, and in the cicatrices of burns.

The *prognosis* of stricture depends much upon the attention paid to it by both the practitioner and the patient; bridle or valvular, incomplete, and recent strictures are more readily curable than others; while annular, or complete strictures, indurated, and those of long standing, are very tedious and difficult of cure. Strictures resulting from atrophy of the tissues around the urethra, are very difficult of cure. Complications often exist in advanced strictures which may render the prognosis doubtful as abscesses, fistulas, ex-

travasation of urine into the tissues, hernia, complete retention of urine requiring puncture of the bladder, etc.

In the *treatment* of strictures four methods are employed, viz., dilatation, cauterization, internal division, and external urethrotomy. The last three are usually performed in very difficult and obstinate cases, (excepting strictures at or near the meatus), and consequently belong more especially to the domain of surgery. In this work we will devote a few pages to the cure by dilatation, which is applicable to more recent and incomplete strictures, and to the major part of cases presented to the physician's notice, and which consists principally in the careful introduction of flexible or metallic bougies into the urethra, from time to time, in order to promote absorption of the morbid deposition. When the stricture is very small, or the urethra irritable, catgut or small elastic bougies may at first be employed. Experienced physicians, with the proper knowledge of the anatomy of the parts usually prefer metallic instruments, but in the hands of those of less experience and knowledge, the elastic ones are much safer. Before attempting the introduction, the patient should evacuate his bladder.

Having ascertained the size of the bougie required for the commencement of treatment, by the previous exploration, and the patient standing in front of the physician, or, which I prefer, lying upon his back with the shoulders slightly elevated, the medical man will proceed to pass the instrument. This should first be oiled, or anointed with some anodyne ointment, as, of Belladonna, Stramonium, Conium, etc., and in extremely difficult cases, it will also be advisable to freely oil the urethral walls by injecting some olive oil into the canal, and preventing it from passing out by compressing the meatus while the bougie is passed. I generally prefer castor oil in oiling the bougie; and the instrument should always be warmed to a temperature equal to that of the body, as a cold bougie will give rise to spasmodic contractions, and interfere with its advance through the urethra.

Holding the penis lightly between the fingers of the left hand, the bougie is to be passed slowly and gently along the urethra, almost allowing its own weight to carry it, until it comes to the strictured part; no force should be made to pass it, but holding it between the thumb and forefinger, gentle and continued pressure should be made in order that its extremity may enter the strictured orifice,—five, ten, or even fifteen minutes of this steady pressure may be required, when, if the stricture is permeable, it will be felt to yield, and the bougie will slowly pass through the part, and the same course is to be pursued with each obstacle encountered. If

too much pressure be made, the urethra may be torn through its walls, and a false passage be made, which is frequently done by careless or ignorant operators; when this happens, immediately withdraw the bougie, instruct the patient not to urinate for a few hours, and make no further attempts to pass a bougie until twelve or fourteen days have passed.

The signs of the production of a false passage are, 1. At the moment it is produced, both the patient and the physician experience a sensation of crackling, of tearing, and blood flows from the urethra; sometimes these signs are absent, or, if blood be present, it may proceed from another source, as, for instance, urethral fungosities.—2. Another sign is a deviation of the direction of the bougie from the median line; but this will not be observed when the false passage is parallel to the urethra.—3. When a false passage has commenced, the instrument advances with difficulty, and gives rugous frictions; but the same sensations are produced when the bougie is engaged in one or several strictures,—it is equally held tight by them, and passes only when some force is employed, after the beak has entered the orifice.—4. Some practitioners have carried the *catheter* through a false passage, nearly, if not quite, its whole length, without any suspicion of it. A want of the flow of urine should then be taken as an evidence. However, the catheter may be carried to the bladder without a flow of urine, either because its orifices have been closed by mucosities, or because they have entered above the surface of the fluid; an injection in the first instance, and a slow withdrawal of the instrument, in the second, will remove the difficulty.—5. If, nothwithstanding these signs, the deviation of the route through the urethra has not been noticed, (which can hardly happen except when the catheter re-enters the urethra, or is in the bladder, and has permitted the urine to flow), we will become aware of the presence of a false passage by the consecutive symptoms. Complete false passages give rise to infiltration of urine, abscess, and urinary fistulas; incomplete, may remain for a long time without occasioning any symptoms,—their tract often becomes cicatrized. Model bougies may give an impression of them.

Having passed the bougie through the stricture, we must allow it to remain in a length of time according to the character of the contraction; if this allows the instrument to pass through it rather readily, from five to ten minutes will be sufficient; if the passage has been difficult, it may remain in for half an hour or an hour; if it has been extremely difficult, the orifice being quite small, it may remain in for eight or ten hours, or all night;—but in no case

must it be allowed to remain long enough to give rise to irritation at the part.—The next day, provided there be no irritation nor inflammation to prevent, or as soon as the irritation is removed, two bougies are to be introduced, commencing with one of the same size as that used the last time, and, after allowing it to remain a few minutes, withdrawing it, and immediately passing the other, which should be a size larger. Thus, on every session, using two bougies, always beginning with one of the same size as that with which the preceding operation had been finished, and concluding with one a size larger. The pressure of the bougie will generally occasion a mucous discharge in dilatable strictures; non-dilatable strictures give a dry bougie upon withdrawing it.—In all cases of difficult introduction, the patient should take a warm sitz bath immediately after the operation, for about half an hour each time, in order to prevent any great amount of irritation following; and should the urethra become very sensitive or irritable, this may be overcome by injecting as far as the irritable part, a small amount of a mixture of Extract of Belladonna half a drachm, Glycerin a fluidcunce; repeating it, as required, two, three, or four times a day. Bruised Stramonium Leaves (recent) to the perineum, or around the penis, according to the location of the stricture or of the sensitiveness, will also exert a good effect.

It may be the case, that the orifice of the stricture may be excentric instead of centric, in this case, after a careful pressure for ten or fifteen minutes without the beak entering the orifice, we should withdraw the instrument an inch or two, and then, keeping the beak as much as possible against the side or wall of the canal, slide it along; thus trying consecutively every part of the surface of the canal until we have discovered the part or direction at which the orifice exists,—and when once ascertained, it should be recorded, in order not to forget it in subsequent operations.

The following rules, from an English writer, bearing in mind all that has been heretofore observed relative to the exploration of the canal, diagnosis, etc., will be found useful in the introduction of bougies;—1. Begin with one of a moderate size, or such as will pass the stricture, and increase it very gradually; sometimes, its passage will be greatly facilitated by curving it, previous to its introduction, so as to adapt it to the curvature of the urethra.—2. Employ no force in passing it along the canal; but where resistance is encountered, be content with merely causing its beak to press against the contracted orifice for a short time each day, with the hope, that by a perseverance in this plan, an entrance and a dilatation may ultimately be effected.—3. Never pass the bougie

into the bladder, except at the first exploration to ascertain the extent of the disease, but merely carry its beak at a short distance beyond the stricture or strictures.—4. If it is to remain in the canal any length of time, guard against its slipping into the bladder, by bending its end, and tying it with a cotton thread or tape fastened to the penis. I have found a better plan to be to cut the bougie to the required length, and then, by means of a small disc attached to its outer extremity, and which rests upon the glans around the meatus, it is retained in place.—5. Avoid all exercise during its presence in the urethra, and prevent, as much as possible, the penis from becoming erect.—6. In every case, even after the disappearance of the stricture, the bougie should be occasionally passed for a considerable length of time, at first every month, then once in every three months, and finally once in every six months; and should there be the least return of the obstruction, to which there is always a tendency, the dilatation should again be had recourse to. And on this account, the patient should always be taught to perform this operation for himself, as soon as the canal becomes sufficiently dilated to admit of the ready passage of a large sized bougie.

In addition to the means already stated, other means must be pursued in order to facilitate the cure, and render it permanent. In difficult cases, a poultice of bruised recent Stramonium Leaves, or, of dried Stramonium Leaves and Lobelia, should be applied around the penis, or to the perineum, according to the seat of the obstruction, and be allowed to remain on, each time, about half an hour or an hour previous to the introduction of the bougie; and two or three times a day, the surface immediately external to the stricture should be well rubbed with an ointment composed of Belladonna Ointment one ounce, Iodine ten grains, Strychnia, dissolved in sufficient Alcohol by means of a drop or two of Nitric Acid, two grains; mix, triturate the articles thoroughly together, and use but a small portion at a time, being careful not to let any of it come in contact with an abraded surface, the eyes, or the mouth. These means favor the ready passage of the bougie, and produce a condition of the parts in the neighborhood of the adventitious deposit, favorable to its more rapid absorption, when compressed by the bougie.

In some cases, the application of Mild Vegetable Caustic upon the stricture, by means of a proper instrument, will facilitate its softening and absorption; Alum, Sal Soda, and ointments containing small proportions of Chloride of Zinc, Sulphate of Zinc, etc., will also frequently answer a similar purpose, but great care

must be taken not to occasion too much irritation by these applications.

Not unfrequently, internal measures will greatly facilitate the cure, and I have found considerable benefit to follow the free use of an infusion of Horse-mint, Water Pepper, or Buchu, in conjunction with one of the following pills, repeated two or three times a day: Take of Digitalis, in powder, one scruple, Strychnia one grain, Extract of Stramonium five grains (or Extract of Belladonna four grains), Alcoholic Extract of Black Cohosh one scruple,—mix thoroughly together, and divide into twenty pills. The following has also proved serviceable: Take of Iodine one drachm, Strychnia two and a half grains, Podophyllin twenty-four grains, Alcoholic Extract of Black Cohosh three drachms, Leptandrin a sufficient quantity to form a pill-mass; divide into one hundred and eighty pills, the dose of which is one pill to be repeated three times a day.—Bromide of Potassium internally will be found very serviceable in cases of stricture attended with considerable irritation of the urethra and bladder, allaying the irritation so that a bougie can readily be passed.

The urine must be kept as free from acridity as possible, by the use of proper diet, mucilaginous diuretics, diaphoretics and bathings of the surface, as little exercise as possible, and, if required, the means heretofore named for acid and alkaline conditions of the urine. The bowels must also be kept regular, exposures to cold and damp be avoided, together with a plain, but nutritions and easily digestible diet, avoiding all stimulants.

The resilient and undilatable strictures met with at or near the meatus urinarius, and at the fossa navicularis, always require incision or division, after which, a large bougie should be passed, and be retained for a considerable time to prevent contraction occurring from cicatrization. Steel or silver instruments are the best to be employed in these cases.—The character and condition of a stricture, the ready introduction of a small bougie through its orifice, the internal division of an undilatable stricture, the direct application of agents to the strictured part, and consequently, a safer and far more efficacious treatment than has generally been pursued heretofore, is readily accomplished by the employment of the endoscope.

The treatment of *Spasmodic Stricture* consists in evacuating the bladder as soon as possible, by the introduction of a catheter, which may be readily effected by at first placing the patient in a warm bath. When the catheter reaches the strictured part, it should be held firmly but not forcibly, the same as named in the

preceding treatment for organic stricture, for some ten or fifteen minutes, when it will overcome the stricture and pass into the bladder. If, however, the stricture be very obstinate, a fomentation of recent Stramonium Leaves, bruised, or, of dried Stramonium and Lobelia Leaves may be applied to the perineum, and, if necessary, around the penis, and be kept there for some time, aided by nauseating and relaxing doses of some preparation of Lobelia; after which, the introduction of the catheter may be attempted.—Dr. Thomas says, "In spasmodic stricture, where the irritability of the urethra is so considerable as to forbid the introduction of a common bougie, this may be readily lessened by touching the point of the instrument slightly with Liquor Potassa, after it has been oiled, and is ready for introduction. The effect of potassa employed in this manner upon an irritable urethra is often astonishing, and a full-sized bougie may be thus easily passed into the bladder, which had been previously regarded as impracticable." The above cataplasms of Stramonium, the injections of Belladonna and Glycerin into the urethra, and the use of anodyne and relaxing suppositories or injections into the rectum, will also facilitate the catheterism.

Spasmodic stricture is apt to return; in order, therefore, to permanently remove it, an after treatment should be pursued, consisting of temperance in all things, regularity of the bowels, and the use of a pill, repeated two or three times a day, composed of Sulphate of Quinia one grain, Extract of Belladonna one-eighth of a grain, and Eupurpurin two grains; mix for one pill. The Injection No. 2, under the treatment of Gonorrhea, will also be found beneficial. In obstinate cases, a liniment may be applied once or twice daily, to the perineum and along the course of the urethra, composed of Olive Oil, Oil of Amber, each, one fluidounce, Oil of Lobelia, Aconite Liniment, each, two fluidrachms; mix.

Inflammatory Stricture may be removed by anodyne poultices, spirit vapor bath, cathartics, warm fomentations, sedative injections into the urethra, anodyne suppositories, nauseants, sedatives, and other similar measures.

SPERMATORRHEA.*

Spermatorrhea is the term applied to a spontaneous discharge of semen, generally occurring at night, during sleep, and occasion-

*"Spermatorrhea" is an unfortunate name for the malady or maladies resulting from excessive venery or masturbation, as there are but very few instances

ally during the day. The night discharges are termed "nocturnal emissions," or "nocturnal pollutions." It may arise from several causes, but more commonly from sexual excesses, and especially from masturbation. Unfortunately, masturbation is a vice by no means uncommon among the youth of both sexes, and is frequently continued even into riper years; in the course of the last twenty-eight years, I have treated 2,751 males and 117 females, whose ailments were brought on by this habit; and, in addition to this, during the same length of time I have received communications from more than 4,000 persons, victims of self-pollution, who did not come under my treatment, either because I could not promise quick cures, or, for pecuniary or other reasons. I state this to show the prevalence of the vice, and its evil results, although denied by many practitioners, who ought to know better.

Although upon commencing the habit of self-pollution there may be no abnormal tendency of the system, yet, if the practice be persisted in, it eventually produces morbid condition of the spinal marrow and cerebellum, which, together with the accompanying symptoms, are of very difficult and tedious removal; and the more frequently the vice is indulged in, the greater will be the desire to continue it, from the prostration of the will—and mental powers,—so that, like the drunkard, the victim loses all moral power, and has no longer any control over his animal appetites, and the cessation of the habit becomes almost, and in some cases, quite an impossibility. Yet there are many instances in which mental and physical injury are not present, unless indeed, they unfortunately exist in the imagination of sensitive and timid persons, being either caused or aggravated by the exaggerated statements made in popular works by interested writers.

It must be constantly borne in mind that nocturnal emissions, of themselves, although annoying, are not dangerous; the danger exists in the reflex movements,—the functional or organic lesions of the brain and spinal marrow following their frequent repetition, and particularly when they are associated with the powerful mental efforts usually made by masturbators during the act, to conjure up the most libidinous, unnatural, and voluptuous—exciting ideas and images, and, as it were, to make a reality of them. Nocturnal emissions may occur with any man, as well as spontaneous nocturnal sexual orgasms with the female, and under the

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of spontaneous seminal discharges except those that occur as "nocturnal emissions." The day discharges are more commonly of prostatic and not of seminal fluid. I employ the term here in its more popular (but erroneous) sense, as referring to the several abnormal conditions following the above-named vices.

influence of one or more of a multitude of causes, without constituting a disease; they may even occur as favorable crises among those who are continent. But when these pollutions occur frequently, and especially when they are followed by the symptoms hereafter named, the result of frequent nervous irritation, attended by reflex motions, they then become serious and demand prompt attention.

The practice of masturbation is almost always commenced in early life; among the many persons whom I have treated for maladies occasioned by this unnatural practice, I have met with but one who commenced it subsequent to the eighteenth year of age,—the others acknowledged that they first practiced it at an age varying from ten to fifteen, and some at so early a period as to have actually forgotten the initiative. But, however early may be the age at which persons first masturbate, the practice is not always confined to their youth, nor suspended when coition is to be had, but is frequently continued into riper years, and even by those who are married.—Among females, however, I have met with many who commenced the practice after their eighteenth and some even not until their twenty-fifth year; this may be owing to the fewer opportunities they have for gratifying the passion naturally, than males, and to their greater chances of detection, when they receive the embraces of the male.

To enumerate the multifarious symptoms accompanying spermatorrhea, would be almost a Herculean task; they vary according to the frequency of sexual excesses or masturbation, the stamina of constitution, the temperament, the condition of brain and nervous power, the age at which the habit was commenced, the predisposition to disease, and various other circumstances. Strumous, and delicate, weakly habits suffer the most. Some persons practice it moderately, for years, with perfect impunity; while with others the same course gives rise to symptoms of a grave character. More frequently, however, the severer symptoms and maladies produced by it are extremely rare, and are met with only among those who have carried their unnatural indulgence to a very great excess. And when the symptoms of spinal and cerebral disturbances manifest themselves, the pathological condition has already been in existence for a long time: many months, and even years may pass before they become manifested, and this tardiness in their development often leads to a mistake of their true cause.

When the habit is commenced in childhood, or previous to the twelfth or thirteenth year, before there is any semen formed in

boys, or ovarian manifestations in girls, no *symptoms* are observed until the nervous system suffers; and the loss of nervous energy is caused by the overexcitement produced, which exercises upon the brain and nervous system an effect similar to that caused by repeated convulsive shocks, or epileptic spasms, in consequence it often retards the growth, impairs the mental faculties, and brings on a premature old age, with debasement of the human soul, and the mind filled with obscenity and beastliness. The child loses its memory and brightness of intellect, and gradually becomes dull, stupid, and indolent; it moves about slowly and heavily; the face becomes pale, and emaciated or swoln; the lips grow paler; the eyes become hollow and encircled by a livid margin, and the pupils are much dilated; the disposition becomes more irritable and fretful; the appetite capricious, voracious, or diminished; in walking, the gait becomes stooping and tottering; all taste for play or exercise is lost; and solitude is sought for the purpose of reveling in voluptuous ideas and indulging in titillation of the sexual organ. Various symptoms indicative of cerebellar and spinal disturbance manifest themselves, as, noises in the ears, headache, dilated pupils, partial blindness, determination of blood to the head, with heat and redness of the face, forgetfulness, great languor and debility, trembling of the knees, perverted vision, etc. Stammering is also a frequent result of early masturbation, owing to the frequent shocks to the nervous centers, injuring them and impairing their functions; the cerebellum being kept in a constant state of abnormal irritation.

With many, symptoms of dyspepsia appear, with general emaciation; there will be a frequent desire to void urine, with more or less pain in accomplishing it; the bladder becomes irritable requiring to be evacuated often; the child becomes feverish, and should any acute disease attack it, this assumes a typhoid character, which is apt to prove rapidly fatal. If the child is disposed to chorea, epilepsy, spasms, pulmonary disease, etc., these are certain to be induced in time. If the unnatural practice be continued, although no semen is lost at first, yet, after a time, the continued excitement, probably from a rapid or forced development of the functions of the genital organs, will effect a discharge of prostatic fluid, and perhaps even semen, and which will be attended with increased pleasurable sensations. If the habit be not left off, insanity, idiotcy, paralysis, or some other incurable malady is brought on, which eventuates in death.

The symptoms, among those masturbators who have arrived at the age of puberty, or at an age when semen is secreted, are as various as those met with among children, and are due to the excessive

discharges of semen, the constant straining excitement of the brain, and the repeated spasmodic shocks experienced by the nervous centers; several of these symptoms will usually be found in individual cases; rarely will they all be found present in any one subject. One very common symptom, more especially among young females, is a disposition to solitude, to seclude themselves from society; and this is by no means unfrequent among male masturbators. Headache, wakefulness, uneasy and restless nights, pains in various parts of the body, indolence, inaptitude to study, forgetfulness, melancholy, hysteria, great mental despondency, suicidal thoughts, weakness in the back and in the reproductive organs, variable appetite, and a lack of confidence in one's own ability, are very usual symptoms. Cowardice is a striking peculiarity,—masturbators can not look a person in the face steadily, for they fancy their habit is known or at least suspected. Symptoms of dyspepsia, with cough, irritation of the throat, pains in the chest, costiveness, unrefreshing sleep, disturbed dreams, constant and annoying lascivious desires and thoughts, and a tendency to lie long in bed in the morning. Among females, we also find leucorrhea, prolapsus uteri, menstrual derangements, sterility, hysteria, chronic uterine or ovarian congestion resulting in uterine or ovarian tumors, catalepsy, nymphomania, and often unaccountable nervous symptoms.

But the more important and usual symptoms accompanying spermatorrhea, are those due to functional or organic lesions of the nervous centers, the principal of which are as follows: weakness of memory; an inability to concentrate the mind; a want of confidence; disposition to mental and physical indolence; disturbances of vision, as, spots, flashes, bright lights, etc.; ringing or roaring in the ears, dull pain in the occipital region, or along the vertebral column, and especially in the lumbar region,—at first, these pains are manifested only after the seminal emission, but eventually they become prolonged, and terminate by being constantly present; more frequently, this dull pain obliges the patient when sitting or standing to frequently change his position, and it becomes less marked or even disappears when he lies down; weakness in the small of the back; palpitations; formication; and in severe cases, there is weakness or trembling of the knees or hands, a tendency to profuse perspiration on the least exercise, and a staggering gait much like that of an intoxicated person—tabes dorsalis or ataxie myelo-phthisis. But it must be recollected that the more severe cases are rarely met with.

From want of nervous energy and nutrition, the penis, as well as the testes, gradually diminish in size and energy, and have more or

less coldness; sometimes the testes swell and become tender or painful, or hang very low; the spermatic vessels enlarge, feeling like a coiled up bundle of worms, (varicocele); priapism is sometimes present. There is a weakness at the root of the penis, when erect, with often a soft state of the glans penis; and although not completely impotent, yet as far as the female is concerned, the patient is wholly useless, from imperfect erections and premature emissions on attempting coition. One of the more common and serious results is an involuntary discharge of the prostatic fluid (*see Prostatorrhea*), immediately after urinating or defecation, with seminal emissions during sleep, and either with or without erotic dreams, as well as with or without pleasure, according to the degree of normal nervous sensitiveness of the parts. The prostatorrhea is frequently accompanied with an itching or tickling in the glans penis, and is a most obstinate disease to overcome; it has been commonly confounded with seminal discharges, and has been termed "diurnal emissions or pollutions,"—but day spontaneous emissions of semen are very rare. I have met with but two cases in my practice.

The nocturnal emissions may occur every night, once a week, or only twice a month, and, as already remarked, in some rare instances, they may come on in the day-time. Cauterization has been recommended for these emissions, but I do not believe a single permanent cure has ever been effected by it, notwithstanding what has been stated by writers.

A microscopic examination of the fluid discharged, will detect its seminal character, by the presence of the spermatic filaments; in very bad cases, more or less of these filaments will be found in an abnormal condition, as, the head of the filament without the tail, or the tails will be short, or else have no head, or, again the tail or the head will be deformed, or there may be but a few filaments visible, in the midst of a fluid, containing little granules and the debris of epithelial scales,—and small crystalline masses will also be noticed in most cases. But it must not be forgotten that when there is a complete obliteration of the spermatic ducts, the fluid ejected is principally prostatic and contains no spermatic filaments whatever.

Chronic irritation of the neck of the bladder is common, with a sense of weight and fullness in the part, a frequent call to urinate, and, in some cases, requiring the patient to get up during the night. There is also apt to be a morbid sensibility of the genital organs, as manifested by tenderness or pains, itchings, and a more or less constant half-erotic condition of them; and when alone,

especially at night, a masturbator is powerfully disposed to pollute himself, notwithstanding the terrible consequences which he knows must ensue from a persistence in the habit; this is due to morbid sexual excitement with loss of moral power and nervous energy. In cases where there is great excitement of the genital organs, or where there is a disposition to continue the habit of masturbation, certain agents have been administered to check or suspend sexual feeling; but however much this class of agents (antaphrodisiacs) may be desired, their continued, or too frequent use is often more harmful than beneficial. Moral power, strength of will, are the best antaphrodisiacs, and these should be well cultivated.

When there is an irritable condition of the seminal vesicles and ducts, the presence of semen in the vesicles always produces more or less excitement, which, in connection with the irritability of the surrounding parts, amounts to an unhealthy excitement; this, under favorable circumstances, as, in the presence of a woman, becomes very much augmented, and is apt to cause an intense sexual feeling, supposed by the patient to be an evidence of a naturally strong animal passion. This condition is likewise often caused by an irritable state of the cerebellum. If, under this mistaken supposition, coition be indulged in, and continued to any extent, the ultimate result will be an impotency difficult to cure, and which may either come on rapidly, or gradually manifest itself, not being complete until several years have passed. Persons laboring under this kind of irritability, will have the sexual desire aroused by any slight extra irritation, as, riding on horseback, in a coach or stage, and even upon a mere handling of the parts.

There is also apt to be a weakness of the walls of the urethra, in which, after urinating, a few drops leak out and moisten the linen; and the stream may be free, flat, twisting, or divided into two or more jets soon after leaving the urethra; this is also common to stricture. Crystals of oxalate of lime, or dumb-bells, are apt to be present in the urine, more especially when the gastro-hepatic organs become deranged.

From a deranged or perverted nervous excitability of the sexual organs, the semen is prematurely discharged on attempting coition; or else, coition can only be performed under certain peculiar circumstances; and, from defect of sexual nervous power with muscular debility, there will be a partial or complete impotency.* The

*Although many medical men of high reputation deny the existence of abnormal results from masturbation, and even go so far in their ignorance or prejudice, as to attribute many of the symptoms encountered to mental influence,

commencing signs of impotency are, a weakness at the root of the penis during erection; an inability to maintain an erection and complete the copulative act, without causing the imagination to dwell lasciviously upon other females; premature emissions; diminution or loss of sexual desire; and softness and flaccidity of the penis *immediately* after an emission. One or more of these symptoms are always present in approaching impotency. Permanent impotency may or may not be associated with great loss of memory, mental weakness, great depression of spirits, and, in very severe cases, some kind of eccentricity, or monomania.

The more common consequences of excessive masturbation are, various symptoms simulating those of lesions of the brain, spinal marrow, heart, lungs, liver, stomach, or kidneys, as, chorea, mental impairment, hypochondria, premature old age, epilepsy, insanity, apoplexy, paralysis, dyspepsia, nervous irritability, etc. The children of parents whose nervous centers have been impaired by masturbation, are seldom robust and vigorous; in infancy they are subject to convulsions, to epilepsy, to scrofula, to bad habits; in adult life their mental qualifications are never extraordinary, and they are apt to be diminutive in stature. Frequently, however, a proper course of training will overcome some of these results, if commenced at a sufficiently early age, and persisted in until the full period of puberty.

The *diagnosis* of spermatorrhea is readily made out by the history of the case, the symptoms present, and the microscopic examination of the fluid discharged; an absence of spermzoons in this fluid is indicative of an obliteration of the spermatic duct, or else that the fluid is prostatic; deformed or imperfect spermzoons indicate a lesion of the semen-forming organs, with impaired nutrition and defective nervous power; a thin watery semen is indicative of irritability and debility of the seminal vesicles and the prostate gland (functional impairment).

Some persons may masturbate moderately, present apparent indications of good health, and yet secretly suffer from some of its con-

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yet I have seen and treated too many cases to be misled by their statements or reasonings; and I venture the assertion, that there are hundreds of married men now living, between the ages of thirty-five and fifty, who are secretly suffering from premature emissions and partial impotency, the result of former sexual excesses, and who make no efforts to obtain relief, either from a false modesty, or a want of confidence in the skill of the profession,—and who fear to fall into the hands of advertising and unprincipled impostors. It is time that medical men should drop their prejudices regarding this subject, and devote more attention to it,—a subject which is of vital importance to humanity.

sequences; it is by no means uncommon for men, apparently healthy in every other respect, to be laboring under a partial or complete impotency at a period of life when their virile powers should be in a state of full vigor. More generally, however, masturbators, and especially those who have carried the act to an excess, may be known by their paleness or sallowness of countenance; by the rough, dry, cracked, or pimpled condition of the skin; more or less emaciation; dark semicircle under the eyes, which are apt to be sunken and hollow; dilated pupils, and a languid aspect as if drowsy or indolent. There is also a desire for being alone, or, when in company they keep aloof, sheepishly regarding some of the opposite sex who may be present, mentally associating them with lascivious and beastly ideas. They are late risers, loving to lie in bed for hours in the morning; their propelling, moving power becomes diminished. There is a want of firmness, of decision, in their deeds and manner; they are easily agitated, irresolute, timid, are apt to be slow of comprehension, are inattentive, "absent-minded, sad, melancholy, easily frightened, easily discouraged, wanting in clearness and point of idea, less bright than formerly, and altogether depreciated in looks and talents compared with what they would have been, had this soul and body-destroying practice never been contracted." They can not look another person steadily in the eyes, at least without blushing, or manifesting an apparent feeling of guilt or shame. The flesh becomes soft and flabby, and there is apt to be a weakness of the joints, more especially in the knees. A peculiar, disagreeable, rank odor is very apt to be exhaled from the body of a masturbator. Females, in addition to the above, will manifest a retiring, diffident manner, and a peculiar reserve in answering the common questions relative to health. Not unfrequently, when the fingers are used to bring on the venereal orgasm, sores will be seen around the nails, or, one or more very rough and broad warts, most generally upon the index and second fingers.

The *prognosis* of spermatorrhea is generally favorable. But there are cases, in which the lesions of the nervous centers have become so severe that they are beyond the reach of art, and a fatal termination inevitably ensues sooner or later. A combination of the symptoms of impaired digestion, weakness of knees, dyspnœa, all the time, great exhaustion following emissions, palpitations on the least exercise, formication, weak vision, mental weakness and confusion, and partial deafness, are unfavorable symptoms; and more decidedly so when, in addition, the patient frequently observes a blue spot before the eye, which enlarges in area, and then disappears. When symptoms of ataxie myelo-phthisis are developed, the case is doubt-

ful. Great care must be taken by the practitioner, to determine partial or complete impotency due to actual lesions, from those arising solely from the fears of the patient, who has become alarmed, perhaps from reading some advertisement or publication in which the more severe consequences are especially dwelt upon. These severer results, it must be recollected, are of much less frequent occurrence than the milder and more readily curable forms.

A quick cure in spermatorrhea with functional disturbance of the nervous centers is simply and absolutely impossible. Time is always required to restore the brain and spinal marrow to a healthy condition, *after which*, the sexual weaknesses, under proper treatment, will rapidly disappear. The danger lies in the lesions of the brain and spinal cord, and not in the emissions themselves, which when due to mere local irritation are readily curable either by treatment alone, or conjoined with marriage. Indeed, it can not be expected that a disease brought on by calling one of the most important functions of life into action before the system is fully matured for it, and that, too, in an unnatural manner, and continuing this unnatural excitement of the function and its organs for several years, carrying it to such an excess as to affect the nervous centers, and, as it were, undermining the very foundation, strength, and vitality of the constitution,—can be cured in a few weeks or months. We have, in these cases, not only the existing lesions to overcome, without which the emissions will not cease, but also the reflex influences of these emissions upon the nervous centers, kept up by the existing impairment of these centers. The shortest time in which a *certain* and *permanent* cure can be effected is from twelve to eighteen months; many cases require from three to five years. It will be found that the reported cures effected by cauterization or otherwise, in a few weeks or months, are always temporary and never permanent. I have known supposed cures of these kinds, followed by marriage, in which no spontaneous emissions occurred subsequently, or but seldom, to terminate in partial or complete impotency between the ages of thirty-five and fifty.

The *pathological conditions* in spermatorrhea are unnatural paleness of the urethral mucous membrane, a granular condition or ulceration of the prostatic mucous membrane, irritability of the prostatic urethra, of the neck of the bladder, and of the orifices of the ejaculatory ducts, dilatation and a patulous condition of the prostatic or ejaculatory ducts, morbid changes in the testes, and, in some instances, an obliteration of the vas deferens, the tail or globus minor of the epididymis, or of the seminiferous vessels of the testes.

In the more advanced and unfavorable cases there will exist organic lesions of the spinal cord and cerebellum.

In the *treatment* of spermatorrhea and its attending lesions, much will depend upon their character, their severity, their influences upon the patient, his temperament, predispositions, etc., for that which will be found applicable to one patient, will often prove of no utility to another.

Marriage has been unwisely and ignorantly recommended by some physicians, as a remedy in these difficulties; but the instances in which it has effected cures, are extremely rare—indeed, I have known of four cases in which marriage was advised, and the persons were not capable of coition; in one case, the man died from ataxie myelo-phthisis; in the other three, a cure was effected in two, and the wife of the third party left him and returned to her parents. The objections to marriage in these cases, are,—one is not able as a general rule to have healthy intercourse, either from feeble erections, premature emissions, or even total inability; or, it may be that, from irritation at the neck of the bladder, the patient may imagine his sexual propensities to be naturally strong, and thus be induced to cohabit frequently, thereby hastening impotency; it also retards a permanent cure by keeping up more or less irritation of the nervous centers; again, if offspring are born, they are apt to be delicate or strumous. Persons who marry, laboring under the conditions heretofore referred to, as accompanying spermatorrhea, may find a cessation of their spontaneous emissions as long as they cohabit regularly, and which is due to the fact that the discharges that would have passed spontaneously are now passed naturally, but, this substitution of one mode of emission for another does not remove the functional or organic lesions of the nervous centers, and, consequently, at the age of from forty to fifty, the very period when the parties should be in their prime, they usually become partially or completely impotent, unless a cure of the accompanying lesions has been effected. Married, as well as unmarried persons, who have endeavored to remove their difficulties by proper attention to diet, exercise, bathings, etc., more generally find, after several years, that their condition is improved up to a certain point by such measures, but here it stops,—they do not become cured—nor can the difficulties in these cases be permanently eradicated unless by an appropriate treatment addressed to the brain and spinal marrow.

When these lesions have been cured, if the seminal discharges still continue, local means should be pursued to stop them; if these fail, marriage may be advised only under the following

circumstances; the spontaneous emissions must not occur oftener than once or twice a month, and must not be followed by exhaustion or other unpleasant symptoms; there must be no prostatorrhea present; and the patient must not only agree to pursue treatment, but, until cured permanently, also agree not to cohabit oftener than once or twice a month; in such cases, marriage, in which emissions occur in a healthy manner, and at proper and regular intervals, will aid materially in allaying prostatic and vesical irritation, and in curing the non-complicated spontaneous discharges. Yet it must not be forgotten, that it appears to be a natural tendency of the nervous centers when under the influence of disease for a long time, to develop some of the previous symptoms of the disease, often upon very slight exciting causes, and which susceptibility may exist even for many months after a cure of the disease has been effected.

The first and one of the most important points in the treatment, is, that the patient at once abandon the pernicious habit, for unless this be done, all our remedial means will be useless and ineffectual. This will frequently be found a very difficult task for the patient to accomplish, for, from the moral and physical debility already effected, he will relapse into the habit unconsciously; and, in many cases, it will require much firmness, patience, and perseverance on the part of the physician before he will be able to permanently overcome this vexatious obstacle to a cure. But he must not become discouraged, nor leave his patient to suffer the terrible consequences of this unnatural practice, without making the most powerful and oft repeated endeavors to persuade, convince, encourage, and strengthen his reason and resolution. To be restored to health, therefore, masturbation, as well as natural sexual contact must be positively and absolutely discontinued. It will be found that although the constant irritation and abuse of the reproductive organs enfeeble and irritate the spinal cord, yet, when means are employed that improve the condition of these organs, an invigorating and restorative reflex influence upon the cord almost invariably ensues.

I know, that, acting upon the maxim of choosing the least of two evils, physicians have advised masturbators to marry,—nay, even to have unmarried cohabitation, hoping thereby to ultimately effect a cure, both of the habit and its consequences. But unfortunately, however plausible such a course may appear, experience, as a general rule, does not sustain it; for those who act in accordance with such advice find to their cost that the remedy is worse than the disease. The only true course for the physician to pursue

is, to gain the confidence of his patient, and then explain to him exactly what must be done. It will not do for the physician to be lax with his patient upon this matter; he must not wink at any minor pecadilloes of an animal nature, nor indulge him in anything calculated to excite in the least, the sexual sense. If he sincerely desires to benefit his patient he must take the highest moral grounds with him—in no other way can he cure him. The sexual organs, the sexual sense *must be kept in a passive condition until the cure is effected—no other* course can be depended upon. If the patient be married, and can avoid cohabiting while under treatment, it would tend to facilitate his cure, and be greatly to his advantage; but in no case should he be permitted to perform this act oftener than once in every two or three months. If he can not do this, it will be almost useless for him to undertake treatment,—though there may be a few exceptions to this rule.*

Balls, parties, theaters, lewd women, lewd men, novels, obscene books, etc., and especially books upon the subject of masturbation which exaggerate its effects and unnecessarily alarm those suffering from this vice, must all be imperatively avoided. These by calling the mind to thoughts of a sexual character produce an increased secretion of semen, which, by stimulating the genital organs, exerts a renewed sexual influence upon the brain, giving rise to desires and passion of an almost uncontrollable character, and which drive the patient, in spite of his reason to commit the very acts which he most wishes to avoid; and this, more especially among those who have never been trained to mental and physical self-control. The mind of the patient should be constantly occupied with something useful or interesting, he must not be permitted to remain idle for a minute through the day,—he must exercise considerably, but with moderation,—and whenever, through the day or night, he finds sexual thoughts occupying his mind, he must at once fly to close study, or active physical exercise, even to fatigue, if necessary, for safety. Not only must all other external causes of irritation be avoided, including horseback riding, exercise or work that will strain the back, too long continued sitting, etc., but those that are local must likewise be removed by appropriate treatment, as hemorrhoids, warts around the anus, urethral stricture, irritable urethra or bladder, ascarides, constipation, etc.

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*I refer here to married persons who have committed sexual excesses, or who previous to wedlock were masturbators. Such may have nocturnal emissions, but, more generally, prostatic discharge, premature emissions on attempting coition, partial impotency, and evidences of cerebral or spinal disorder to a greater or less extent.

The bowels of the patient should be kept regular without purging; the diet should be nutritious, easy of digestion, not disposed to cause any distress, weight, or heaviness at the the epigastrium, gastric acidity, flatulency, diarrhea, or constipation, and the food should be well and thoroughly masticated before swallowing it. All high-seasoned food, spices, liquors, or acidulous articles are to be avoided, and as little saccharine substances be used as possible. Hearty suppers should never be eaten; and the supper should always be taken at least two hours previous to going to bed, and should invariably be light, using no meats whatever. The patient must not give way to melancholy, low spirits, or despondency, feelings apt to be common among this class of persons,—but should strive resolutely and manfully against all such feelings; he should be as cheerful and confident as possible,—seek pleasant society, but avoid the lascivious,—and absolutely refrain from seeking solitude for the purpose of brooding over unpleasant and dangerous thoughts. The more lively he forces himself to be, the sooner will his nervous system recover strength and vigor. Gentle exercise in the open air should be taken on every fair day. He must also endeavor by every means in his power to overcome the habit of sleeping on his back, as this position almost invariably occasions emissions with those who are disposed to nocturnal discharges; and as a full bladder is also likely to effect the same result, he should be careful to evacuate it on going to bed, and on awakening during the night.

If there is a sore or tender spot in the urethra when a bougie is passed, this should receive attention, and be removed either by a regular daily introduction of the instrument, or by the action of sedative, anodyne, astringent, etc., lotions or ointments, as may be required. The character of the urine should be ascertained, and any unhealthy condition of it be removed by the appropriate measures. The skin should be attended to once a week, bathing with a warm, weak alkaline solution, and drying with friction. A cool douche to the perineum, for five or ten minutes, also to the back of the head and along the spinal column, every morning will almost always prove serviceable; and, in some cases, the addition of a tepid douche to the perineum and genitals before going to bed, will aid in allaying irritation of the parts. The patient should invariably sleep upon a hard bed, with as little covering as possible to keep up a comfortable degree of warmth.

The therapeutical measures will depend upon the condition present, and various means will be required according to circumstances. Where no great amount of debility has been produced,

the patient will generally recover under a stimulating and tonic treatment, thus: Take of Cinchona, in powder, two ounces, Chamomile flowers one ounce, good Port Wine one quart. Mix together, and allow it to stand for a few days, frequently shaking, when it will be fit for use. A wineglassful may be taken three or four times a day. The elixir containing soluble Pyrophosphate of Iron, (*see* page 774), will also be found advantageous in nearly all cases.—Should there be nervous exhaustion with sadness, no disposition to exertion, etc., the following may be given: Take of Chloroform, Tincture of Ginger, each, half a fluidounce, Aromatic Spirit of Ammonia two fluidrachms; mix. The dose is twenty-five drops in a wineglassful of milk or rice water, to be repeated three times a day.

When there is debility with a sense of lassitude, or indolence, one of the following preparations may be given: 1. Take of Acetate of Strychnia one grain, Acetic Acid twenty minims, Alcohol two fluidrachms, Distilled Water six fluidrachms; mix. The dose is ten drops, three times a day, each dose containing one-fiftieth of a grain of Strychnia.—2. Take of Sulphate of Quinia, Alcoholic Extract of Nux Vomica, each, twelve grains, Extract of Hyoscyamus twenty-four grains; mix, and divide into twenty-four pills, of which one may be given every three or four hours.—3. In long-standing cases, with more or less anemia and virile weakness; take of Phosphate of Quinia, Superphosphate of Iron, each, twenty-four grains, Alcoholic Extract of Nux Vomica six grains, Aletridin twenty-four grains, powdered Colombo a sufficient quantity to form a pill-mass; mix them well together, and divide into twenty-four pills. The dose is one pill, to be repeated three times a day.—4. Take of Citrate of Iron with Strychnia sixteen grains, Citrate of Iron with Quinia twenty-four grains, Syrup six drachms, Water four ounces; mix; the dose is two or three teaspoonfuls, three times a day, in a wineglass of water. All preparations of Strychnia and Nux Vomica should be used with great care, as, improperly used, they will produce serious effects. The dose of either should rather be proportioned to their influence upon the system of the patient using them; and it will be found that in some individuals the one-fiftieth of a grain of Strychnia will produce powerful effects, and the dose will have to be lessened to the one-sixtieth, one-seventieth, or even one-eightieth of a grain; while in others, again, the twelfth or sixteenth of a grain will be found necessary to produce the desired effect.—Preparations of Iron administered internally often occasion a congested condition of the genital organs, and, consequently, their employment should be closely watched; if congestion and irritation

follow their use, especially among those who are much annoyed with nocturnal discharges, we must cease their further employment.

Severe pain in the back part of the head, or a constant, dull, disagreeable soreness in this region, requires counter-irritation over the part to produce pustulation, or a discharge; and stimulating applications along the spinal column will frequently be of advantage. In most cases, however, it is better to avoid very active counter-irritating measures.

Irritability in the neighborhood of the neck of the bladder and prostate, tending to obstinately keep up nocturnal discharges, may be allayed by internal means, as well as by local applications; and these means, when effectual, will also temporarily arrest the spermatorrhea. Among the internal means which have been found the most effectual, are the following: 1. Lupulin, in doses of from fifteen to thirty grains at bed-time, either with or without the addition of a grain or two of pulverized Digitalis.—2. Bromide of Potassium in doses of from ten to fifteen grains, repeated three times a day.—3. Tincture of Sheep Laurel two parts, and Tincture of Stavesacre (*Delphinium Staphysagria*) one part; mix,—the dose is from ten to fifteen drops in a tablespoonful of water, to be repeated three times a day.—4, A strong infusion of the aments or catkins of Salix Nigra, drank freely.—5. Opium, Belladonna, or Conium, have frequently been found useful, and, in many cases, the means named under the treatment of Irritable Bladder, and Chronic Prostatitis.

Among the local applications are suppositories, injections, and counter-irritants. Suppositories are generally made of Butter of Cacao six grains, with or without one grain of Spermaceti, with which is incorporated one or two grains of Opium; one or two grains of Opium with from three to six grains of Extract of Conium; one grain of Extract of Belladonna; four or five grains of the Iodide or Bromide of Potassium; or, from one-half to two-thirds of a grain of Morphia, etc. But the prolonged use of suppositories will generally be found not desirable, from the unhealthy influences they exert upon the rectum and neighboring tissues; they are more especially useful in obstinate irritability and spermatorrhea.

Urethral injections are for the purpose of allaying irritability of the canal and the parts at the prostate and vesical neck, to remove urethral granulations, promote healing of any existing ulcerations, and to impart healthful tone to the debilitated and patulous seminal and prostatic orifices and ducts. To be effectual they should be carried directly upon the parts, and even into the bladder. Some practitioners consider them injurious, more, I think from the trouble

they occasion, and the dislike many patients have in reference to them, than from sound reasoning. I have successfully prescribed them for many years, and have never found them to fix the attention of the patient upon his disease to a greater degree than does the employment of other measures, and have never found the peripheral irritation increased, nor the reflex excitability of the cord augmented thereby. The articles I generally employ, are, a solution of Tannin one drachm to a pint of Water; a solution of Tannin and soluble Golden Seal, one drachm of each, to a pint of Water; a solution of Chloride of Gold and Soda, and Chloride of Zinc, each, sixteen grains to a pint of Water; the injections named under Gonorrhea, Nos. 1 and 2; and, Geranium, Golden Seal, each, in powder, half an ounce, Sulphate of Zinc sixteen grains, Water, Glycerin, each, half a pint. These injections should always be employed immediately after urination, and be retained as long as possible; they may be repeated two or three times a day. At first, they may cause some irritation, but this will speedily cease.—Dr. Douglas, of Glasgow, states that he has derived benefit from an injection of the following: Take of Opium one grain, Acetate of Lead three grains, Mucilage one fluidounce; mix. But I detest the Lead.

Counter-irritants are occasionally required, as in cases where there is soreness or tenderness upon passing a bougie along the prostatic canal, with frequent emissions and persistent irritability of the parts. A Compound Tar Plaster may be applied to the perineum, and a discharge be kept up for some time. Indeed, I have known the continued use of such a plaster upon the perineum, with internal means for the nervous complications, to effect permanent cures of spermatorrhea in the course of ten or twelve months; but, from the painful soreness the plaster produces, and the difficulties attending its application, but few patients will persevere in its use. Sometimes, I have beneficially employed the following ointment to the perineum, instead of the plaster: Take of Strychnia twenty grains, Alcohol 70 per cent. half a fluidounce, Oil of Origanum one fluidrachm, Simple Cerate one ounce; mix, and apply a small portion night and morning, with friction. Or, the following may be used: Take of Strychnia twenty grains, Aconitina four grains, Oleic Acid two drachms, or a sufficient quantity to dissolve the Alkaloids,—then add Olive Oil, or Simple Cerate, one ounce, and form a liniment or ointment, to be used in the same manner as the preceding. These should be employed with carefulness, not being allowed to come in contact with abraded or ulcerated surfaces, wounds, etc. They are also useful for giving tone to the relaxed

and enfeebled muscles concerned in the function of erection, whose powers have been overworked.

The *treatment* for the spinal and cerebellar lesions, will be the same as named under these maladies in a previous part of the work, (and to which the reader is especially referred), consisting principally of the internal administration of the Iodide or Bromide of Potassium or of Ammonium, Camphor, Belladonna, Ergot, Strychnia, Citrate of Quinia with Strychnia, Citrate of Iron with Strychnia, etc. Among the compounds that have proved useful, are the following: 1. Take of Bromide of Potassium one drachm, Citrate of Iron with Strychnia forty-five grains, Fluid Extract of Ergot forty-five minims, Glycerin, Water, each, half a fluidounce; mix. The dose is thirty-six minims, or about half a teaspoonful three times a day. The above quantity contains only fifteen doses. After using it for a few weeks, the ergot should be discontinued, substituting for it Extract of Belladonna three grains,—alternating the use of these articles every five or six weeks. In those cases where there is a weakness in the inferior extremities, or a tendency to paraplegia, bromide of potassium should not be employed until these symptoms have disappeared. 2. Take of Bonjean's Ergotin one drachm, Extract of Belladonna four grains and a half, Strychnia three grains, Alcoholic Extract of Black Cohosh one drachm, powdered Black Cohosh, a sufficient quantity to form a pill-mass; mix, and divide into sixty pills, of which one is a dose, to be repeated three times daily. It must be recollected that preparations of Strychnia are only useful in cases where the lesions of the nervous centers are reflex, and should not be used when these lesions are centric. 3. The following has also been highly recommended: Take of Oxide of Silver, Sulphate of Bebeerin, Alcoholic Extract of Black Cohosh, each, one drachm and a half, Camphor half a drachm, Extract of Belladonna twelve grains; mix, and divide into ninety pills. Dose, the same as the preceding. Of course, in all cases, functional lesions are much more yielding to treatment than organic.

There are several auxiliary measures that may be required during the treatment of spermatorrhea, to which I will now refer. Varicocele, as well as a painful condition of the testes, or, great irritability in the neighborhood of the prostate and vesical neck, will frequently be remedied by wearing a suspensory bandage.—Pains in the testes, as well as a sense of fullness about them, may be overcome by Nitrate of Potassa in doses of five or ten grains, three times a day.—Great aching pain and weakness in the spinal column, especially in the lumbo-sacral region may be relieved by wearing over the part, an Opium plaster with Camphor sprinkled on it; a

Belladonna plaster; or, by the daily application of the Dermabiotokon. Croton Oil Liniment will also be found useful in some instances. In these cases severe labor or exercise must be avoided.—An annoying pain at the epididymis shifting to the prostate; or, a sensation of formication in the urethra or vas deferens; a sensation of fluid passing through the urethra, but none to be observed; coldness of the scrotum and testes,—may all be relieved by the application of veratria ointment or liniment to the scrotum and perineum.

That sense of fullness, or coldness in the testes and scrotum, which is often the certain forerunner of an emission, may be allayed by Lupulin in large doses.—A powerful preparation to prevent troublesome night erections is a pill consisting of Lupulin one drachm and a half, Camphor ten grains, Extract of Conium one scruple; mix, and divide into twenty pills, of which one may be taken at bed-time, and, in bad cases, one likewise two or three hours before bed-time.

A morbid sensibility of the urethra may be overcome by introducing a bougie daily or every other day; the instrument should be anointed with Extract of Hyoscyamus, or Extract of Belladonna, half a drachm, Glycerin a fluidounce; mix. Or, it may be anointed with a mixture of Hydrochloric Acid twenty drops, Muriate of Morphia fifteen grains, Glycerin one ounce; let the bougie remain in for five or ten minutes at a time. Or, the following may be injected into the urethra: Take of Hydrochloric Acid ten or fifteen minims, Glycerin a fluidounce, mix; or, Extract of Belladonna four grains, Glycerin a fluidounce; mix. Also attend to the state of the urine.

Excessive nervous irritability may be overcome by the use of Ammoniated Tincture of Valerian; or, by a pill composed of Valerianate of Quinia half a drachm, Alcoholic Extract of Black Cohosh, Alcoholic Extract of Skullcap, each, one drachm, pulverized Pleurisy Root, a sufficient quantity to form a pill-mass; mix, divide into ninety pills of which one may be taken for a dose, and repeated three or four times a day. Some prefer Oxide of Zinc one drachm, to the Pleurisy Root.—Premature seminal discharges may be overcome, when unconnected with lesions of the nervous centers, by Opium suppositories, Bromide of Potassium ten or fifteen grains taken at bed-time, and the constant use of the inverse voltaic current by means of Pulvermacher's voltaic belt, which should be constantly worn in these cases.

Generally, impotency, not accompanied with lesions of the nervous centers, or remaining after these have been cured, will gradually disappear with the involuntary emissions; or, at all events will yield

to tonics, stimulating liniments, phosphoric acid, extract of cannabis indica, nux vomica, phosphorus, phosphate of manganese, galvanism, etc. Among the agents that have been given internally with success are the following: 1. Take of Phosphoretted Ether,* Tincture of Nux Vomica, Tincture of Cantharides, each, equal parts; mix,—the dose is twenty or thirty drops, three times a day.—2. Take of Phosphate of Quinia six grains, Dilute Phosphoric Acid half a fluidrachm, Glycerin, Water, each, two fluidounces, Essence of Lemon a few drops; mix; the dose is a tablespoonful three times a day.—3. Take of Tincture of Chloride of Iron, Tincture of Cantharides, each, one fluidrachm, Tincture of Nux Vomica half a fluidrachm; the dose is thirty or forty drops, three times a day.—4. Take of purified Extract of Indian Hemp twenty grains, Citrate of Quinia and Iron forty grains, Phosphate of Manganese one hundred and twenty grains, Alcoholic Extract of Aletris, a sufficient quantity to form a pill-mass; mix, and divide into forty pills. The dose is one pill three times a day.

Impotency when due to nervous exhaustion from over-indulgence, etc., must be overcome by rest, regimen, tonics, cold bathings, galvanism, etc.—It is often due to several old cicatrices of ulcers, lying along the floor of the urethra, at various sore, tender, or contracted spots. In some cases there may also be chronic congestion, with spasmodic stricture, and perhaps a neuralgia or pain in the testicle arising from reflex irritation. In these cases, if stricture be present it must first be cured, after which apply daily along the whole course of the urethra, from the bladder to the meatus, an ointment containing, powdered Opium one scruple, Chloride of Zinc ten grains, Spermaceti Ointment one ounce; mix. The application of this ointment should be continued until it causes no smarting, spasm or reflex pain, at which period the local disease will be cured and the general tone improved. Then, to reinduce the virile powers use a Pulvermacher's galvanic battery, applying the positive pole to the lower portion of the spine, and excite the parts generally, especially the glans, with the negative pole—also apply it, with a urethral conductor, to the prostate and vesicula seminales. (Pulvermacher's voltaic belt increases the tone of the parts; a battery current should be used occasionally; Opium, suppositories to allay any irritation; and minute doses of Cantharides to excite the parts.(*H. Lobb.*)

Not unfrequently, impotency is due to certain mental causes, as

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* Phosphoretted Ether is made by dissolving twenty-eight grains of phosphorus in four fluidounces of pure sulphuric ether.

fear, grief, anxiety, disgust, peculiar sensitiveness or imagination, or from apathy, etc.; such cases require a moral treatment adapted to their particular cases. It may also be due to close study, use of liquors, hypochondria, gastric difficulties, syphilitic affections, injuries of the head, etc., all of which must first be removed by proper treatment, and then, if the impotency persists, employ the means to overcome it, heretofore named.

Both spermatorrhea and impotence may be due to an excessive irritability of the urethra, which not only renders the person extremely liable to nocturnal emissions, but, with some, the mere act of urination will occasion a seminal emission. The treatment for this difficulty is Electricity, passing the currents in various directions, from the perineum to the glans, from the sacrum or lumbar region to the glans, through the rectum and penis by means of an instrument which conveys one pole into the urethra or into the rectum; urethral injections of Belladonna in Glycerin, Sulphate of Iron in Glycerin, Tannan in Glycerin, etc.; internal use of Tincture of Sheep Laurel, of Staphysagria, or of Chloride of Iron, etc. And for the cerebellar or spinal affection, which usually accompanies this variety, Bromide of Potassium may be used internally, and electrical shocks should be passed for a few minutes along the vertebral column from the occipital region to the glans, applying the negative pole to the glans, or perineum, and the positive to the spinal column, and repeating the operation daily, or every other day. I have found the constant electrical current more useful in allaying the cerebellar and spinal irritation, than the induction current, or Faradization.

Sometimes there will be a tardy ejaculation, requiring a lengthened period of coitus before an emission occurs; this is due to a debilitated condition of the reproductive organs, a want of normal excitation or irritation, and requires electricity, and local stimulations, as, urethral injections, or the introduction of bougies coated with Glycerin in which Sulphate of Iron, Sulphate of Zinc, etc., have been dissolved. The walls of the urethra should be placed in direct contact with the negative electrical pole, along its various points, and especially at the fossa navicularis, and at the prostatic region. In these cases, the penis is apt to be cold, pale, and relaxed, and the scrotum loose and pendent.

One point must be especially urged upon patients who have been cured of impotency, and that is moderation in coition; this should never be undertaken oftener than once or twice a month, in any case. A departure from this rule, will almost invariably effect a return of the impotency.

DIABETES.

The term "diabetes" was formerly applied to an excessive discharge of urine; but in later years investigations have led to the discovery that there may be an increased amount of urine passed, in some cases containing sugar, in others holding no saccharine substance whatever. The former has received the names of *diabetes mellitus*, *glucosuria*, *melituria*, and *glucohæmia*, the latter being the preferable term, as it implies a saccharine state of the blood. It is likewise subdivided into two classes: *a*, in which saccharine matter is present in the urine at longer or shorter intervals, and is due to certain physiological or pathological conditions, not strictly affiliated with true saccharine diabetes, and which has been called *incidental diabetes; b*, in which the saccharine condition of the urine is persistent, and is accompanied with grave symptoms. This last is diabetes proper, or true glucohæmia, and forms two groups;—one in which the saccharine substance varies in amount at different periods, and in which the symptoms are less severe, thirst and excessive emaciation being generally absent;—the other, in which all the symptoms are of a serious character, with constant thirst and excessive emaciation.

The *causes* of diabetes are merely conjectural; among the supposed exciting causes are, exposures to wet and cold, or to sudden changes of temperature; intemperance; excess in venery, or masturbation; immoderate evacuations; excessive use of saccharine and amylaceous articles of diet; sedentary habits; severe mental emotions; constant use of acid drinks, or crude, unwholesome diet; organic diseases of the brain and spinal cord; injuries to the brain and other parts; and indeed anything that will derange the digestive and biliary functions, impoverish the blood, and debilitate the system. Many of these causes have no doubt occasioned incidental diabetes, and may also be a starting point of the more serious and persistent variety of the disease. And the incidental variety, also termed *diabetes insipidus*, or *polyuria*, is often observed following epilepsy, asthma, whooping-cough, the inhalation of chloroform, etc.

This disease may occur in either sex, but is more common among male sin the proportion of two to one. It is seldom met with under five years of age or beyond sixty-five, is more common and more fatal among males between the ages of forty-five and fifty-five, and among females between twenty-five and thirty-five.

The ordinary duration of diabetes is from one to three years, though it may run a much more rapid course.

For convenience, I have considered diabetes at this place, which is, at present, as suitable as any other, because we do not positively know whether it is a renal, pulmonary, hepatic, nervous, gastric, or blood disease. Its *pathology* is but little understood, notwithstanding the multiplied researches of recent years. Thus, Bernard, after a series of elaborate investigations, came to the conclusion that the liver secreted a material, an amyloid substance (hepatic-dextrine), which, coming in contact with some peculiar ferment in the blood, was converted into sugar, which became decomposed and disappeared in the lungs under the influence of the inhaled atmospheric oxygen. But when, under certain morbid conditions, and especially that of nervous irritation, either an inordinate amount of sugar is formed from the liver-dextrine, or the decomposition of the sugar in the lungs is incomplete,—diabetes is the result. Dr. Harley rather sustains these views, though he considers respiration to be the exciting cause, during health, of the hepatic saccharine forming function; and, from his experiments, does not believe that any great amount of decomposition of the saccharine matter in the blood occurs in the lungs, but that this matter affords support to the system, disappearing, in health, from the larger blood-vessels, in its passage through the numerous capillaries of the body.

On the other hand, Dr. Pavy, who has also devoted considerable research to this subject, denies that any sugar is formed from the liver-dextrine during a state of health, or, that it exists in the circulation, and maintains, that if it is converted into sugar, or if sugar is found in the circulation, it is an abnormal condition, or, is the result of post-mortem changes. His view appears to be correct, as regards cold-blooded animals, and is gradually becoming the prevailing opinion as regards the warm-blooded.—So that, between the views thus briefly presented, nothing satisfactory has yet been made out, and the pathology of diabetes remains to be determined, though important knowledge toward this highly desirable object has been attained.

The *symptoms* of diabetes may manifest themselves rather suddenly, but more commonly they are gradually developed. After several weeks or months of indisposition, with some feverishness, and, perhaps, slight emaciation, but without any derangement of the digestive functions, the patient's attention is directed to the frequent calls to urinate during the day, and which also disturb his night's rest, as well as to the increased amount of urine passed,

which may vary from ten to even thirty pints per day. With this excessive discharge of urine, the patient experiences an unquenchable thirst, as well as inordinate appetite; the mouth is dry, the tongue either clammy and coated with a white creamy fur or mucus, or else red and preternaturally clean, and the saliva thick and viscid. The gums are frequently swoln and inflamed, bleeding upon the least touch; the breath has an odor similar to that of the urine, like that of hay, or ripe apples, and, in many instances, the body often exhales a similar odor; not unfrequently a sweet taste is experienced in the mouth; and the bowels become costive, with occasional colicky pains. The skin becomes harsh, dry, and scurfy; emaciation occurs, with a care-worn, dejected expression of the features; there are frequent attacks of dizziness and pain in the head, as well as a sense of lassitude, and fatigue; and, usually, the sexual appetite becomes more or less impaired. The patient becomes restless, dissatisfied, and the moral and intellectual faculties are gradually blunted.

As the disease advances, the emaciation and debility augment; pulmonary symptoms become developed, or else, an uncontrollable diarrhea, with hectic fever, and diminution in the quantity of urine, which may lose its saccharine character and become albuminous; and dropsical effusion occurs in the inferior extremities, continuing and progressing, until death from exhaustion, coma, convulsions, diarrhea, or other complication, ensues.

Persons laboring under diabetes are subject, in addition to the symptoms already named, to boils, carbuncles, eczema, psoriasis, and other cutaneous affections; to gastro-intestinal derangements; to diarrhea, sometimes of a dysenteric nature, and proving rapidly fatal; to pulmonary tubercle; to low and fatal types of pneumonia, pleuritis, or peritonitis; to gangrene of the lower extremities; to amblyopia; and to cataract. Diabetic cataract is generally of the soft kind, is rapid in its progress, and may attack one or both eyes,—more commonly both. I have met with this cataractous opacity in three cases, in each of which it disappeared in from five to eight weeks, under the influence of Nitrate of Ammonia.

Diabetes insipidus may be determined from glucohæmia, by the absence of sugar and albumen in the urine, and by the specific gravity of this fluid, which varies from 1033 to 1007. The accompanying symptoms are similar to those of diabetes mellitus, but are usually of less severity.

The most prominent feature in diabetes mellitus is the character of the urine; this is excessive in quantity, very clear, paler than natural, though sometimes having a green tinge, of a sweet taste,

an odor like hay or ripe apples, specific gravity varying from 1025 to 1055, and fermenting very readily. The presence of sugar in the urine, and its amount, may be determined by the methods made known on pages 122, 862, by means of Mitscherlich's polarizing apparatus, or, by the tests named in the author's Am. Dispensatory, 6th ed., pages 821, 822. Sometimes the grape sugar disappears from the urine, and in its place will be found inosite or muscle sugar, to detect which will require a different process from that pursued for grape sugar. (*See* page 864.)

The *prognosis* of diabetes will depend greatly upon its character; in diabetes insipidus it is less grave than in diabetes mellitus; yet, notwithstanding, it is frequently unyielding to treatment, and proves fatal, especially when due to organic disease of some of the more important organs,—indeed the seriousness of the prognosis will depend on the character of the accompanying disease, the severity of the symptoms, and their influence on the general system.

In diabetes mellitus, it must be remembered that it is only occasionally a cure is effected; by far the larger number of cases prove fatal. This may be owing to our ignorance of the correct pathology of the disease, and its consequent empirical treatment. The prognosis is much more unfavorable in young persons than in those of advanced years; as well as in persons of spare habits than in the corpulent. The more unfavorable symptoms are, abundance of urine, pulmonary symptoms, presence of cataract, or amblyopia, increased amount of sugar in the urine, diarrhea, and the presence of albumen in the urine.

The favorable symptoms, (which, if not indicative of recovery, are of a susceptibility to improvement and a prolongation of life), are, no unusual appetite or thirst; diuresis absent or very moderate; emaciation and debility not marked; sugar in moderate amount, appearing only temporarily or intermittently; abundance of uric acid deposits in the urine; and when the disease is due to mental anxiety, or to injuries that may terminate in permanent recovery. A gradual and finally a persistent disappearance of abnormal thirst, diuresis, and sugar, together with an increase in flesh and strength, are very favorable indications,—yet we must be aware that the disappearance of these symptoms may be followed sooner or later by their reappearance, and even in an aggravated form. Toward the termination of the disease, as well as in its later stages, when symptoms of phthisis or of severe dropsy occur, it is by no means uncommon for the sugar to disappear from the urine; but in these instances, there is no amelioration of any of the other symptoms. In all cases, however, those who labor under diabetes may be said

to hold their lives in their own hands; a strict attention to hygienical measures, and a thorough control of the passions and appetites, may greatly ameliorate their condition and prolong life for an indefinite period; but an inattention to these points, even a slight exposure to cold or moisture, or an increased amount of exercise, etc., may develop complications or an augmented intensity of the symptoms, which may rapidly and unexpectedly terminate life.

There are no *pathological appearances* peculiar to diabetes, or that throw any light upon its nature or its location. The liver, the kidneys, the lungs, the stomach, and the floor of the fourth ventricle, sometimes present more or less serious pathological changes, but these are not constant nor uniform, are often observed in cases where there has existed no diabetes, and appear to have no direct relation to the diabetes. Sugar is usually detected in the blood, and frequently in various other fluids of the system, as, in the saliva, tears, sweat, gastric juice, etc.

The *treatment* of diabetes, as heretofore remarked, is purely empirical, the principal objects being to diminish the amount of sugar in the blood, to decrease the diuresis, and to sustain the general nutrition and strength; the auxiliary measures are for the purpose of palliating or overcoming certain annoying symptoms that may be manifested from time to time, and for these several purposes both therapeutical and hygienical treatment is demanded.

The therapeutical means are complicated and uncertain, and consist of remedies and measures to influence supposed derangements of certain organs, as the blood, liver, and nervous centers, as well as of articles which have been asserted to exert a specific influence in this disease.

The bowels must be kept regular, by means of the Compound Powder of Rhubarb and Potassa, in small doses repeated three times a day, or, by minute doses of a mixture of Podophyllin one part, Leptandrin six parts. Active purgation must be avoided. Especial attention must be paid to the skin, bathing it daily with a stimulating liquid, and drying with considerable friction. Cold water douche to the back part of the head, and along the spinal column, will frequently be found very advantageous; it should be repeated every morning, or, every other morning. The Spirit Vapor Bath will also be found a very useful mode of exciting the skin to action; it may be repeated two or three times a week, as the strength of the patient will permit. Sometimes counter-irritation to the occiput, and along the vertebral column, will exert a very happy influence, as, by dry-cupping, firing, or by the use of the Dermabiotokon. And, as far as my own experience goes, I have

found excellent results follow these counter-irritating applications, when made in the hepatic region.

Among the various agents that have at times appeared to exert a special influence upon the disease, lessening the quantity of the urine, its specific gravity, and the amount of sugar contained in it, are the following:

1. Opium, which is often tolerated in large doses, even to four or five grains, without producing any unpleasant effects. It should be employed in conjunction with a restricted diet, and in doses sufficient to cause sleep; it appears to act by lessening the appetite and diminishing nervous excitability, but its effects are rarely permanent. Where opiates disagree, Belladonna may often be advantageously substituted. In cases where a tonic is required, Opium may be combined with Sulphate of Quinia, or with Alcoholic Extract of Aletris.

2. Alkalies, as the Bicarbonate of Potash, Carbonate of Ammonia, etc., have sometimes proved useful, while in other cases they have been of no service. The hypothetical view of their action by Mialhe is, that they increase the alkalinity of the blood, and thus favor the oxidation and destruction of the sugar contained in this fluid. As the too prolonged use of alkalies are apt to prove injurious, they should not be administered for more than twelve or fourteen days at a time, with intermissions of eight or ten days. Bicarbonate of Soda is given in the quantity of one drachm per day, gradually increased to three or four drachms. Carbonate of Ammonia is given in scruple doses three or four times a day. Camplin has recommended an effervescent Citrate of Ammonia. M. Guyot-Dannecy recommends half-drachm or drachm doses of Citrate of Soda, daily, as a remedy in diabetes. Its use may be prolonged for a greater period than the other alkaline salts, and is followed by a disappearance of sugar from the urine; when absorbed into the system, the acid is burned up in the respiratory process, and the system is then placed under the influence of an alkaline carbonate, which is eliminated by the urine.

3. Strychnia has in some cases appeared to exert a beneficial influence; though it will frequently be found to fail.

4. Permanganate of Potassa has been highly extolled, but has not sustained the eulogiums it at first received. And the same may be said of Ergot, Creosote, Iodide of Potassium, Tincture of Chloride of Iron, Rennet, Pepsine, etc., all of which have had their day of reputation.

I have treated four cases of diabetes mellitus successfully, by the internal administration of Nitrate of Ammonia in doses of from

ten to twenty grains, repeated three times a day, and given in solution. In two of these cases there was cataract in both eyes, which disappeared after having continued the use of the solution for five or six weeks. In conjunction with this agent, I also employed the following pills, alternating them every four weeks:—*a*, Take of Citrate of Iron and Strychnia, Sulphate of Quinia, each, forty-five grains, Opium from sixty to ninety grains; mix, divide into ninety pills, and give one pill for a dose, repeating it three or four times a day; *b*, Take of Bromide of Potassium two hundred and seventy grains, Extract of Conium Maculatum ninety grains, Extract of Aletris ninety grains; mix, divide into ninety pills, and administer the same as the preceding. Rennet wine was prescribed, to be taken after the breakfast and dinner meals, and the usual attentions bestowed upon the skin, kidneys, bowels, diet, etc.

The Nitrate of Uranium in doses of one-tenth of a grain, repeated three times a day, has produced some decidedly beneficial results, and is deserving of further investigation.

Dr. James Anton, who has had an experience in this disease, recommends the use of the cold wet bandage, applied around the body so as to cover the hepatic and renal regions, and then covering it with oil-silk or India rubber cloth, to prevent too rapid evaporation; it should be changed every night and morning, and its use be continued for several weeks. Any irritation, interfering with the sleep of the patient, he allays by a dose of Sulphate of Morphia at bed-time followed by a full dose of Tincture of Gelseminum, to prevent any unpleasant effects from the morphia, and to increase its anodyne influence.

A mixture of Phosphate of Lime fifty grains, Carbonate of Lime ten grains, Bicarbonate of Soda five grains, for a dose, taken in mucilage of Buckshorn Brake, and repeated three times a day, about an hour after each meal; in conjunction with a pill, taken also three times a day, about an hour before each meal, composed of Oxide of Silver one grain, Extract of Belladonna one-eighth of a grain, Sulphate of Quinia one grain, Extract of Black Cohosh one grain,—is stated to have proven very efficacious in the treatment of diabetes.

Dyspeptic symptoms should be treated according to their character and indications; an infusion of Aletris and Lycopus Virginicus, drank freely, will be found useful to restore tone to the digestive and biliary systems, and to diminish the urinary discharge. Pepsin, or Rennet Wine will sometimes be found to improve the appetite and the digestive powers. Pain, nervous irritability, and wakefulness, require anodynes. Anemia, debility, and emaciation,

are best overcome by Iron, Cod Liver Oil, wine, and proper diet; the soluble Pyrophosphate of Iron, will be found a useful tonic. To relieve an excessive craving for food, and the sinking sensation at the epigastric region, a pill may be given, whenever required, composed of Assafetida three grains, Sulphate of Quinia one grain, Sulphate of Morphia one-eighth of a grain; mix for a dose.

The hygienical treatment of diabetes constitutes as important a part, if not more so, than the therapeutical; more especially the dietetic measures. No half way course must be pursued; if the patient desires recovery or prolongation of life, he must not trifle with his malady, but must rigidly pursue the means pointed out,—he must gain absolute control over his appetites and cravings. The diet must be nutritious, but must contain no starchy or saccharine elements, or, at least, as little as possible of them; and, to prevent the stomach from rejecting it, the articles should be frequently changed. Meats, game, poultry, fish, eggs, cheese, salad oil, gelatin, cream, and butter may be used; and for vegetables, spinach, dandelion greens, water-cresses, turnip-tops, green lettuce, and sparingly of celery and radishes; also custard made without sugar, blanc-mange made with cream and not milk, and sparingly of various kinds of nuts. Bran bread, according to Camplin's plan, should be used instead of wheat, rye, corn, or oat-meal bread or cakes; or Pavy's almond rusk or bread may be taken.* For drink the patient may use tea, or coffee without milk or sugar, claret, spring water, dry sherry, plain brandy and water, weak beef tea or mutton broth, soda-water, and water acidulated with cream

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*Almond rusk and biscuits are made by first freeing the almond powder from sugar, by washing with boiling water slightly acidulated with tartaric acid; then forming it into rusk or biscuits by means of eggs. When dry they are fit for use, and should be well masticated before swallowing.

Bran bread is made by washing the bran thoroughly, in water, until the water runs clear, then squeezing the bran in a cloth as dry as possible, exposing thin layers of it to the heat of a slow oven, until it becomes perfectly dry and crisp, and then finely grinding it. To three ounces of this bran powder, add three fresh eggs, an ounce and a half of butter, six ounces of cream; stir all thoroughly together, and flavor with nutmeg, ginger or other spice. Immediately before putting it into the oven, stir in the mixture, thirty-five grains of bicarbonate of soda, and then three drachms of dilute hydrochloric acid; put the basin containing the mixture at once into the oven, and bake for an hour or more. Biscuits may be made by omitting the soda and hydrochloric acid.

Another good biscuit may be made of fresh meat, pounded to a jelly, butter cream, gelatin, and prepared almond flour, mixed together and baked. This may be spiced to suit the taste, and will be much liked by the patients.

of tartar, tartaric, nitric, muriatic, or phosphoric acid, lime-water, infusion of Lycopus and Aletris, etc.; and he should be urged merely to sip at frequent intervals, rather than to indulge in large draughts at a time, which will augment the diuresis. As a general rule, no liquors whatever should be used, except required to sustain the strength.

Among the forbidden articles are oysters, crabs, lobsters, sugar, wheat, rye, corn or oat-meal cakes or bread, rice, arrow-root, sago, tapioca, maccaroni, vermicelli, potatoes, carrots, beets, turnips, parsnips, cabbage, cauliflower, peas, beans, pastry, puddings, and sweetened custards, apples, pears, peaches, gooseberries, strawberries, currants, plums, oranges, and sweet fruits of all kinds whether fresh or preserved, asparagus, etc.; also milk, ale, porter, beer, sweet and effervescent wines, port-wine, rum, gin, cider, cordials, etc.

Moderate exercise should be taken daily, in the open air; sudden changes of temperature must be avoided; the body should be kept well clothed; the feet especially must be protected from cold and damp; sleep should be limited to eight or nine hours per day; and all sexual indulgence be positively avoided. In many cases, travel and change of scenery will be useful, if the dietetic measures can be pursued at the same time. Similar measures may be pursued for diabetes insipidus; but, in all cases, any existing complication or etiological disease must be remedied by the appropriate treatment therefor.

CHRONIC DISEASES OF

THE INTEGUMENTARY SYSTEM.

Chronic diseases of the skin may be purely local, depending upon want of cleanliness, irritation of the skin, the presence of parasites, etc.; or they may be due to some constitutional derangement, as, a rheumatic, scrofulous, or syphilitic affection. It must be borne in mind, however, by the practitioner, that these maladies do not always exist in an isolated form, but that cases are often presented to us in which two, and even three, different forms of skin disease co-exist in the same individual. Again, it must be recollected that a host of circumstances may be present which will greatly modify the character and severity of the affection, as well as its greater or less degree of susceptibility to treatment. Among these circumstances may be named age, sex, occupation, diet and manner of living, character of climate or of dwelling place, (in women uterine derangements), struma, anemia, gout, rheumatism, plethora, dyspepsia, syphilis, etc. And in estimating the diagnosis and the treatment of diseases of this system, the practitioner should pay great attention to such of these several conditions as may be present with any given case.

In order that cutaneous maladies might be more easily studied and understood, they have been grouped into classes; and there appears to have been presented to the profession nearly as many various classifications as there are authors, each one forming his system according to his own peculiar views regarding the cause and the especial characters of, as well as the structural changes attending, each particular affection. And as there is no classification at the present day that has been accepted by the medical profession as *the* system, the author will present such of these affections as he designs treating upon, under the divisions that appear to have met with the most favor in this country, and which are only modifi-

cations of the system of Willan and Bateman. Some of the affections commonly treated upon by writers under the head of skin diseases, are omitted at this place, having been previously described under other heads, as, Erysipelas, Purpura, Scorbutus, etc.

To correctly treat affections of the skin, we must first be enabled to form a correct diagnosis, for without this, we are much more likely to be unsuccessful than successful. The examination should be made by daylight in order that we may make no mistake as to the correct color of the affected parts. We must determine whether the affection is vesicular, pustular, papular, or tuberculous, etc.; if one of these, to which of the subdivisions does it belong. This may be arrived at by learning the history of the case, the patient's sensations and general health, the appearance of the skin, the condition of the pores, the color of the diseased part and its depth, the presence of excoriations, branny scales, or thick yellowish crusts, the appearances presented by the disease itself upon the surface of the body, as well as when a portion of it is examined under the microscope, etc. All of these several points must be carefully investigated, and, whenever there is any doubt, the whole surface of the patient's body must be examined thoroughly, should this be deemed necessary in order to a more perfect and satisfactory diagnosis.

ORDER I. EXANTHEMATA.

This order is characterized by superficial redness of greater or less intensity, as well as of variable size and form, which redness is due to an augmentation of blood in the small vessels, which almost or quite disappears under pressure, returning promptly however, when the pressure is removed, and which terminates in resolution or desquamation. No vesicles, or pustules are present in affections of this order, though there may be elevated points at certain parts of the skin, from a great accumulation of blood in such parts, and these may be known from papulæ by their temporary disappearance under pressure, which is not the case with papules. This order of maladies is often complicated with gastro-intestinal irritation, or disease of the brain, or lungs.

ERYTHEMA.

Erythema is a mild, non-contagious affection, characterized by a uniform redness manifesting itself in one or more superficial patches, of variable form and extent, and which is more commonly observed

on the face, chest, and extremities. Sometimes there will be an elevation or puffiness of the skin, which, however, soon subsides, leaving the redness behind. Febrile symptoms are rarely present, and there is generally but very little, if any heat, itching, or pain. One or two weeks is the general duration of the disease; on the disappearance of the redness a purplish or bluish tint remains for a few days, and, in all the varieties, desquamation is apt to take place.

Among the numerous varieties that have been named by authors, I may call attention to the following: 1. *Erythema fugax*, an evanescent affection, appearing and disappearing more or less suddenly, and generally on the face, arms, neck and breast, frequently with a degree of heat, tingling or itching, and perhaps some dryness and puffiness of the surface.—It is usually due to some gastro-intestinal derangement, or to mucous irritation of other parts, as, of the respiratory or urinary organs, and occasionally exists without any attributable cause.—2. *E. Marginatum*, in which the patches are rounded or circular, their borders are elevated and well defined, and the redness is deeper than in the preceding variety, but variable, the circular patches are from six to twelve lines in diameter, and the eruption is more commonly observed about the loins and external lateral parts of the limbs, though it may be seated on any part of the body. The affection occurs more especially among middle-aged persons and those of advanced years, and is ordinarily associated with some chronic disease of internal organs; its duration varies according to the character and curability of the accompanying chronic affection. This variety appears to be identical with Herpes Circinatus.—3. *E. Læve*, or erythema associated with œdema. This ordinarily attacks persons enfeebled by sedentary habits, intemperance, gastro-intestinal disease, anemia, and too much standing or walking; it usually occurs around the ankles and in the lower limbs, is attended with more or less redness, itching, a sense of tension, and a swelling which pits on pressure. It is often confounded with erysipelas, and may terminate in ulceration, or gangrene. In some cases, the cuticle gives way, and an ichorous fluid oozes out, forming a thin crust on becoming dried.—4. *E. Tuberosum* is more common among weakly females having derangement of menstruation. It consists of small circular patches, three or four lines in diameter, attended with or preceded by smarting or itching, bright red at first, but eventually becoming purplish, or resembling a bruise, and is sometimes mistaken for a mild form of purpura hemorrhagica. They occur principally upon the superior parts of the body, or the legs.—5. *E. Nodosum* greatly resembles E. Tuberosum; it is, however, attended with more active inflammation, is in oval patches

varying from six lines to three inches in diameter, is more commonly observed running on the forepart of the leg, in the course of the tibia, and is met with among debilitated or badly nourished constitutions.

6. *Erythema Chronicum* may present itself in the form of bright-red spots that come on very gradually, and then remain stationary, becoming paler or brighter according to the amount of gastro-intestinal irritability present. Or, it may follow an acute form of erythema, being persistent and attacking parts where the skin forms folds, as, in the groins, behind the ears, in the joints, on the scalp, etc. The skin becomes red, the cutis more or less thickened, the epidermis exfoliates more or less, and the skin often chaps and cracks. There are three forms of E. Chronicum, viz.: *a. E. Pityriasis*,* or *branny tetter*, presenting dull-red or pinkish irregular patches, which may form on any part of the body, and are usually attended with more or less heat, itching, and tingling. Minute whitish scales are more or less rapidly thrown off from the light-colored patches, usually in abundance, and vary in size, being smaller and mealy-like in places where the skin is thin, and larger and branny-like where the skin is thick. The disease is not contagious, but is very persistent, and has been divided into several varieties of pityriasis.—*b. Pityriasis Vulgaris*, consisting of red patches, of greater or less extent, with more or less itching and tingling, especially when in bed, is common to those having a fair, delicate skin, usually occurs upon the parts more exposed to the air, and is attended with the exfoliation of more or less small scales. It is often observed along the sides of the chin, on the forehead, and around the mouth.—*c. P. Capitis* or *Dandruff;* attended with itching, an abundant exfoliation of scales, and is met with on the scalp and face, under the hair, eyebrows, and beard.

The *prognosis* of erythema is always favorable; the malady is readily yielding to proper treatment, and a removal of the exciting cause.

The *treatment* must be chiefly directed to the diseased conditions associated with or giving rise to the erythema. Keeping the bowels regular by laxatives; the kidneys by saline diuretics; the skin by slightly stimulating alkaline baths. Tonics, as Quinia, Hydrastin, etc., if there is much debility; Iron, if there is anemia, or Elixir of Cinchona and Iron. In several cases I have found much benefit from Bromide of Potassium; and in others, from the infusion of Maiden Hair, Elder Flowers, etc., named under Erysipelas.

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* *Pityriasis*, from a Greek word, signifying "bran"—dandruff.

The external use of soap should be avoided in *E. Fugax.* As a local application Glycerin will be found very effectual; it may be combined with Tannin, Honey, Chlorate of Potassa, Muriate of Ammonia, Lobelia, or Iodine, etc. The Veratria Ointment will sometimes be useful in *E. Nodosum.* In œdematous erythema, *E. Lœve*, astringent washes, and bandaging, may be used, in conjunction with the appropriate internal treatment; and if the serous infiltration be so great as to threaten ulceration or gangrene, the skin may be punctured here and there to allow the accumulated fluid to drain away.

URTICARIA.

Urticaria or Nettle Rash, is a non contagious exanthematous affection of the skin, characterized by round, oval, or wheel-like elevations or wheals, (pomphi), which are either lighter or deeper-colored than the healthy skin, are of irregular shape, and generally surrounded by a red margin; it is accompanied with a burning, tingling, and itching sensation, and is rarely followed by desquamation. The disease attacks all ages and constitutions, and the chronic forms, are either persistent or intermittent, and often very unyielding to treatment.—Urticaria is occasioned by gastro-intestinal irritation, as well as by irritation of the pulmonary, genito-urinary, and other mucous membranes. Is more generally met with in warm weather, and appears to consist of an irritation of the nerves of the skin with consequent spasm of the muscular structure of the skin, due, probably, to a reflex action. Mental emotions, fatigue, exposures, improper diet, as well as certain kinds of food, dentition, etc., are frequently exciting causes of the appearance of the eruption.

1. *Urticaria Evanida* is characterized by the intermittent appearance of roundish wheals, white or with trifling redness, and which are accompanied with much itching and tingling, particularly when the body is very warm, or the patient is in bed. The spots look somewhat as if the patient had been whipped by a lash. Its appearance is usually connected with gastric irritation, disappearing when this is removed. When the eruption is persistent, it is called *U. Perstans.*—2. *U. Subcutanea* is a neurosis, which is accompanied at more or less distant intervals by a stinging and itching eruption, the tingling continuing during the intervals, as well as during the eruptions. At first, it may be confined to one spot, but subsequently extends over more or less surface of the limbs and body. Cutting or pricking pains are sometimes occasioned from slight causes, and there is usually more or less stiffness of the muscles of the affected part.

The loins and thighs, and sometimes the arms, are the parts more commonly affected. This variety of urticaria is described by Willan, and appears to have been some nervous malady, in which the occasional appearance of the eruption was a symptom.—3. *U. Tuberosa* is a rare form, characterized by large wheals which extend deeply into the subcutaneous cellular tissue, are painful, hot, and itching, when the patient is warm, and leave the patient weak and sore, as if he had undergone much fatigue. The wheals usually appear at night, and disappear in the morning.

The *diagnosis* of urticaria may be established upon the symptoms heretofore named. It somewhat resembles *lichen urticatus*, but this affection consists of small, hard, round pimples, which appear in successive crops, and eventually have a dark-colored scab to form upon them. However, urticaria may be complicated with other cutaneous eruptions.

The *prognosis* of chronic urticaria depends upon its exciting cause; the removal of this is generally followed by a disappearance of the eruption. If the eruption recedes, the internal disease is apt to be aggravated.

The *treatment* of urticaria must be directed to its cause, as, nervous debility, visceral derangement, mucous irritation, etc. The diet must be carefully regulated, avoiding all articles that appear to have an exciting action. Laxatives, saline or cooling vegetable diuretics, and frequent bathings of the whole body and limbs, must not be omitted. If there is a tendency to rheumatism, Colchicum, Black Cohosh, etc., may be used. When no indications of gastro-intestinal irritation, or other disorder is present, the eruption will often yield to the long-continued, or alternated employment of the following articles: Citrate of Iron; Tincture of Chloride of Iron; Sulphate of Quinia and Tincture or Extract of Black Cohosh; Belladonna Extract and Strychnia; and Bromide of Potassium, or of Ammonium. The intermittent form of urticaria must be treated by Quinia, Black Cohosh, Citrate of Iron and Strychnia, etc. The following has proved useful in obstinate cases, in conjunction with Bromide of Ammonium: Take of Oxide of Silver, Sulphate of Bebeerin, each, thirty grains, Extract of Belladonna four grains, Alcoholic Extract of Black Cohosh thirty grains. Mix, and divide into thirty pills, of which one is the dose, to be repeated three times a day.—Aconite has also been found successful.

To allay the tingling and itching, Glycerin in which Chlorate of Potassa, Belladonna, Morphia, or other narcotics are dissolved will often be of service; or, a mixture of one part of Acetic Acid with ten parts of Cologne; or, a mixture of two parts each of Chloro-

form and Laudanum, with sixteen parts of Water.—Vesication to the surface, or active rubefacients, with internal sudorifics will prevent or remove a retrocession of the eruption.

ORDER II. PAPULÆ.

Papulous or Lichenous affections are characterized by very small elevations of the cuticle, solid, acuminated, somewhat resembling enlarged papillæ of the skin, and of a color varying from dull white to bright red; pressure momentarily removes the color, but the pimple remains. They rarely contain any fluid, and usually terminate in resolution or in slight furfuraceous desquamation of the epidermis, and occasionally in a slight ulceration of the summits of the papulæ. They generally form slowly without any apparent cause, are apt to be preceded by itching, are seldom attended with fever, are non-contagious, may be manifested on any part of the body, and continue from a few days to many months.

LICHEN.

Lichen is a term employed to designate an eruption of minute, hard, conical papules, which are usually red or of the color of the skin, are attended with itching, prickling, or tingling, occur either in groups or isolated, are often obstinate and annoying, appearing in single or successive eruptions, and terminate generally in resolution, or in desquamation, rarely in superficial ulceration, and, which also tend to a thickening and roughness of the cutis. It is usually met with in warm seasons, and, although occurring in persons otherwise apparently healthy, is frequently connected with digestive derangements, overexertion, and exposures. Lichen frequently results from exposures to excessive or continued heat; from irritation of the skin; from depressing moral or physical causes; and *L. Agrius* is more common among persons during middle life, especially those who are dyspeptic, gouty, rheumatic, or laboring under mental anxiety. When met with in children and infants, it is popularly called "red gum" or "tooth rash," (*Strophulus*). There are several varieties of strophulus, requiring similar treatment, as, cleanliness, attention to diet, regularity of the bowels, chalybeates if anemia be present, alteratives if struma exist, tonics if there be debility, etc., and, if there be much itching, the application of powdered Starch, Oxide of Zinc, or a mixture of equal parts of Glycerin and Rose Water.

The following are the principal varieties of Lichen that may be encountered in a chronic form: 1. *Lichen Simplex*, presents minute papules, more commonly upon the extremities, but occasionally upon the face and body, they are usually less red than in the acute form, and are likewise attended with less itching. In eight or ten days desquamation ensues, but the eruption again appears and runs the same course, and this successive development of the disease may continue for months and even years, the affected parts of the skin gradually becoming thickened. In enfeebled systems the papules often present a bluish or dark appearance, and the affection is then termed *Lichen Lividus*. When the pimples appear at the points of the skin from which the hair proceeds, or, "at the roots of the hair," it is called *Lichen Pilaris*, and is accompanied with much itching and tingling; this variety is more common among intemperate persons, and those laboring under gastric derangement. Another variety of L. Simplex is *Lichen Circumscriptus*, in which the papules exist in irregularly oval or circular patches, with well-defined margins, the patches gradually increasing in diameter, and either healing in the center, thus forming rings, or, the center remaining red and scurfy. This has often been confounded with the vesicular affection, ringworm of the scalp or herpes circinatus; but it is more apt to be located on the external part of the fore-arm. When the ring, referred to above, is imperfect, or when several broken rings or circles are irregularly connected together, it has then been named *Lichen Gyratus*.

2. *Lichen Urticatus* appears to be a combination of lichen and urticaria, the papules being larger than in the other lichenous affections, appearing in wheals and attended with a burning and itching; when these pass away there remains papulæ behind, frequently of a very obstinate character.

3. *Lichen Agrius*, like the preceding varieties may exist in an acute or a chronic form. The latter may follow the acute form, or it may be chronic from the commencement, and is characterized by a small cluster of papules, that are accompanied with considerable itching and smarting, and when removed by scratching or friction, they are succeeded by more pimples on the next day, and so on for many days, until finally the eruption forms a much larger and permanent patch. The itching is always increased by heat, stimulating food or drink, exercise, warmth of the bed, etc. Not unfrequently the affected skin becomes thickened, with deep cracks or fissures, and may be confounded with eczema, which disease, by the way, often co-exists with it. Occasionally some gastro-enteric derangement may also be present, but more commonly the patient

is apparently in good health. The parts more liable to be attacked are, the back of the hands, the arms, shoulders, legs, loins, and sometimes the face and chest. The grocer's, baker's, washer-woman's and brickmason's itch, are only varieties of this eruption occurring upon the back of the hands. The eruption frequently remains with obstinacy upon the inferior extremities of middle-aged persons.

Lichen may be *diagnosed* from *prurigo*, by its papules being smaller, more acuminated, and redder; from *scabies* by the itching being more of a tingling character, and the lichenous eruption more generally appears on the thicker parts of the skin; from *eczema*, by the eruption consisting of pimples and not vesicles, and by the absence of any fluid discharge from the pimples when they are broken.

The *prognosis* of lichen is not always favorable, at least as far as a prompt cure is concerned, for it often obstinately continues for years proving a source of great annoyance and discomfort to the patient.

The *treatment* of lichen will depend considerably upon the condition of the patient; if he be strumous, Bromide of Potassium, Iodide of Ammonium, Tincture of Chloride of Iron, and other anti-strumous agents should be administered internally; if he be anemic, Tincture of Chloride of Iron, or other chalybeates; if he be dyspeptic, gouty, or rheumatic, the proper internal measures must be pursued for these maladies; gastric acidity especially must be removed; if he be debilitated, tonics will be needed; if residing in a malarial district, antiperiodics, etc. All known causes of the eruption should be carefully avoided, and a general attention be given to the hygiene of the patient. In weak, cachetic patients, a strong infusion of the leaves and stems of Urtica Dioica, in doses of a fluidounce or two, repeated three or four times a day, has been found very beneficial.

Various external applications have been recommended, among which I prefer the following,—though great care should be had not to continue the employment of any local application that has a tendency to irritate or inflame the skin:

1. Take of Carbolic Acid one drachm, Water, Glycerin, each, one fluidounce; mix. Apply to the eruption two or three times a day.—2. Take of Carbolic Acid one drachm, Pyroligneous Acid four fluidrachms, Water one fluidounce and a half; mix, and use as above.—3. Oxide of Zinc Ointment.—4. Take of Cherry Laurel Water one fluidounce, Glycerin two fluidounces; mix.—5. Take of Tincture of Chloride of Iron one fluidounce, Glycerin two or three fluidounces; mix.—6. Ointment of Iodide of Ammonium, one

drachm to the ounce of Simple Cerate.—7. Sometimes a Sulphur Vapor Bath every three or four days, will be of immense service.—8. Take of Iodide of Ammonium half an ounce, Camphor Water one pint; mix, and dissolve, and then add Chloroform four fluid-ounces. Shake this well together each time before using.

PRURIGO.

Prurigo is a chronic affection of the skin, characterized by the presence of non-contagious pimples or papules, and an intense, burning itching, which is greatly increased by overexercise, heat, or the warmth of the bed, and which varies greatly in intensity from the mildest to the most aggravated form. The papules are broader than in lichen, less acuminated, and are of the same color as the skin, and, from the scratching with the finger nails, they are torn and bleed, and then become covered with a small, thin, black crust or scab. In long-standing cases the skin eventually becomes thickened, indurated, and coarse. The *causes* of prurigo are various; it is often due to uncleanliness, and sometimes to improper or innutritious diet, to the use of stimulants, to unhealthy atmosphere, to nervous irritability, to hepatic and gastro-enteric derangement, and to an impoverished condition of the blood; *Pruritus Senilis* appears more especially to owe its presence to the last-named cause. The affection has been divided into several varieties, according to its intensity and its location.

Prurigo mitis is the mildest form of the eruption, in which the papules are few, scattered, and attended with a moderate degree of itching; it may attack any part of the body, but is more commonly located on the posterior parts of the shoulders and body, and on the external parts of the extremities. It is worse in spring and autumn, and may remain for several weeks or months. *Prurigo formicans* is the term applied to the more severe form of the disease, in which there is not only intense itching, but more or less pain, and a sensation frequently compared to the creeping or stinging of insects, or to hot needles piercing the skin. The scratching often tears the skin, leaves marks of the nails, abrasions, and sometimes gives rise to pustules and small ulcers. The itching is often insupportable, occasioning much distress and mental irritation, or even despondency; and seriously affecting the general system. The disease terminates in a branny desquamation, leaving the skin dry and thickened. When the disease attacks aged persons, with incessant itching, and a greater disorganization of the skin, it is

termed *Prurigo Senilis*. Care, however, must be taken, that these symptoms be not due to the pediculus corporis or body louse.

The *diagnosis* of prurigo may generally be made out with the aid of a magnifying lens; the papules are broader and less elevated than in *lichen*, paler, and instead of being grouped in patches like lichen, they are isolated or more diffuse; there is also a greater morbid condition of the skin in prurigo, and the itching is intense. In *scabies* the itching is not of a burning, tingling nature, but is more constant and supportable, the eruption is located in the flexures of the joints, and may be at once determined by the presence of acari, and their minute furrows or canals,—in prurigo, the itching is more paroxysmal in its character, and the eruption is usually found on the outward surfaces of the limbs.

The *prognosis* of prurigo is not always favorable as to a cure, but is so in the majority of cases met with among the young, and those who have not passed beyond middle life. It seldom proves dangerous, except in the more severe and obstinate forms of P. Senilis.

The *treatment* of prurigo, like that of lichen, and to which it will be somewhat similar, will depend upon the circumstances present, and the peculiar conditions of the system. Food and drink of a stimulating or heating character must be avoided, using a light and cooling regimen, keeping the bowels and kidneys in as normal a condition as possible, and avoiding the several predisposing causes of the disease. Iodide of Ammonium, Bromide of Ammonium, Iodide of Iron, Tincture of Chloride of Iron, etc., will be required according to the tendency of the constitution. If hepatic disorder be present, Podophyllin, Leptandrin, or some of the other agents heretofore named for affections of the liver must be used. In all obstinate cases, the urinary and renal functions must be especially attended to.

In old and obstinate affections I have derived considerable benefit from the internal use of Aconite, either in the form of tincture or alcoholic extract; it may, likewise, be advantageously combined with Bitter Root, Leptandra, or Blue Flag. An infusion of Yellow Dock Root, drank freely, has proved very serviceable in P. Senilis. Among the agents said to have been useful, but which I have not used, are Nitro-muriatic Acid, Strychnia, and Stillingia.

In the severe forms of prurigo, the surface of the whole body should be washed daily with soap and water; the soap containing an excess of alkali; and once or twice a week the surface of the limbs and body should be exposed to the Sulphur Vapor Bath. If

the strength of the patient will allow, the Spirit Vapor Bath may be used every week or two, with great benefit.

The local applications are the same as those named for lichen; to which may be added the following: 1. A very dilute solution of Nitro-muriatic Acid.—2. An Acetous Tincture of Bloodroot.—3. Take of Chloroform one fluidrachm, Sulphate of Morphia one or two grains, Glycerin one fluidounce; mix.—4. Take of Oil of Bitter Almonds two drachms, Cyanide of Potassium twelve grains, Simple Cerate two ounces; mix.—Solution of Acetate of Ammonia; Extract of Belladonna and Glycerin; Solution of Muriate of Ammonia with the addition of Tinctures of Aconite and Poke, have also been found useful.

When the disease is seated upon the scrotum and root of the penis it is termed *Prurigo Scroti*, and is sometimes very distressing and unyielding. It may occur as a primary affection or be an extension of the preceding malady. When located upon the female organs, the labia or even extending into the vagina, it is named *Prurigo Pudendi Muliebris*, and is frequently so severe as to occasion nymphomania, and even give rise to the habit of self-pollution. When the affection is located on the perineum, or around the anus, it is called *Prurigo Podicis*, or *P. Ani;* in which the itching is apt to be very intense, the cuticle rough, and the parts covered with black crusts and furrows from scratching. Means similar to the above named must be used in these local affections. To allay the intense itching, in addition to what has already been named, a solution of Salt in water may be applied once or twice a day; or, the the Solution of Borax with Morphia;or, a mixture of Juniper Tar two parts, Glycerin thirty parts; mix and place over a fire, and while hot, stir in powdered Starch fifteen parts. A solution of Muriate of Ammonia in a dilute solution of Hydrochloric Acid, has also afforded prompt relief. The parts must be washed daily with soap and water. A solution of Borax one drachm in a cold infusion of Cleavers one fluidounce, will be found an excellent wash in nearly all of the lichenous, papular, and eczematous eruptions. And in many cases the solution of Sulphite of Soda in water and glycerin, named in the treatment for Favus, will be found decidedly efficacious.

ORDER III. VESICULÆ.

Vesicular or Eczematous affections are characterized by the presence of vesicles, containing a transparent or opaque fluid, serous or

sero-purulent. This fluid may become absorbed, and terminate in small, round, dry scales, or, it may be effused upon the surface giving rise to concrete laminated scabs or flakes. The eruption may be seated upon any part of the body, and is usually associated with a debilitated condition of the system.

ECZEMA.

Eczema is a very common non-contagious cutaneous malady, appearing both in an acute and a chronic form, and attacking either sex, and at all ages. It consists of an eruption of minute vesicles forming irregular patches upon various portions of the skin, and which, when ruptured form superficial, moist excoriations, which eventually dry and give rise to white, opaque, or yellowish, thin flaky crusts. One crop of vesicles is apt to be followed by another in rapid succession, the skin being more or less red, and eventually becoming thickened from infiltration of serum, into its tissues, and sometimes fissured, and even œdematous. Wilson states that "eczema is never present without lichen, and only becomes eczema when the vesicles are in excess over the papules." In the chronic form though there may still remain some redness of the skin, yet the more prominent characters are, the scaliness and desquamation, or, the cracked and fissured condition of the affected parts. According to the severity of the disease, there is more or less pain, smarting or burning, and itching, the itching being more severe in the chronic forms.

Various terms have been given to the disease, according to its peculiar appearances, as well as its location. Thus, *Eczema Erythematosum* when the predominant symptom is redness; *E. Papulosum*, when the cutaneous pores are in the form of papules or pimples; *E. Vesiculosum* when numerous vesicles are present; *E. Ichorosum* when a serous or colorless lymph is abundantly exuded; *E. Pustulosum*, when pustules and pus are present; *E. Squamosum*, when numerous scales are present; *E. Fissum*, when the skin is fissured; *E. Neurosum*, when severe pain attends, etc. And, as the eruption may manifest itself upon the scalp, the face, the ears, the lids, the mouth, in the axilla, on the breasts, hands, scrotum, etc., it has also received the names of *Eczema Capitis; E. Faciei* (crusta lactea); *E. Aurium; E. Palpebrarum*, etc., which designate not only the location, but frequently the variety of the eruption, as this, in most instances, presents one or other variety according to the part attacked. Thus, on the scalp, face, and ear, the eruption is at first

ichorous, and then scaly; on the back of the hand, it is papulous; on the palm of the hand it is scaly and the skin fissured, etc. When eczema is on the back of the hand, it has been popularly termed *grocer's itch*, *washer-woman's itch*, etc., "and it is often a point of nice distinction to determine whether to call a given eruption, eczema or lichen agrius, lichen eczematosus, as it might with great propriety be called."

Eczema Crurale is a very annoying and obstinate form of the disease which appears on the legs, giving rise to excoriations, crusts, or fissures, and even deep or superficial ulcers, and a serous or purulent discharge occasionally mixed with blood, and also to more or less infiltration of the skin. When deep, the fissures are red and raw-looking, and occasionally filled up by the small crusts formed by the discharge; the ulcers may be inflamed or indolent. It more frequently occurs in persons about middle-life or later, and is often associated with varicose veins, when it may require several years of treatment for a permanent cure.

All these varieties of eczema may assume a chronic form, *Eczema Chronicum*, or *Psoriasis*, in which the inflamed and swoln skin has deep cracks and fissures, from which, as well as from the excoriations present is secreted an ichorous and often unpleasantly-odorous discharge, which, when dry, forms thin, yellowish, laminated scabs, that fall off and are replaced by similar crusts successively deposited. Fresh returns of the disease, with redness, swelling, and discharge, may follow each other and perpetuate the disease for months and years. The skin may be morbidly charged, with a dense and infiltrated subcutaneous cellular tissue, and the eruption may be in circumscribed patches, callous and dense, thin and dry, thick, or horny and warty, and, frequently, there will be no ichorous exudation from these patches, or it may appear and disappear at certain periods. In chronic eczema the itching is frequently almost insupportable. The scabs often appear as if perforated with a number of pores through which the ichorous secretion exudes, and if any attempt be made to remove them before they are ready to fall off spontaneously, the parts beneath are thereby made to bleed.

The *causes* of eczema are generally somewhat obscure. The disease appears to be associated with general debility, or some constitutional disturbance, and may be excited into action by irritation of the skin, by general nervous irritability, induced by dentition, exposures, improper diet, derangements of the gastric, hepatic, or uterine functions, contact of certain irritating substances, etc. A strumous tendency also appears to be a predisposing cause, as well as rheumatism and gout. The disease is not contagious, though it is stated

that it has been transmitted by coition, and that the application of the discharge, when this is profuse, to healthy parts has occasionally developed the eruption.

In the *diagnosis* of eczema, it must be recollected that it is primarily vesicular, the vesicles containing a fluid that stiffens and discolors the linen, and that, unlike lichen, it prefers the internal aspect of the limbs. In *scabies* resembling eczema, the pustules contain pus from the first, and the itch insect may also be found. In *impetigo*, the pustules never contain lymph, are larger than those of eczema, are confined to a smaller extent of surface, and its crusts are dense, thick, and greenish-yellow or brown. As the chronic form of eczema bears some resemblance to lichen agrius, we must carefully endeavor to ascertain the previous history of the eruption; chronic thickening of the skin, dull redness, absence of papules or vesicles, scaly exfoliation of the epidermis, intense itching, an ichorous secretion, chaps or fissures, and, perhaps, œdema, are the characters of chronic eczema.

The *prognosis* of chronic eczema is generally favorable; but, in most cases, the disease requires many months before a cure can be effected, depending, however, upon its cause and the condition and circumstances of the patient.

The *treatment* of chronic eczema is both constitutional and local; in the constitutional measures we must be guided by the rules already given under the treatment of Lichen and Prurigo, carefully examining the patient to ascertain both constitutional and local derangements. The internal agents from which I have derived the greatest amount of benefit in this affection, are, Bromide of Potassium; Tincture of Chloride of Iron; Compound Syrup of Yellow Dock with Bromide of Potassium;—Bromide of Ammonium one ounce, Water one pint; mix, dissolve the salt, and add Solution of Perchloride of Iron an ounce and a half—the dose is a teaspoonful, three times a day; in some cases, the iron solution may be omitted, and two or four drachms of Citrate of Iron and Strychnia, be substituted therefor;—Iodine Pill; and in some cases, a combination of Sulphate of Quinia one drachm, Reduced Iron one drachm and a half, Strychnia three grains, Alcoholic Extract of Black Cohosh one drachm; mix, and divide into sixty pills, of which one is a dose, to be repeated three times daily. The preparation named in the Note on page 383, and also that in the treatment of Chronic Peritonitis, in which the Soluble Pyrophosphate of Iron enters, will be found exceedingly useful.

No general rules can be given for the selection or employment of these agents; the practitioner must be guided by all the circumstances of the case, as well as by the influence exerted by the

agent administered. The internal use of Cleavers, Hydrocotyle Asiatica, Steel Wine, Cod Liver Oil, etc., have been lauded, but I have not used them.—Of course, hygiene must be strictly attended to, especially regulating the condition of the stomach, the bowels, the kidneys, and the skin—and avoiding all stimulating and indigestible articles of diet.

As external applications, some one of those named for lichen and prurigo may often be used with advantage. Or one of the following may be employed, bearing in mind, that the disease is frequently very rebellious to local applications, which require to be often changed. 1. Take of equal parts of Suet and Sweet-gum; melt together; a small portion of this may be warmed, and rubbed in upon the part, there or four times a day.—2. Take of Red Oxide of Lead Plaster one ounce, Sweet Oil a sufficient quantity to make the two articles, when melted together and cooled, form a thin ointment. This may be used in the same manner as the preceding.—3. Compound Ointment of Bayberry.—4. Ointment of Oxide of Zinc.—5.Compound Ointment of Oxide of Zinc.—6. Paint the parts twice a day with a solution of Chloride of Zinc one drachm, Water, Glycerin, each, half an ounce.—7, Take of Prepared Tallow, Prepared Lard, each, six ounces, White Wax four ounces, Juniper Tar (pyroligneous oil of juniper, or huile de cade) one pound; mix together, by means of heat. To be used in the absence of moisture and itching, during desquamation.—8. Saturated Solution of Oxalic Acid.—9. Take of pulverized Sulphate of Zinc four ounces, Liquid Styrax four ounces, Lard one pound; mix, and boil gently together for some time, constantly stirring. Apply twice a day.—10. Mix together Iodide of Ammonium two drachms, Water and Glycerin, half an ounce of each; or, one ounce of Benzoated Lard or Oil may be substituted for the water and glycerin. Ointment of Iodide of Sulphur has sometimes proved efficacious; also the following: Take of Sulphuret of Potash, Carbonate of Soda, Hydrochlorate of Ammonia, each, in powder, three drachms; Lard two ounces; mix, by trituration. Many other preparations could be named, but the preceding will be found sufficient for all purposes. In all cases, the skin should be well washed with soap and water, each time before making an application; and when an ointment is used it should be softened by warming it, just previous to rubbing it upon the affected part.

In all cases, previous to applying any of the local remedies, the crusts formed must be removed, and which may be effected by first softening them with oil, and bread poultice. If there is any considerable infiltration of the skin, the application of alkalies is

indicated, as, alkaline Soft Soap, or Liquor Potassa carefully used; one of these may be applied once or twice daily, and it should never be so strong as to produce any destructive action upon the skin. In some cases the following will be found excellent: Take of Oil of Bitter Almonds one drachm, Oil of Sweet Almonds one ounce, Carbonate of Potassa four drachms, Camphor one ounce; mix.—When the infiltration and the itching have become moderated, a preparation has been highly recommended composed of Soft Soap, Alcohol, Oil of Cade, each, one ounce, Oil of Lavender an ounce and a half; mix. By means of a piece of flannel, rub some of this a little firmly over the eruption, night and morning, and allow it to dry upon the parts; before each re-application wash the parts as clean as possible. Petroleum Soap may be substituted for the Soft Soap, and Tar for the Oil of Cade.

The eczematous ulcers or fissures in *Eczema crurale* must be treated upon general principles, according to their inflamed or indolent condition. When there is much irritation or congestion, leeches around the parts will be found useful. The patient should be kept quiet, in the recumbent position for ten or fifteen days at a time, and the affected limbs be supported by a bandage evenly applied, and re-adjusted two or three times daily; in other respects the treatment will be similar to that heretofore named for the several varieties of eczema.

HERPES.

Herpes or Tetter is a common, transient, non-contagious, vesicular eruption, characterized by larger vesicles than those of eczema, globular, occurring in well-defined circular or irregular groups or clusters, seated on an inflamed base, and accompanied with an itching, pricking, smarting or burning sensation. The integument occupying the intervals between the clusters presents a healthy appearance. The clusters themselves vary considerably in size and shape. In from six to ten days, if the vesicles have not disappeared from absorption of their contents, they usually rupture, or dry up without rupture, and form thin pale-brownish scabs, which do not remain for any great length of time. The fluid in the vesicles is clear and colorless at first, and gradually becomes milky and opaque; when clear, it is of a neutral or slightly alkaline reaction, but never so alkaline as the fluid in eczema,—when opaque, it is neutral or slightly acid. The purplish or dark hue remaining after the scabs fall off, disappears in a few days.

There are several varieties of Herpes, as, *H. Phylctenodes* which may occur on any part of the body, but more commonly upon the superior parts, and runs its course in from eight to fourteen days. *H. Labiales*, which is seated upon the lips or around the mouth, and lasts about eight or ten days. *H. Preputialis*, when seated upon the foreskin, and which sometimes forms a sore that has been mistaken for a chancre. *H. Pudendalis*, when the eruption occurs upon the labia majora, and which is often perpetuated by the irritating discharges from the vagina. *H. Zoster* or *Shingles*, which usually occurs on the abdomen, and is limited to one side of the median line; it may, however, affect the scalp, head, face, neck, back, chest, etc., and usually disappears on the tenth or twelfth day. *H. Iris* occurs in the form of circular patches, formed of concentric rings which present various tints of color, owing to their various degrees of development. The center of each patch consists of a solitary vesicle, with rings of vesicles surrounding it, and which run the usual course of herpetic vesicles. It is very rarely observed.

Herpes is essentially an acute disease being rarely met with in the chronic form; *H. Iris* is more liable to become chronic in elderly persons of debilitated or cachectic constitutions. The *treatment* of any chronic form of herpes will be the same as recommended for vesicular eruptions generally; including that for erythema, bullæ, etc., when the eruption assumes erythematous, bullar, etc., symptoms.

ORDER IV. PUSTULÆ.

Pustular or Impetiginous eruptions are characterized by pustules or elevations of the epidermis containing pus; these may be irregularly scattered, or united in clusters, and vary in their size and shape. Sometimes the purulent matter becomes absorbed, with accompanying desquamation; but more commonly the pustules terminate in ulcerations covered by crusts or scabs, or, by induration; permanent cicatrices are often left by the disease. The pustules may be seated upon any part of the body, and are usually associated with some constitutional derangement.

ECTHYMA.

Chronic Ecthyma is more frequently encountered than the acute form. It is a non-contagious affection, and is characterized by pustules occurring in succession for several months. They are

circular, of varying size, though usually rather large, and are apt to be indolent, passing through their various stages very slowly. When very large, they have a more or less inflamed areola around them, of a violet color, and hard. Some slight pain may also be present. In old persons, and those of impaired constitutions, the base of the pustule often presents a dingy violet or livid color, with more or less considerable inflammation. Eventually, the epidermis ruptures, and discharges a bloody sanious fluid, and the denuded surface becomes covered with hard, black, and usually very adherent crusts, which fall off after several weeks, leaving dark-red spots or cicatrices behind them. If these scabs be prematurely removed, they expose indolent ulcers with callous edges, secreting an ichorous fluid, and are of very difficult cure. In some cases, after an apparent tendency to suppuration, the pustules will gradually disappear with desquamation of the epidermis. When the disease occurs in infants it has been termed *Ecthyma Infantile;* and when in broken-down constitutions, *E. Luridum*, and *E. Cachecticum.*

The *causes* of ecthyma are various; the more common are, unhealthy and enfeebled constitutions, intemperance, gastro-intestinal disorder, and improper or insufficient food. It may also be occasioned by irritants applied to the skin, as observed among brick-layers, grocers, persons working among irritating powders, etc., by inhabiting moist, unhealthy residences, by improper exposures, and, sometimes, it follows as a sequela of measles, scarlet fever, etc. It is more common to adults in early life, and in the spring and autumn, and is frequently associated with other cutaneous affections, as, lichen, prurigo, scabies, etc. The seat of the disease appears to be between the cutis and cuticle, and not in an enlarged follicle.

The *diagnosis* of chronic ecthyma, requires that the history of the case, the symptoms, and the color of the skin around the pustules be taken into consideration. The pustules are large with a red or dark-colored areola around them, in which respect they differ from *acne* and *sycosis*, which present hard elevations without any areola. *Boils* are more painful than ecthyma and contain a "core;" the inflammation of boil is, at its commencement, deeper seated and thence extends to the surface, while, in ecthyma, the inflammation commences at the surface and spreads to the deeper-seated tissues.

The *prognosis* will depend very much upon the condition of the patient; a removal of any constitutional or local disorder will

usually be followed by a disappearance of the eruption. Of itself the disease is not dangerous, though frequently very obstinate.

The *treatment* of ecthyma is very similar to that recommended in the preceding forms of cutaneous eruption. A strict attention to hygiene; good nutritious food; tonics; alteratives; and warm baths. Constitutional or local diseases must be met by their appropriate treatment, and all external causes of the eruption must be entirely avoided. Sometimes, the Sulphur Vapor Bath, will be found beneficial. As local applications to the eruption, an alkaline wash may be used, as, a dilute Solution of Potassa; of Carbonate of Potassa; of Carbonate of Soda; of Hydrochlorate of Ammonia; of Iodide of Ammonium; or of Potassio-tartrate of Iron, etc. When there is much pain or irritation, anodyne and emollient applications only must be employed. The erythematous ulcers, when exposed, being of a very indolent character, usually require some stimulant application to cause them to heal kindly, as, touching their surfaces with Sulphate of Copper, Iodine, Compound Solution of Iodine, Turpentine, Sulphate of Zinc, Sesquicarbonate of Potassa, or Tincture of Chloride of Iron, etc.

IMPETIGO.

Impetigo (*Scall, Crusted Tetter, Running Tetter, Humid Tetter*, etc.), is characterized by an eruption of small, hemispheroidal, or flattened pustules, with but little inflammation at their base, and which may be scattered and distinct, or be collected into clusters of various extent, and fused one with another. These pustules are called "psydracious," from their being small, hardly elevating the cuticle, not having much inflammation around them, and ending in a thick scab. They are attended with more or less itching, rapidly mature, rupture in the course of from one to four days, and discharge a quantity of thick purulent matter, which quickly dries, forming semi-transparent, thick, rough, greenish, or brownish-yellow, irregularly-shaped crusts. As the discharge often continues under these crusts, their thickness and size become greatly augmented, and the disease is prolonged. The purulent secretion exhales a very unpleasant odor, in most instances, which has been likened to that of valerianic acid, of spoiled cheese, or of rancid butter, more especially if the patient be kept in an uncleanly condition. Very often fresh pustules form around the parts originally affected, and thus cause the eruption to spread over a large surface. The crusts are

often slow and irregular in becoming detached, and when they do separate leave a red, shining, and very tender surface, which gradually disappears without leaving any cicatrix. The disease is divided into the following varieties:

1. *Impetigo Figurata*, (*Crusta Lactea*, *Porrigo Larvalis*), occurs more frequently upon the face, scalp, and neck, rarely on the limbs and trunk, and is often met with among infants during the period of teething. The small yellow pustules become developed upon one or more small patches of redness, and form distinct or confluent groups, of a circular or oval form, and the disease may be very mild, or be attended with more or less heat, itching, tension and pain. The cheeks, scalp, ears, lips, nose, and even the eyelids, may be affected. In a day or so these pustules burst, discharge a fluid, which forms crusts, as heretofore described, and which resemble a patch of dried honey; the disease may be prolonged by the formation of successive crops of pustules, with thickening and hardening of the integument, or, this may assume a morbid action, continuing to discharge an abundant semi-purulent fluid, which constantly keeps up the formation of crusts. When these crusts occurring on the limbs, become very thick, forming a sheath upon or around the limb, the disease has been termed *Impetigo Scabida*, and is often attended with severe ulceration. Impetigo figurata is the most common variety of impetigo met with; and notwithstanding the deep fissures and ulcerations of the skin caused by it, a permanent cicatrix is never produced. Sometimes constitutional symptoms may attend the disease, but they are usually mild. The eruption may be confined to a very limited space, or it may be very extensive, literally covering the face, like a mask; and it may appear periodically for several years in succession.

2. *Impetigo Sparsa* is more especially confined to the extremities, the legs in particular, and differs from the preceding variety in the irregular and scattered distribution of the pustules; these are usually attended with a more intolerable itching, and form thicker, more friable, and smaller crusts than the I. figurata. It is often conjoined with œdema, as well as severe ulceration; and the incrustation may spread to the ends of the fingers or toes, distorting or destroying the nails. It is always obstinate in its character, often continuing for years, notwithstanding every attention and treatment. *Impetigo Scabida* is a severe form of this variety.

When either I. figurata, or I. sparsa attacks the scalp, the disease is termed *Impetigo Capitis*, and is often accompanied with an enlargement of the lymphatic glands of the neck, sometimes followed by suppuration. Frequently, each pustule will be found traversed by

a hair, as if the disease had commenced in the hair-follicle. The hair is usually matted together by the secretions and crusts, and, if there is a want of attention to cleanliness, it will be full of pediculi. The disease is not contagious, and does not, as a general rule, injure the roots of the hair.—When the beard is the part affected, it is termed *Impetigo Sycosiformis*.—When there is much heat, tension, redness, and tumefaction, with fever and constitutional disorder, it is termed *Impetigo Erysipelatodes*, or *I. Erythematica*.

Impetigo may be occasionally *caused* by local irritation, but is more commonly referable to some constitutional predisposition, as, debility and the lymphatic temperament. Young persons are more liable to it than old, and it is more common in spring and autumn. Among the exciting causes may be named, bad food, unhealthy locations, intemperance, dentition, menstrual derangements, gastro-intestinal derangements, mental excitement, uncleanliness, etc.

The *diagnosis* of impetigo may be readily made out by observing that it is seated between the cutis and the cuticle, and that its pustules are of small size, not much elevated, and with no induration around them. It may be determined from *favus*, by the bright-yellow, dry, cup-like crusts, through the center of each of which, one or more hairs pass, and which are readily pulled out; or, when these conditions are absent in favus, by the discoloration of the hair, and the patches of baldness. In case of doubt, the microscope will clear up the diagnosis by an examination of the hair, which may contain the parasite peculiar to favus, but which present their normal appearance in impetigo.

Impetigo may be discriminated from *sycosis*, in which the pustules are larger, more prominent, discrete, with darker-colored crusts, and attended with tubercular swelling and induration around the pustules; the microscope also reveals the parasite peculiar to sycosis either in the hairs or in the exfoliated debris; beside which, the disease commences differently, with elevated rosy circles, like those of herpes circinatus, and which increase in size circumferentially.—From *herpes tonsurans*, in which the hairs are diseased by a parasite.

The *prognosis* of chronic impetigo is usually favorable, though it frequently proves a very obstinate and troublesome disease. The duration of the eruption will depend greatly upon the constitution of the patient, the causes producing it, and the accompanying circumstances. When the scalp is affected, it is often of tedious cure.

The *treatment* of chronic impetigo is the same as advised in the preceding cutaneous affections, both as regards the hygiene, and

the local and constitutional measures; much will depend upon the judgment and skill of the practitioner in selecting those means more especially adapted to each particular case. I prefer as a tonic and alterative, Bromide of Potassium, or, the alterative with soluble Pyrophosphate of Iron, given under Chronic Peritonitis. As external agents, the following will frequently prove useful: 1. Take of a saturated Solution of Oxalic Acid, Cologne, each, one fluidounce, Creosote twelve minims; mix, and apply twice a day. This will also destroy the lice.—2. Simmer the fresh leaves of Tricolored Violet (*Viola Tricolor*) in Cream and strain; a sufficient quantity of the leaves must be used, so as to form an ointment when finished. Use this three or four times a day.—To remove lice, Cologne may be used as a wash; or, an ointment, or infusion of Stavesacre; or, a very dilute solution of Carbolic Acid; the wash should be continued daily until all the "nits" have disappeared.

ORDER V. BULLÆ.

Bullous eruptions (blebs or bubbles), are, in reality, vesicular, but the vesicles are larger than in the Order Vesiculæ; indeed, when they exceed the size of a pea they may be termed bullæ. In some instances these blebs attain a diameter of six or seven inches; they may be round, oval, semi-circular, or polygonal, and contain a clear, transparent fluid, sometimes tinged with blood; a yellowish, opalescent fluid; or, a turbid, sero-puriform fluid. They are seated between the mucous and horny layers of the cuticle, and undergo the same changes as the Vesiculæ, speedily rupturing, and forming yellowish, or yellowish-brown scabs, as well as excoriations or superficial ulcerations. They may appear on any part of the body, but more commonly upon the extremities, especially the inferior. The disease may be partial or general, the bullæ appearing singly or in groups, occurring generally in successive crops, and continuing for several months or even years. It is apt to be associated with diseased or enfeebled constitutions, and sometimes gastro-enteric derangements.

PEMPHIGUS.

Pemphigus, sometimes termed *Pompholyx*, is more frequently met with as a chronic affection. It is characterized by the appearance of crops of bullæ, which rapidly and persistently succeed each other, and in so close a manner that they may be met with in all

stages at the same time—some appearing, and others passing away; frequently, before the first crop has run its course, the second, and even the third have made their appearance. Occasionally, the intervals between the crops of blebs are longer. Febrile symptoms sometimes precede each crop. Sometimes the bullæ are surrounded by reddish areolæ, and the first crop that appears is apt to be preceded by erythematous spots. A sensation of tingling and itching, or of smarting, accompanies the appearance of the blebs, which rapidly attain their full size, then burst, discharge their contents, giving rise to superficial excoriations, or, the fluid contained in them may decrease in quantity and dry up into thin, brownish, epidermic looking scabs, which cover red and tender surfaces, the cuticle surrounding them being wrinkled and thicker than natural. In this way the eruptions may continue to succeed each other for weeks, months, or years, occasioning a tedious and painful affection. More or less severe constitutional symptoms are apt to be present. The eruption may appear on any part of the surface, but more commonly on the fore-arms, and legs; and when on the face the bullæ are frequently confluent.

When the disease is attended with a most intense and insupportable itching, it is termed *Pemphigus Pruriginosus.* When the eruption consists of fine yellowish or grayish scales, usually commencing on the chest, and finally covering the whole surface so that there are no intervals of sound skin, it is called *Pemphigus Foliace.* In the foliaceous variety the itching is usually moderate, there is no great infiltration of the skin, the scales and crusts resemble parchment, are turned in upon their margin, and are partly detached; beneath them are slight ulcerations with red surfaces, from which is discharged a somewhat plastic secretion. The skin usually exhales a nauseous, fetid kind of perspiration. When the bullæ present dark, livid spots, a purplish areola, and leave painful dark-colored ulcerations, secreting a fetid discharge, more or less constitutional disturbance being present, the disease is termed *Pemphigus Gangrænosus*, *P. Infantilis*, and *Rupia Escharotica.*

The *causes* of pemphigus are not well known; it appears to be associated with constitutional debility, disease of internal organs, depressing causes, want of nutrition, derangements of the hepatic, gastric, intestinal, and uterine organs, etc., and may occur at any period of life, the chronic form being, however, more frequent among persons advanced in years. It is a disease rarely met with.

The *diagnosis* of chronic pemphigus may be determined by the history of the disease from its commencement, the usual mildness of the constitutional symptoms, and its obstinacy and duration.

The bullæ of pemphigus leave behind them peculiar, dusky-red, isolated, irregularly-shaped marks, of various sizes, and from which there is a slight cuticular exfoliation from time to time. It may be determined from the following affections by the characters named: *ecthyma* consists of distinct pustules; *herpes* presents minute vesicles in clusters, and upon an inflamed patch; *eczema* consists of smaller vesicles, the skin becomes infiltrated and thickened, the scales and crusts are small, and the disease rarely manifests a tendency to appear upon the entire surface of the body at once; *erysipelas* presents more redness, swelling and inflammation, the redness disappears temporarily under pressure, the inflamed parts are swoln, and there is more constitutional febrile disturbance; *rupia* presents flat and less defined bullæ, isolated, more apt to be surrounded by a red margin, and thicker incrustations, beneath which is a more distinct ulceration.

Pemphigus being generally attended with debility or disease, does not afford a favorable *prognosis* for a rapid cure. Indeed, when complicated with disease or much constitutional disorder, the prognosis is unfavorable in proportion to the character and severity of the complication. It is very liable to relapse, and sometimes occasions diarrhea, emaciation, etc., which prove fatal. The pruriginous, foliaceous, and gangrenous varieties are very apt to prove fatal. When the system is about giving way, this eruption is often one of the unfavorable indications of such failure. When no serious complications are present, the prognosis is favorable, as the disease, in itself, is not of a serious character.

In the *treatment* of chronic pemphigus, tonics are the remedies usually prescribed, but we must be very careful in our examination of the patient in order to ascertain the existence of any local or constitutional disease, which, if present, will require its appropriate treatment in conjunction with the measures pursued for the pemphigus,—in such cases the cure of the eruption greatly depends upon that of the complication. I prefer as an internal agent in this affection, the following combination: Take of Bromide of Potassium one ounce, Citrate of Iron and Strychnia two drachms, Citrate of Iron and Quinia four drachms, Water one pint; mix, and dissolve the salts. The dose is a teaspoonful three times a day. Other tonics and alteratives may be used, however, especially some one of those named in the treatment of the preceding skin diseases. Cod Liver Oil, Quinia, and Nitro-hydrochloric Acid, etc., have also been advised as tonics; and Scrophularia, Rumex Crispus, Celastrus, and Helianthemum, as alteratives. If there is considerable irritation of the mucous lining of the air passages or

of the alimentary canal, Bromide of Ammonium; Infusion of White Indian Hemp, Solomon's Seal, and Yellow Dock; Infusion of Pleurisy Root and Ptelea; anodynes, etc., together with counter-irritation upon the surface of the chest or abdomen, will be required. Inhalations may also prove serviceable, when bronchial or laryngeal irritations are present. Other urgent symptoms will require means of relief according to their indications.

An attention to hygienic measures is of great importance; the skin should be frequently bathed with an alkaline solution, and also be at different intervals exposed to the action of a warm alkaline bath; the kidneys should be properly attended to, according to the character of the urine; the bowels should be kept regular without active purgation; the diet should be generous and nutritious but of easy digestion, and in old persons or in very weak systems a little wine or porter may be allowed; and the patient should be exposed as much as possible to a pure fresh air.

In the local management of the eruption it has been advised to open the blebs with a fine needle as soon as they form, and, after they have discharged their contents, to cover them with a mixture of equal parts, of Oxide of Zinc and starch, in fine powder. In many cases, an ointment of Stramonium and Lupulin will be of value to relieve pain and itching. When the excoriations or ulcerations are indolent, they may be touched daily or every other day with a drop or two of Spirits of Turpentine, and then be at once covered with Turner's Cerate, Benzoated Compound Zinc Ointment, or, with Mayer's Ointment,—as the Turpentine produces considerable pain shortly after its application, and which continues for some minutes. The detachment of the crusts may also be favored by the constant application of one of these ointments, or, of the Sweet Gum Ointment; they should never be torn off.

RUPIA.

Rupia is commonly described by authors, with Pemphigus, under the order Bullæ; it is characterized by an eruption of large, distinct, flattened bullæ, seated on very slightly raised bases, and surrounded by reddish-brown areolæ of an inflammatory nature. The bullæ contain a serous, sero-purulent, sanious, or dark-bloody fluid, which is discharged upon their rupture, and drying, forms thick dark or brownish, rough, prominent crusts, frequently of a conical shape, or resembling limpet shells or oyster shells, being thicker at the center than at the circumference, and looking as if formed of concentric layers projecting one beyond the other. These

crusts usually remain for some time before they fall off, and when this does occur, each detached crust exposes a circular, indolent, more or less deep, grayish ulcer, from which issues a profuse, ichorous, fetid fluid, and fresh scabs are readily reproduced upon the ulcer. The ulcers heal very slowly, requiring several weeks therefor, leaving a persistent dark-red or livid hue of the skin around the cicatrix. Not unfrequently rupia is attended with considerable disturbance of the general health, fever, etc. Three forms of rupia are usually described; but there is no material difference between the first two described below.

1. *Rupia Simplex* is the simplest form, the bullæ being circular, flattened, and about the size of a dime the crusts being thin, and the ulcers beneath them superficial; it more generally appears on the legs and inferior portions of the trunk, and is common among young children. It sometimes follows the exanthematous fevers, and is occasionally complicated with purpura hemorrhagica.—2. *Rupia Promineus* is characterized by larger bullæ, thicker crusts which are more projecting and conical, and a deeper and more troublesome ulcer, which is disposed to spread and increase its diameter. The crusts remain for some time before they become detached, and the exposed ulcer sometimes discharges a matter which gives rise to a new crust. The cicatrix formed continues of a dark or livid hue for many months. The bullæ may be few or many, may be developed slowly or rapidly, and may appear on the superior or inferior extremities, more commonly the latter.—3. *Rupia Escharotica* has already been referred to under Pemphigus.

The *causes* of rupia appear to be those that occasion debility or constitutional disease, as, intemperance, unhealthy food, impure air, uncleanliness, etc., and the disease is frequently met with among scrofulous persons, and the children of drunken and dissipated parents; in most instances, it is associated with a syphilitic taint.

In the *diagnosis*, rupia must be distinguished from pemphigus and ecthyma. In *pemphigus* the bullæ are not flattened, usually occur in groups, with little or no redness around their bases, the fluid discharged is clear and transparent, the scabs are not so thick and conical, and beneath them there is only excoriation, or, at most, a very superficial ulceration.—In *ecthyma* the eruption is pustular from the first, has a harder and more elevated base, the crusts are flatter, and the ulcerations beneath them are not so deep as in rupia.

In itself, rupia is not a dangerous malady, although very obstinate and of tedious cure. The *prognosis*, however, will depend upon the size and number of the bullæ, their location, and the character and

nature of any co-existing diseases. A profuse eruption is unfavorable, and the atonic ulcers formed on the legs are often very intractable to treatment, requiring many months before they will heal. In the aged the disease sometimes proves fatal, especially among those whose systems have become impaired by disease, or irregular habits.

In the *treatment* of rupia, we must direct our means to the conditions of the system that are present. Any scrofulous or other taint or tendency of the system, will require the proper alteratives; and so of other maladies that may be present, the appropriate measures should be pursued the same as if no rupia had manifested itself. More commonly, tonics and alteratives will be required, together with a generous, nutritious diet, regularity of bowels, kidneys, and skin, and a pure fresh air.

The bullæ should be opened at an early period, and the fluid contents be permitted to escape, afterward painting the vesicles with the Tincture of Chloride of Iron. As the irritation is kept up by the morbid secretion from the ulcerations, the crusts should be softened and gently detached by applications of oil and poultices; and the surfaces of the exposed ulcerations should be stimulated so as to favor prompt healing, by applying Tincture of Chloride of Iron, either alone or combined with some Chlorate of Potassa;—a drop or two of Oil of Turpentine; Concentrated Nitric Acid, upon a soft wood porte-caustic; or Compound Tincture of Iodine may also be used. The healing of very obstinate ulcers on the legs may be greatly facilitated by passing strong electro-magnetic interrupted currents through them and the surrounding parts, daily; in such cases, a recumbent position, with the legs elevated, will be found useful.

With the exception of Rupia, and perhaps Herpes, the other varieties of cutaneous eruptions referred to in the preceding Orders, appear to be closely allied to each other, and indeed we frequently find two or more of them manifested simultaneously; beside which, the treatment is very nearly identical in each of them. Again, they are well known to be convertible into each other, and the erythema of to-day, may be an eczema, a lichen, or an impetigo to-morrow, and, subsequently, become a chronic ecthyma. These facts lead me to believe that in reality they are but one disease, under different modifications according to the exciting cause, the particular layer or tissue of skin affected, the peculiar conditions of the system, degree of original inflammatory action manifested, etc. But as authors generally describe them under distinct heads or orders, I have deemed it best to do the same.

During the last twenty years I have frequently been called upon to treat a very remarkable disease, which appears to be not only of a contagious character, but also to exist epidemically; it has received several names, as, *Indiana Itch*, *Illinois Itch*, *Prairie Itch*, *Seven-year Itch*, *Camp Itch*, *Army Itch*, etc. I have never seen a description of it, and consequently have no authorized name for it. It appears to be a prurigo, sometimes of an eczematous character, at others, presenting ecthymatous or impetiginous appearances; and frequently, it is associated with scabies.

It is characterized by a minute vesicular elevation of the skin, accompanied by a most intense and distressing itching, which is greatly augmented when the surface becomes heated, as, by exercise, heat of bed, etc. It appears upon the back of the hands, and between the fingers, more especially when complicated with scabies; also upon the arms, the trunk, and the legs. Any part of the body may, however, be attacked with it. Its duration varies from a few weeks to three or four years; but more commonly, under proper treatment it disappears in a month or two; sometimes it is very intractable to treatment.

The itching is of that intense character that the patient not only scratches, but actually tears the affected parts with his nails; and which, instead of allaying the itching, renders it more of a tingling, burning character. From the scratching, more or less imperfectly circular, rather indolent ulcers are produced, either large or small, superficial or deep-seated, and which become covered by thin scales or scabs of a dark color. In many instances there will be more or less redness around the margin of the ulcers, the surfaces of which bleed a little upon being scratched or rubbed hard, and the itching usually continues nearly as severe as at first, but scratching is apt to be more painful. In certain constitutions these ulcerations are more or less of an atonic character, with a dark color around them, and when healed leave a dark or livid cicatrization which continues for some time. In a few cases the eruption assumes a pustular or furuncular form, discharging a purulent fluid for many days.

I am not aware of its *causes;* it appears to attack all persons exposed to its action, without regard to age or sex; and those of weak or deranged systems are more liable to its severer forms. Uncleanliness, improper or innutritious food, and congregating persons together, as, in camps, etc., favor its appearance. The *prognosis* is generally favorable; but I have undoubtedly seen cases in which the disease having disappeared from the surface spontaneously, or from the influence of local (without internal) treatment, was subsequently followed by serious disease of internal organs; but whether

there was any positive relation between the two, or, whether they were mere coincidences, I am not prepared to say.

The *treatment* consists in the employment of the proper measures to overcome such abnormal conditions of the system as may be present,—the same as advised in the preceding skin affections; together with the necessary hygienic measures. And in all cases where the patients are in other respects apparently well, I invariably have them to take solution of Bromide of Potassium internally, as an alterative.

As to local applications, there are several that have been found useful, as—1. Bathing the whole surface of the body twice a day with warm water and an alkaline soft soap.—2. Take of Lard half a pound, Sulphur two ounces, Salt of Tartar one ounce; mix, and form an ointment; after bathing as above, apply this ointment every night.—3. Take of Sulphuric Acid two drachms, Sulphur half an ounce, Lard three ounces; mix, and apply as the preceding.—4. Take of Pyroligneous Acid two fluidounces, Pure Carbolic Acid four drachms, Water seven and a half fluidounces; mix the acids and then add the water. Apply to the affected parts once a day, by means of a pencil or sponge, thoroughly impregnating the skin with it. Nos. 2, 3, and 4, will especially be found useful in those cases associated with scabies.—5. Take of Iodide of Ammonium one drachm, Lard one ounce; mix. Apply three or four times a day, washing the surface every night with common soap and water. Twelve or fifteen minims of Chloroform added to this ointment, will aid in allaying the itching.—6. Take of Washed Sulphur, pulverized Carbonate of Ammonia, each, one part, Lard eight parts; mix. Thoroughly cleanse the person with soap and water, and apply the ointment; it may be applied once or twice daily.

For the ulcers, I have found that touching them two or three times a day with Tincture of Chloride of Iron, and then dressing them with Mayer's Ointment, or with the Red Oxide of Lead Plaster, exerts a decidedly beneficial influence.

FURUNCULUS.

Furunculus or Boil is a tumor varying in size from that of a pea to a hen egg, hard, prominent, conical, and usually quite tender and painful. The tumor presents a dark-red color, gradually increases in size, its base penetrating deeply, and more or less rapidly advances to maturity, the summit of the tumor becoming pointed and yellowish-white, bursts, and discharges a variable amount

of pus frequently mixed with blood. After the opening of the boil a sloughy piece of cellular membrane, or the *core*, will be seen occupying the purulent furuncular cavity, and which in the course of from four to fifteen days becomes loosened and is expelled. The pain now ceases, the swelling rapidly disappears, with the formation of granulations, and in a few days the part heals, leaving a transient, dusky redness, and a permanent cicatrix.

Boils may appear on any part of the body, but seldom in any great number, more commonly only one or two at a time, but they are liable to appear in succession, and thus annoy the patient for months and even years. In some cases, they are attended with constitutional febrile symptoms, depending, however, upon their location as well as their size. When seated in the neighborhood of sensitive nerves the pain is often intense. Young persons appear to be more liable to them, and they are due to gastro-hepatic disorder, constitutional debility, impure blood, etc., and sometimes exist as an epidemic.

Treatment is rarely required for boils except when they are very painful, or when they appear successively following each other. The progress of a boil may often be retarded and completely arrested by applying a cataplasm of pounded Ice to it; or by painting it frequently, with Oil of Turpentine, a saturated solution of Oxalic Acid, Compound Tincture of Iodine, Nitrate of Silver, or Iodized Oil of Juniper, etc. A poultice of Elm Bark, Flaxseed, Bread and Milk, or, of Hops and Lobelia Leaves, will hasten suppuration; and some Laudanum or Belladonna may be added to the poultice to allay pain. After the discharge of matter, should the cavity assume an indolent form, it may be touched with the Sesquicarbonate of Potassa, and be dressed with the Red Oxide of Lead Plaster.

When the reproduction of boils continues for weeks and months, moderate exercise, a generous diet, and the use of one of the following compounds will arrest their further appearance: 1. The preparation composed of Blue Flag, Black Cohosh, Soluble Pyrophosphate of Iron, Glycerin, etc., named in the treatment of Chronic Peritonitis; 2. Bromide of Potassium; 3. A decoction of Burdock Seed one ounce, Ground Centaury (*Polygala Nuttalli*) half an ounce; mix; 4. An infusion of equal parts of Burdock Seed, Sassafras Bark, and St. John's Wort.

When the furuncular disease appears as an epidemic, in addition to one of the above agents, the following powder should also be taken: Take of Bisulphite of Soda four hundred grains, Sulphate of Quinia ten grains, Sulphate of Iron twenty grains, Leptandrin

eighty grains; mix, and divide into twenty powders, of which one may be given for a dose every four or five hours.—Citrate of Ammonia, Yeast, and Porter have been found useful in the treatment of boils. I have known the following to permanently cure persons subject to constant and successive crops of numerous troublesome boils: Take of fresh Lemon-juice one pint, good French Brandy three fluidounces; mix. The dose is half a wineglassful, to be repeated three times a day. It should be taken in about an equal quantity of water, and its use be continued for three or four weeks.

ANTHRAX.

Anthrax or Carbuncle is a tumor of a malignant character, which is larger than a boil, and less conical. It usually commences with great heat and pain in the affected part, as well as more or less itching; a small pimple manifests itself, which, increasing in size, extends deeper and deeper into the cutaneous tissue, forming a circumscribed, flattened, deep-seated, hard, and dark-red or purplish tumor. And the disease is accompanied throughout its whole course by more or less severe throbbing and burning pain, irritative fever, and considerable constitutional disorder. When the tumor has reached its full size one or more small vesicles form on its summit, and which, when broken, discharge a thin, acrid, dark-colored fluid (sanious, ichorous, purulent), which excoriates the parts coming in contact with it. There may be one or many discharging orifices. These tumors vary in size from half an inch in diameter to six inches and upward, and they rapidly proceed to a gangrenous condition, grayish sloughs being detached from the healthy tissue. Carbuncles differ from boils in always being solitary.

The nape of the neck, the back, the buttocks, and the external surface of the limbs are more apt to be affected with them; and they are more frequent among middle-aged persons with constitutions impaired by dissipation, intemperance, etc. Bad food, residence in confined and damp places, mental depression, close study, trouble, etc., have been named among the exciting causes.

If granulations spring up, the abscess gradually healing, the *prognosis* is favorable. When the disease continues to progress, with great constitutional disturbance and typhoid symptoms, the prognosis is unfavorable. Death may occur from exhaustion, from pyæmia, or from the disease becoming extended to important tissues.

The *treatment* consists in applying potassa fusa freely to every part of the tumor, and especially within the apertures, having first benumbed sensibility by means of Richardson's anæsthizer; or by the application of pounded ice and salt to the part, for about five minutes. After this apply a poultice made of equal parts of powdered Marsh Mallow, Wild Indigo Leaves, and Charcoal, to which must be added some Carbolic Acid dissolved in Alcohol and Pyroligneous Acid; or Phenol Sodique may be substituted for the Carbolic Acid. Renew the poultice two or three times a day, and re-apply the caustic at each fresh dressing, until the parts slough off, and a healthy appearance is assumed, when the ulcer left may be healed the same as an ordinary ulcer. I have derived great benefit from the local application of a solution of Permanganate of Potassa (twenty to forty grains to the fluidounce of water); bathing the incised carbuncle with it daily, and also keeping it constantly applied by means of light compresses, covered with a fold or two of dry cloth.

Internally, the bowels, kidneys, and liver must be kept in as normal a condition as possible, being careful to avoid the production of diarrhea; tonics and alteratives should also be given, adapting them to the general condition of the patient. One of the agents named under Boils may be employed, or the following: Take of Cinchona one ounce, Ground Centaury half an ounce, Wine two pints; mix. The dose is a wineglassful three or four times a day. Tincture of Chloride of Iron, Chlorate of Potassa, Nitro-muriatic Acid, etc., have also been found useful. The diet should be nutritious, allowing ale, porter, wine, etc., as tonic stimulants. In case of diarrhea, Charcoal, the mineral acids, Perchloride of Iron, etc., may be used, or, some of the means named under Diarrhea. The following will frequently relieve the patient's sufferings: Take of Sulphate of Quinia eight grains, Sulphate of Morphia one grain, Elixir Vitriol two fluidrachms and forty minims, Tincture of Black Cohosh five fluidrachms and twenty minims; mix. The dose is a teaspoonful in some water or syrup.

ORDER VI. SQUAMÆ.

Squamous or Scaly diseases are characterized by their being of a chronic inflammatory, non-contagious nature, and consisting of a variable number of minute red papular elevations of the skin, or deep-red patches, which speedily become covered with particles of scurf or scales, the result of a morbid secretion of the epidermis. These scales are portions of the degenerated epidermis, and are

laminated, of a whitish or grayish-white color, often of a glistening micaceous appearance, dry, friable, of various thickness, and readily detached, leaving the skin from which they have fallen off, red, smooth, and shining; they are reproduced by successive desquamations for a long time; and are quite different from the scabs or crusts occasioned by the dessiccation of purulent and sero-purulent fluid upon the surfaces affected by the eruptions heretofore treated upon. The epidermis of the parts affected is altered in its qualities, being thickened, hard, dry, or otherwise degenerated. But little, if any, constitutional disturbance attends them; and the local heat and itching is not apt to occasion much inconvenience unless the epidermis becomes thickened and indurated; indeed these local symptoms are frequently unperceived. The unsightliness of the affection occasions the most uneasiness and annoyance.

Squamous affections are more apt to affect the outer sides of the limbs, and to avoid the flexures of the joints, but may occur in their vicinity, and often give rise to a sense of stiffness in the parts affected, to chaps, excoriations, and, when of long standing, to considerable induration and thickening of the diseased integuments. All persons are liable to these eruptions, without regard to sex, age, station, etc., and they may be transmitted hereditarily. The only squamous affection that I shall describe is Lepra. Pityriasis, psoriasis, and ichthyosis have been placed under this order, but I have considered the first under *Erythema*, the second under *Vesiculæ*, and the last under *Xerodermata*.

LEPRA.

Lepra (*scaly leprosy*, *dry tetter*, *branny tetter*, etc.), is one of the most persistent and difficultly-curable of skin diseases. It is a non-contagious chronic eruption, manifesting itself at first by the appearance of minute, thin, whitish scales upon dark-red elevated patches of various shapes and sizes, but usually of a roundish shape; this eruption may appear upon different parts of the body, but more frequently in the vicinity of the elbows and knees, and, like the pimples of lichen, is developed around the orifices of some of the cutaneous follicles. The scalp and face are also liable to the eruption. Instead of the affected surface presenting a bright or dull-red color, it is occasionally of a brownish or coppery tint, even when the system is free from any syphilitic taint. The patches may continue to increase in size, and as long as they exist the scales are formed, being detached and replaced by successive formations; the patches may also increase in number, and extend

from the points first affected to the trunk, and appear to be due to a congested condition of the skin around its pores. The constitutional symptoms are mild, if, indeed, any are present, and there may be a hardly appreciable itching, though occasionally this is troublesome at the commencement of the disease. The disease often lasts for years, sometimes appearing and disappearing at certain intervals; and its disappearance is manifested by the breaking of the circular patches which gradually become paler until the skin assumes its normal condition, while, at the same time, the elevations gradually sink to a level with the surface.

Lepra has been divided into several varieties according to its appearances, as well as its localities; most of those, however, based upon its appearances, are but different stages of the same eruption; those based upon its location have no other peculiar distinguishing marks. In the following list of these varieties, it must be recollected that several of them are described by some writers under the name of *Psoriasis*, which I have dropped under this Order, describing them under Lepra, as being the more correct affection.

1. *Lepra Punctata* is the early stage of the eruption, when it consists of minute, whitish, scattered patches, about the size of pin's heads.—2. *Lepra Guttata* is the name given to the stage in which the patches have increased in size to that of from two to six lines in diameter, somewhat resembling drops of soft mortar.—3. *L. Nummularis* or *Circumscripta*, is when the patches extending peripherally, unite together, and form round patches of the size of from one to three inches in diameter.—4. When the patches thus fusing together form larger ones of irregular shape, the eruption being over a considerable extent of body, it is termed *L. Diffusa*.—4. *L. Inveterata*, when the eruption is very extensive and troublesome. 5. *L. Universalis*, when the eruption covers the whole surface from head to foot, leaving no intervals of sound skin.—6. *L. Vulgaris* where only a partial desquamation occurs in the middle of single circular patches.—7. *L. Gyrata*, when the patches assume a serpentine, figure of 8, or other waved appearance; this is a declining stage of the eruption.—8. *L. Circinata*, when the eruption disappears in the center of each patch, so that circles of eruption are left, enclosing healthy or nearly healthy skin.—9. *L. Capitis*, when the scalp is affected.—10. *L. Faciei*, when the face is the seat of the eruption.—11. *L. Ungium* when the nails of the fingers and toes are invaded.—12. *L. Nigricans*, a rare form of the disease, occurring in persons of enfeebled constitution, or those exposed to exposures and fatigue; it is charac-

terized by the parts having a dark livid color, and the scales being thin, and of a dull grayish hue. Sometimes a sero-sanguineous or serous fluid will be discharged from the exposed and excoriated surfaces, which hardens into an irregular and friable crust.—All these varieties are, however, but the one disease—Lepra.

Lepra Rupioides is the name given to a variety regarded as a stage intervening between L. Guttata and L. Nummularis, in which there is an unusual accumulation of morbid epidermis, assuming the shape of large conical crusts marked by concentric rings, and projecting, somewhat resembling the crusts of rupia; when the surface beneath these prominent aggregations of scales is exposed, there is no ulceration, but merely a slightly-raised dark-red, rounded surface, which sometimes bleeds a little.

The *cause* of lepra is unknown. It appears to be capable of being transmitted hereditarily, though it is not invariably the case that the offspring are affected with it, because the parents are. It often appears in apparently sound constitutions, as well as among persons of strumous or scrofulous tendencies, and especially among those of sanguine-bilious temperament. Of its exciting causes we know nothing, although many circumstances have been named as such, as, long-continued mental fatigue, menstrual derangements, overstudy, anxiety, debility, intemperance in eating and drinking, etc. All climates, seasons, and races are liable to it. Anatomically, it is congestion and exudation into the upper layers of the cutis, with an increased production of epidermic cells. It is usually worse in winter and spring, and more commonly appears between the ages of twelve and thirty.

The *diagnosis* of lepra, as a general rule, may readily be made out; its prominent characters are the circular or circumscribed form of the dusky-red or coppery patches, the margins of which are elevated, while their centers are depressed,—the thin, dry, grayish-white, imbricated scales covering them,—the absence of moisture or of any discharge whatever,—and the appearance of the eruption near the elbows or knees, no matter wherever else they may be situated. The copper color may lead to an idea that the eruption is of a syphilitic nature, but the difference may be determined by an attention to the following points: *Syphilitic Lepra* is usually not very extensive, the patches are small and isolated, and prefer the inner rather than the outer aspect of the limbs, appearing likewise in the vicinity of the mouth and upon the palms of the hand and the soles of the feet, and have a more decided coppery tint than the non-syphilitic variety. The scales of the specific disease are thinner and less imbricated, not very white, but grayish

or quite dark, and rarely attended with itching,—sometimes there is a tendency to ulceration. The history of the disease, the presence of sore throat, headache in the temporal regions, crusts on the scalp, enlarged posterior cervical glands, condylomata, nodes, etc., will aid in determining its syphilitic character; beside which, syphilitic lepra is generally a second stage or degeneration of some other syphilitic eruption, either pustular, papular, tubercular, or ulcerating, and which is *never* the case with the non-syphilitic disease.

Lepra may be discriminated from chronic *Eczema* in which the color of the patches is brighter, the itching more marked, the scales are thin, not white, and less adherent, the eruption has no tendency to attack the elbows or knees, and at some period of the disease, there is always a serous exudation, which on the head mats the hair. Lepra is a dry eruption. From *Pityriasis*, in which the scales are more branny, and not imbricated, and there is no appreciable thickening or infiltration of the subjacent skin. From *Herpes Circinatus* which has no tendency to attack the knees or elbows, its scales being loosely attached and not of a shining grayish-white, the presence of the parasite as shown by the microscope, and its contagious character. From *Lupus Erythematosus*, which is more apt to attack the face and head, progresses much more slowly, the redness has a purplish tint and is greater near the circumference, the skin looks dry and shrunken, the scales are very thin not readily rubbed off, some of them distending the sebaceous follicles, and the disease leaves a glazed, slightly scarred appearance, as if the skin had been parched and seared by fire passing over it.

The *prognosis* of lepra, as far as the disease itself is concerned, may be considered favorable, as it rarely occasions any serious constitutional derangement, or proves fatal. The disease may become cured either spontaneously, or by treatment, but more commonly it remains through life, disappearing during warm seasons and re-appearing in cold. When it disappears, if the skin returns to its natural normal condition, its disappearance may be permanent, but any remaining abnormal condition of the skin will almost certainly be followed by a return of the eruption at a sooner or later period. First attacks appear to be much more amenable to treatment than subsequent ones. When the center of the patches heal, it is favorable as indicating a natural tendency toward a cure; but relapses are very common. The disease is, undoubtedly, often curable, under persevering and proper treatment.

The *treatment* of lepra does not yield much, if any, reputation to

the medical man; he may be successful, or he may not. A great amount of patience as well as untiring perseverance will be required on the part both of the patient and the practitioner. The closest attention is required to ascertain all the conditions and circumstances of the patient that may develop or perpetuate the disease. Is the patient very sedentary; does he overexercise, or does his business expose him to irritating vapors or dust, etc.; has he any mental anxiety; does his business require great and continued mental exertion; does he reside in an uncleanly, illy-ventilated, or damp location, or greatly secluded from the sun's rays; is he irregular in his habits, his meals, his sleep; are his bowels constipated or irregular; is his urine of an unhealthy character; is he intemperate; does he make use of improper diet; is he uncleanly in his person, etc.? If any of these circumstances are present, they must be removed or overcome by appropriate means. Indeed, in no disease, does a strict attention to the person's hygiene, in all respects, effect so much benefit as in the one under consideration.

A proper attention to diet, regular and moderate exercise in the open air, regular habits, regular hours for meals and sleep, cheerfulness of mind, absence of mental anxiety or severe mental occupations, attentions to the skin, bowels and kidneys and, if it can be had, change of air and scenery, are important essentials in the treatment. When it can be effected, a visit to the White Sulphur, or Salt Sulphur Springs, of Virginia, the Ballston Spa of New York, or other Saline or Sulphur Springs, and the use of the waters, will be found beneficial.

Again, the patient may be disposed to scrofula, rheumatism, gout, nervous irritability, uterine derangement, gastric, hepatic, splenic, renal, or enteric disorder, debility, cachexia, cutaneous torpidity, anemia, plethora, etc., any of which must be treated by the appropriate remedies independently of the cutaneous affection,—and this will be found very important, notwithstanding this affection often occurs in persons presenting, in every other respect, all the externals of health.

There is no specific internal remedy for lepra; arsenic and arsenical preparations have been highly lauded, but, beside being improper articles as medicines, I have known quite a number of instances in which they have proved unsuccessful. Fluid Extracts of bitter-sweet, nettles, mezereon, etc., have also been extolled, but they will be found unreliable; Tincture of Cantharides, however, has occasionally proved beneficial, but its action must be carefully watched, on account of its influence upon the kidneys and bladder.

It may be administered as follows: Take of Tincture of Cantharides one part, Tincture of Hyoscyamus two parts; mix,—the dose is half a fluidrachm in six fluid ounces of infusion of Elm Bark, repeated three times a day.

The best internal means that I have yet found in the treatment of lepra is the following: Take of the Compound Syrup of Yellow Dock one pint, Bromide of Ammonium one hundred and sixty grains; mix. The dose is one fluidounce three times a day, about an hour after each meal. In conjunction with which, one of the following pills must be taken three times a day, about an hour before each meal: Take of Citrate of Iron and Quinia sixty grains, Citrate of Iron and Strychnia thirty grains, Alcoholic Extract of Black Cohosh twenty grains, or more if required; mix, and divide into twenty pills. In some instances a mixture of the Tincture of Chloride of Iron, with a Solution of Chlorate of Potassa, may be substituted for the preceding named pills.—Carbolic Acid has been recommended as an internal agent, but I have not yet tested it in this disease.

External measures will be found as important as internal, and both should always be employed in conjunction. The skin requires attention; it should be bathed once or twice a week, or even oftener, with a soap-suds made of alkaline soft soap, to which some alcohol is added; and once in every week or two a Spirit Vapor Bath should be taken, or some Turkish baths, with thorough shampooing. This course is required to maintain the skin in as healthful condition as possible, as well as to aid in removing the scales, in order that the local medicinal applications may be made direct upon the patches and the skin. During the intervals between these bathings one of the following preparations should be applied to the eruption two or three times a day: 1. Take of Carbolic Acid one part, Pyroligneous Acid (8°), four parts, Water fifteen parts; mix. Apply by means of a sponge. In some instances, the amount of Carbolic Acid may be increased.—2. A mixture of Tincture of Muriate of Iron, Tincture of Cantharides, and Solution of Chlorate of Potassa.—3. Ointment of Oil of Cade.—4. Ointment of Iodide of Sulphur.—5. Ointment of Iodide of Ammonium. These should be thoroughly rubbed upon the patches as well as upon the healthy intervals between them, removing the greasy preparations every morning by means of soap and water. And an exposure of the naked surface every two or three days to the Sulphur and Iodine fume bath, will be found of great value and very efficacious.

ORDER VII. TUBERCULA.

Under this Order are included several affections very unlike each other, both anatomically and pathologically, and which have been described by some authors under the head of "Hypertrophies and Degenerations;" by others, as, "Cutaneous Diseases from Special Internal Causes," etc. The characteristics of this order of cutaneous diseases, are, primary, solid, circumscribed and persistent tumors of various sizes, considerably larger than papulæ, which may terminate in suppuration or ulceration. These affections are chronic in their nature, being generally developed very slowly, and being also very intractable to treatment, frequently requiring months and even years for their cure, and, sometimes, being absolutely incurable.

LUPUS.

Lupus commences with one or more circular or oval flattened elevations, tolerably firm, about a line or two in diameter, brownish-red or deep violet in color, and semi-transparent; these elevations remain indolent and stationary for a variable length of time, when they commence increasing in size and new tubercles become developed. The tubercles are generally grouped together, and assume an annular tendency. Sometimes the disease begins with the appearance of violet spots, on which are formed scabs, which being picked off are succeeded by other scabs, and so on, the disease in the meantime surely but gradually augmenting in area and depth. The parts more liable to be attacked are, the nose, and the cheeks, though it has been met with on other parts, as, the eyelid, chin, ear, arm, leg, etc. The tubercles may or may not ulcerate. Lupus may last ten, twenty, or thirty years, or more; but even when it has disappeared there is always a great tendency to its return. There are three varieties of lupus, as follows:

1. *Lupus Exedens* commences with the appearance of one or more small, smooth, dull-red, opaque tubercles, usually one, seated on the alæ or tip of the nose, and which, after a greater or less period of time, degenerates into one or more minute ulcers upon the summit of the tumor, covered each with a thin, brown, and adherent scab. Swelling and redness of the parts affected are generally present. Sometimes a dark livid spot, with slight swelling of the part is only observed, followed by the formation of a scab. The scab formed, in either case, being removed by scratching or otherwise, is followed by the discharge of an ichorous fluid, the drying of which gives rise

to another scab; and thus scab after scab may become successively formed, each one being thicker, and larger than the preceding, on account of the advancing ulceration and increased discharge of ichorous and purulent matter. The crusts are either rough and dark-colored, or smooth and yellow, are very adherent, consist of dried pus, blood, and sebaceous matter, and are being constantly formed upon the ulcers, whenever these are exposed; frequently, instead of being adherent, they will be undermined with the fluid discharged from the surface of the ulcers covered by them,—and sometimes they are blackish instead of a brownish color, especially in *L. Superficialis.* The ulcerations may extend in diameter, in depth, or both, and may rapidly destroy the nose, the lip, the lids, the cheeks, and even the bones, destroying all these in four or five weeks, or, it may progress very slowly, requiring several years for a part of the nose to be destroyed; the ulcers are concave, with uneven surfaces, grayish-red or yellow exudation of a fetid, ichorous and semi-purulent character, and their margins red, thickened, everted, or somewhat undermined; white patches of lymph will frequently be observed upon their surface,—and, at other times, small, brownish-red, unhealthy granulations. The superficial ulcerations are termed *Lupus Superficialis;* the rapidly destructive ones, *L. Vorax;* when the disease extends in circles or segments of circles, with unaffected skin in their centers, it is termed *L. Serpigineuse;* and when it extends to the deeper-seated tissues it is termed *L. Exedens.* No itching or pain of any account accompanies this disease as a general rule, but touching the diseased spot frequently occasions pain. When the ulcer heals, the exudation becomes less in quantity, and thicker, the healing advances from without inwards, the part becomes paler, though it retains its unhealthy aspect for many years, and the cicatrix may be smooth, or may present white, corrugated bands, and give rise to deformities according to its situation. Sometimes cicatrization may be going on at one part, while fresh tubercles form at another.

2. *Lupus Non-exedens* is almost exclusively seated on the face, where it commences by one or more tubercles, of a dingy-red color, slightly elevated above the surface, not quite so hard as that of L. Exedens, indolent, semi-transparent, and about two lines in diameter. If but one tubercle exists, any improper, irritating applications will cause the eruption to spread more or less rapidly over the face, though this will ultimately occur, even if no irritants be applied. More commonly, however, the tubercles are developed simultaneously over a great portion of one or both cheeks, or of the forehead, and perhaps over the whole face; and the tubercles exist in groups,

assuming an annular disposition; as the disease progresses new tubercles continue to form around the original patch, whether the primary tubercles have disappeared or not, thus perpetuating the disease. They cause no constitutional disturbance, no inconvenience aside from their appearance, and may remain in a stationary, indolent condition for months.

The tubercles very rarely ulcerate, or become covered with adhering crusts, but their bases, after a time, gradually enlarge, the tubercles themselves become flattened, and accidental sores may appear at their circumference. With the enlargement of their bases, an indolent engorgement of the surrounding skin and subjacent cellular tissue occurs, which swell so as to fill up the spaces between the tubercles, and present a remarkable sort of puffiness. After a certain time, the affected parts will become studded with dark-reddish points, which are tubercles not yet raised above the surface, and white points or scars may also be observed interspersed about; the scars having formed without incrustation or exfoliation. The tubercles in lupus non-exedens are rarely incrusted or ulcerated, though they are the seat of an insensible and constant desquamation, and when they disappear they leave cicatrized pits behind them. The swelling, the enlarged, puffy, flabby condition of the affected parts, and the yellowish-red and dingy tint, often present a repulsive appearance.

Sometimes a thin scale may be formed upon their tops, when these are scratched; and by a repetition of the scratching, scales may be produced in succession, each new formation being larger and thicker than the preceding. Occasionally, slight ulceration may be present, but it is insignificant; but at times, more especially upon the application of some improper agent, a considerable ulceration will occur, with more or less profuse ichorous discharge which forms a thick, laminated, yellowish-brown, and in some instances, apparently concentric incrustations, giving a very unsightly appearance to the features; this ulceration is not, however, corroding nor destructive, though it must be remembered that all the varieties of lupus may exist together in the same person.

This variety of lupus usually continues for a long time, and when it disappears, the skin never regains its natural condition and appearance; for a great length of time it presents a thin, smooth, shining appearance, with white cicatrical bands similar to those left by the preceding variety of the disease.

3. *Lupus Erythematosus* is more common among women, and attacks the face and head, especially the nose and cheeks. It may commence very insidiously, presenting a small pale spot surrounded

by a delicate purplish hue, and which slowly but gradually enlarges, while other spots of a similar character become developed around it, presenting after a time somewhat scalloped margins. More commonly, however, it appears in small, irregular, deep-red or violet-colored, slightly-raised patches or spots, circular or oval, and from two to twelve lines in diameter. The redness is greater near the margins than at the central portions, disappears momentarily from pressure, and becomes deeper from any exciting cause. The patches are frequently depressed in the center, the cuticle of which part presents a whitish opaque aspect, dries up into a thin, yellowish and horny layer, formed of small, branny adherent scales, which fall off from time to time. In some cases, instead of being covered with scales, the patches present a number of rough points, which when examined, will be found to be the orifices of the sebaceous glands distended with dry epithelial exuviæ. The parts affected, look seared and parched, as if they had been acted upon by fire. When located upon the scalp, the hair follicles become permanently destroyed, and the hair falls out never to return.

The disease is of slow progress and appears to be an atrophy. When it is about disappearing, the cicatrization usually begins at the center and progresses toward the circumference of the patches; the healed parts become paler and paler, smooth, and leave a more or less distinct cicatrix.—The eruption occasionally appears on the limbs, fingers, and joints, and may be mistaken for chillblains; but its appearance in warm as well as in cold seasons will correct such an error in diagnosis. When the disease attacks the fingers, they look as if the parts had been burnt or scalded, and the atrophied skin contracts tightly upon the phalanges.

The *cause* of Lupus is not known. It appears, however, to be dependent upon a scrofulous or syphilitic taint of the system; the latter especially when it has been derived from progenitors. However, it has occurred in persons with whom there were no reasons for suspecting the presence of either of these taints. It affects children and adults, and young females especially in the first few years of puberty; males are as liable to its attacks as females. After the age of forty the disease rarely becomes developed. Bad food, impure air, want of exercise, and weak constitutions appear to be occasional predisposing causes. Country people are more liable to it than the inhabitants of cities. When the disease has once disappeared, it may re-appear at some future time. The disease involves the derma, causing interstitial absorption and atrophy of that tissue.

The diagnosis of lupus may be made out, from the violet or

dingy-red tubercles, their indolent progress, their subsequent dark-brown incrustation, desquamation, or ulceration, the seat of the disease, as, the nose, cheeks, lips, etc., and the pitted, unhealthy-appearing cicatrix left after the eruption has disappeared. It may, however, be confounded with some of the following affections: It may be determined from *acne*, which is limited to the sebaceous glands, is preceded by pustules which are red, and which leave behind circumscribed indurations surrounded by an erythematous areola, and the course of the disease is not so extremely slow as that of lupus.—From *cancer*, which generally manifests itself at a more advanced age, is attended with lancinating pains, more commonly prefers the lip as its location, presents a single tubercle only, which is hard, and surrounded by a firm base; after ulceration, cancer presents no dark-brown or blackish adhering crusts, its margins are callous and everted, and surrounded by an inflammatory areola, and its ulcerated surface is moist and of a fungous aspect. Lupus non-exedens, especially, may be discriminated from *Elephantiasis Græcorum* the tubercles of which are small, deformed, unequal, and of the same tawny color as the surface around them, which ulcerate, presenting black scabs here and there, and the ulcerations are more superficial than those of lupus, and have not the same tendency to spread; elephantiasis may also be developed upon other parts of the body at the same time or following its appearance on the face, and is eventually accompanied with severe constitutional symptoms.—From *impetigo* in which the crusts are prominent, rough, yellow, and not very adherent, while those of lupus are thick, dark-brown, and very adherent.—From *syphilitic tubercles*, which greatly resemble lupus, but differ from it in presenting larger, rounder, harder, and dusky copper-colored tubercles, which have less tendency to ulceration than those of lupus, and are less disposed to desquamate; the ulcerations that succeed the syphilitic tubercles, occur more rapidly than in lupus, are deep, have sharply-cut, well-defined, swoln, and copper-colored edges, a gray surface, and a greenish crust. Beside which, the history of the case, and the presence of other syphilitic symptoms, as, osteocopic pains, nodes, iritis, ulcers in the throat, etc., will assist in the diagnosis.

Lupus is an exceedingly intractable disease, and rarely yields to treatment until it has effected more or less destruction of parts, always leaving numerous, deformed, and indelible scars. Consequently, although the patient's life is not endangered, the *prognosis* of the disease is unfavorable. The earlier it is submitted to proper treatment, the less severe will be its results. The greater the

degree of swelling, of the parts affected by it, the more serious is the disease; likewise, when recently healed parts have their cicatrices destroyed by subsequent ulceration. When the cicatrices remain soft and of a bluish color, or are surrounded by the development of fresh tubercles, a renewal of the ulceration may be predicted.

The *treatment* of lupus is by no means so efficient as could be desired, and medical men have tried various means, but with only occasional success. Hygiene is very important in the management of this disease, as, pure air, cleanliness, healthy residence, good, nourishing, digestible diet, regular moderate exercise, regularity of bowels and kidneys, avoidance of crowded rooms, etc. Cod Liver Oil may be used with great advantage, both as an article of nourishment and a remedial means.

Internal treatment will be found of much greater value than local. The conditions of the patient as to a tendency to scrofula, the presence of anemia, scorbutus, gastric acidity, gastric debility hepatic disease, nervous irritability, etc., must be especially ascertained, and the proper course of treatment be accordingly pursued to overcome them. Among the internal agents that have been found useful in the treatment of lupus, are, Bisulphite of Lime; Bromide of Potassium; Bromide of Ammonium; Iodide of Iron; Phosphorated Cod Liver Oil, with soluble Pyrophosphate of Iron; Compound Syrup of Yellow Dock; Chloride of Gold and Soda; Carbolic Acid one part to Water one thousand parts, of which a teaspoonful may be taken in a glass of water twice a day, etc.

Among the local applications those that have been of the greatest benefit, are,—1. Carbolic Acid in Glycerin, or in Glacial Acetic Acid, and which has been found of service in each variety of the disease; it may be used in various proportions, as, one part of the Carbolic Acid to from twenty to forty parts of the other fluid.—2. Solution of Chloride of Gold and Soda one part of the gold salt to from sixty to one hundred parts of Water.—3. Tincture of Iodine.—4. In Lupus non-exedens, the Acetum Cantharidis, made with strong Acetic Acid.—5. In Lupus exedens, Chloride of Zinc; pure Nitric Acid; or Potassa fusa; to be carefully applied to the surface of the ulcer, subsequently dressing it with Compound Oxide of Zinc Ointment, in which a small quantity of Carbolic Acid has been incorporated.

During the recovery should there be a tendency to closure of the nostrils, from contraction of the cicatrices, they must be kept distended artificially, by gum-elastic tubing, sponge tents, etc. And any resulting deformities of the lip, eyelids, etc., should be rem-

edied by the necessary operations as promptly as possible.—I have never employed the Bisulphuret of Carbon, but would suggest it as a stimulating local application in lupus non-exedens, to be thrown upon the affected part in the form of spray.

ACNE.

Acne or Blotched Face, is a chronic affection of the cutaneous follicles, in which the sebaceous matter becomes morbidly accumulated; it may present a papular, pustular, or tubercular form. It is characterized by small isolated elevations or pustules, having a deep-red base, which rupture and discharge a small amount of sero-purulent fluid and some sebaceous matter, and are then succeeded by small, circumscribed, livid-red, hard, and indolent tumors, that very slowly disappear, leaving very minute scars behind them. It is common to both sexes, usually appears from the fifteenth to the fortieth year, but is more severe in the earlier years of puberty, and is ordinarily located upon the face; though the eruption may be seated on the neck, shoulders, breast, back of the arms, and back. There are several varieties of acne.

1. *Acne Simplex* is the mildest variety; it is met with on the forehead, temples, face, shoulders, and antero-superior part of the chest, and is more frequently observed in both sexes about the age of puberty. The pustules more commonly appear in succession, and in variable numbers, and each pustule passes through its several stages independently of the others. At first, small, deepish, indurated, more or less inflamed points will be observed, which enlarge to about the size of pins'-heads, become red and conoidal, finally present a pale-yellowish apex, rupture and discharge a small quantity of sero-purulent fluid, which, if allowed to dry forms a very delicate and slightly adherent crust. A dark, or livid-red, small, hard, very indolent tubercle or induration remains after the discharge of the fluid. The pustules generally run through their course in five or six days, without any pain or heat, unless they are developed near the filament of a sensitive nerve, when the pain may be severe. As new pustules are constantly forming, they may be seen in all their stages at the same time. A small, white, indelible cicatrix is often left behind.

When a small black circular point is observed in the center of the pustule, it indicates the external orifice of a hair follicle, and the presence of these black points gives rise to the variety termed *Acne Punctata.* When the pustule is larger and more indolent, suppurating very slowly, with deeper-seated inflammation of the

skin, it is termed *Acne Indurata;* this variety may be very mild and of trifling extent, or it may be very severe and present numerous eruptions, often leaving small, oblong, permanent cicatrices. It is often found associated with the two preceding forms, giving rise to a very considerable unsightliness of the features, from the livid-red tubercles, the thin scabs, the black points, and the swoln, red, shining, and greasy-looking skin. When acne indurata implicates the hairy instead of the non-hairy parts of the face, it is termed *Acne Sycosiformis*, or *Acne Mentagra.*

2. *Acne Rosacea*, (*Carbuncled Face, Grog Blossom*), more commonly manifests itself during adult life, from the thirty-fifth year and upward, though it may occur at a much earlier period. Its more usual seat is on the nose, though it may be developed upon, or extend to, the cheeks, forehead, chin, or even the whole face. The extremity of the nose (or in whatever other part the disease may first appear), become unusually red after a hearty meal, or after drinking some vinous, alcoholic, or other stimulating fluid. This redness gradually becomes persistent, with an enlargement of the veins of the part, and finally a few small yellow pustules make their appearance in the inflamed parts; the skin around them gets thickened and hypertrophied, and presents a rough, greasy aspect. The enlarged and red nose, covered with dark or purplish-red pustules or tumors, tortuous, varicose, bluish, cutaneous veins, and studded with more or less numerous yellow points, gives a very repulsive aspect to the features. Suppuration is never very decided, but appears to be, as it were, somewhat abortive; and the skin ultimately becomes permanently injected, indurated, rough, and granulated. Even should the disease be cured, the features never recover their natural condition and appearance. Occasionally, but rarely, itching and heat attend the eruption; and, sometimes, the disease disappears spontaneously.

The *causes* of acne are not well understood. It may appear in all persons, but more commonly among those of lymphatic temperament, rarely affecting children. Its presence may be due to whatever will induce a deranged condition of cutaneous innervation, as, torpid action of the capillary nerves and vessels, gastro-intestinal derangement, cerebro-spinal irritation from masturbation or other causes, exposure to continued heat, etc. Intemperance is a very common cause of acne rosacea, but is not the only cause, as the eruption sometimes appears in persons of the most abstemious habits: this variety is often met with among females about the turn of life; with plethoric persons laboring under hemorrhoids; and not unfrequently is transmitted from parent to child.

The *diagnosis* of acne may be readily made out, from the preceding description. It may be determined, from *ecthyma*, which has larger, broader, and flat pustules, which are not as indolent as those of acne, are not accompanied with indurations or obstructed sebaceous follicles, are covered with thick and adherent scabs, prominent and laminated, and are not followed by tuberculated indurations. From *impetigo*, in which the pustules have no induration at their base, are usually confluent, and form, on rupturing, thickish, yellow crusts. From *eczema*, which is not limited to the face, is attended with much burning and itching, has a moist secretion at its commencing stages, and presents more decided desquamation at its closing stage. From *syphilitic tubercles*, which are always surrounded by a copper-colored areola, the tubercles being large, flat, shining, of a similar hue, and usually ulcerated on their tops; in addition to which there will be other syphilitic symptoms present.

The *prognosis* is favorable with all the varieties, except that of acne rosacea. *A. Simplex* usually disappears when the adult life is fully attained, or from marriage. *A. Indurata* is more obstinate, and is often very difficult of removal. *A. Rosacea* is seldom curable.

In the *treatment* of acne, the same course, as to the conditions, circumstances, hygiene, and constitutional tendencies of the patient must be observed as has been indicated in the preceding cutaneous maladies. All stimulants must be avoided, as well as intemperance in eating; and everything that may occasion gastro-intestinal derangement must be dispensed with. Tea and coffee should be avoided, and but little animal food be used. Exposures to the sun, to hot rooms, to sudden changes of temperature, are especially to be avoided, as well as mental and physical fatigue.

Among the internal therapeutical means that have been found the most effective, are the following, a proper selection from which for any given case, will depend upon the variety of the disease, and the judgment of the practitioner: 1. Cod Liver Oil.—2. Tincture of Chloride of Iron.—3. To four fluidounces of a strong infusion of Horse-radish Root, add thirty minims of Compound Spirit of Ammonia, and sweeten with Syrup of Ginger; this is to be taken in the course of the day, and repeated daily.—4. Iodide of Iron, in the indurated form.—5. In A. Rosacea, an acid solution of Iron made by dissolving Epsom Salts three ounces, Sulphate of Iron two drachms, in Infusion of Quassia one pint, to which has been added Dilute Sulphuric Acid half a fluidounce. The dose is half a fluidounce, three or four times a day.—6. Take of Solution of Bromide of Potassium (one ounce to the pint), one fluidrachm,

Citrate of Iron and Strychnia three grains; mix for a dose, to be repeated three times a day. It may be taken in some kind of alterative syrup, if required.

Among the external applications are the following: 1. By means of a camel's hair pencil apply a light layer of pure Carbolic Acid upon the pustules; they become whitish, then red, which gradually passes to a brown color, and at the same time the pustules sink and dry up. They then present the aspect of parchment, and an exfoliation removes the eschar from the parts. One application suffices in most cases to cure the pustules; those which contain no pus leave no cicatrices, but those which contain this product leave a small cicatrix after their cure by this cauterization. To prevent a subsequent return of pustules the parts should be painted once a day with a mixture of good wine Vinegar six parts, Carbolic Acid one part. In A. Rosacea, equal parts of Vinegar and Carbolic Acid may be employed.—2. A saturated Solution of Oxalic Acid may be applied to the pustules once or twice daily.—3. Take of Muriate of Ammonia two drachms, Tincture of Conium Maculatum one fluidounce, Distilled Water one fluidounce; mix. The parts may be washed with this mixture several times a day; if little or no irritation be present, the Conium may be omitted, and some stimulant be substituted, if required.—4. Ointment of Ioduret of Sulphur, has proved useful.—5. Iodized Oil of Juniper.—6. Spray of Sulphuret of Carbon, carefully applied once or twice a day.—7. Pure, concentrated Hydrochloric Acid; wet the pustules and skin around them with this, let it remain on about half a minute, and then wash it off first with water, and afterward with soap and water. If the skin be very sensitive the acid should be diluted with glycerin, as the patient can bear.—8. To eight fluidounces of Whisky add Bicarbonate of Potassa, and Hydrochlorate of Ammonia, each, half an ounce; bathe the indolent tumors with this, three or four times a day.

The Spirit Vapor Bath will be of service, taken every week or two; and an exposure to the Sulphur Vapor or Fume Bath, or, of Sulphur and Iodine together, and repeated twice a week, will be exceedingly advantageous. Of course, in these baths, the surface of the body and limbs, and not that of the face, are alone subjected to the influence of the fumes.—It has been recommended to puncture the pustules, and squeeze out the contents of the distended follicles as soon as they become perceptible; and this will prove very useful if, immediately after the operation, the emptied pustule be touched with a mixture of Carbolic Acid one part, Vinegar,

Water, each, five or ten parts.—*Acne mentagra* requires the same treatment as the other varieties.

FRAMBŒSIA.

Frambœsia, Yaws, or Sibbens, is a disorder supposed to have been imported from Africa, and which is common to the blacks on sugar plantations, especially in the West India Islands. The disease sometimes comes on without any premonitory symptoms, but generally, it is preceded by pains in the limbs, somewhat resembling rheumatism, and which are severe especially around the joints; languor and debility are usually present. After a time, more or less severe febrile symptoms manifest themselves, followed by an eruption of small red spots, similar to flea-bites, which are grouped around each other, and appear on various parts of the body, particularly the forehead, face, neck, arm-pits, etc. These gradually enlarge and give rise to papular, flattened, dull-red, firm and resisting papules, which become filled with an opaque, whitish or yellowish fluid, and which finally rupture, discharging a thick, glutinous matter, which on drying forms a somewhat thick scab. These pustules do not cover the whole body at any one time, nor do they appear in regular succession like the eruption of small-pox; but when one crop is passing away, a new one will be appearing in another place, each crop being attended with febrile symptoms. The pustules may attain the size of half an inch, and sometimes one or more will reach a diameter of an inch and a half or two inches. From the pustules being confined to a small space and connected by their bases, they present a rough, mulberry or raspberry-looking, fungoid-like appearance, from which is discharged an unhealthy matter, often of an offensive, acrid character, and which forms a scab around the edges of the excrescence. Cazenave and Schedel found these excrescences, in a patient under their notice, to be "constituted not of accidental tumors developed in the dermoid tissue, but by the skin itself in a state of hypertrophy, and divided into a multitude of vegetations," the epidermis being entirely destroyed.

The parts in the neighborhood of the eruption are hard and callous; and in hairy parts that are attacked, the hair gradually becomes white. The disease may, according to the condition of the system, last for several weeks or months, or even years; it is contagious, being, however, only communicable by direct contact with the matter discharged from the ulcers, and is stated to occur but once in a life-time. It may exist for a long period, occasioning no

great constitutional disturbance, except a severe itching; but it also gives rise to foul and sloughy ulcers of considerable extent, and even caries. Emaciation and debility often follow the disease, and also dropsy. The ulcers leave permanent cicatrices. The disease is rare among the whites; yet they sometimes become tainted with it, especially those who are frequently in attendance upon the diseased blacks.

Weak, feeble, scrofulous blacks, and especially those living in dirty, unhealthy, and damp huts, with poor nourishment, and uncleanly in person, appear to be more subject to this disease. Its *cause* is not known.

The *treatment* consists in first removing the diseased negro to some private, healthy location, where he can have no communication with those who have never had the affection, otherwise it may become spread over a whole plantation. In the early stage of the disease, before the eruption has fully appeared, sudorifics must be given, as the Compound Tincture of Virginia Snakeroot, aided by the Spirit Vapor Bath; the patient may likewise drink freely of a decoction of Sarsaparilla and Guaiac-wood, or of an infusion of Sassafras Bark and Elder Flowers. Occasional purgatives will also be required. The body should be bathed daily with a warm, weak alkaline bath; the diet should be nutritious, consisting principally of vegetables; the clothing should be warm and comfortable; and moderate exercise be taken daily; pursuing this course until the appearance of the second stage.

In the second stage, when the eruptions begin to dry up and disappear, mild purgatives should be given to keep the bowels regular; and for the purpose of preventing, if possible, a continuance of the disease, tonics and alteratives should be administered, as the Compound Syrups, of Sarsaparilla, of Stillingia, of Yellow Dock, etc., according to the constitution, predispositions, etc., of the patient, continuing their use until the disease has wholly disappeared. Ulcers may be frequently bathed with the Tincture of Chloride of Iron, and be dressed with the Compound Ointment of Oxide of Zinc; or an ointment composed of Citric Acid, Subcarbonate of Iron, and Lard. When the disease attacks the sole of the foot, the thick skin by confining the matter formed may occasion obstinate and extensive ulceration, rendering it painful to walk. In such cases, the best application is a poultice of the fresh Cassava Root, which is common to the West Indies; or, a dressing of Red Oxide of Lead Plaster, with a poultice of Elm and Poppy Leaves. Any hard swellings remaining upon the feet may be removed by bathing them in warm water until the swellings become somewhat soft, and then

touching them with Caustic Potassa, and keeping on Elm Poultices until the eschar falls off.

The other forms of disease that may be included in this order, are so rarely met with, and so intractable to treatment, that a very brief notice of them will be sufficient.

Molluscum, so called from its resemblance to the prominences that are observed on the bark of the maple tree, consists of numerous elevations developed within the cutis, varying in size from that of a hemp-seed to that of a grape, either rounded, or flattened and irregular, possessed of hardly any sensibility, usually with a broad base (*Molluscum Sessile*), though sometimes adhering by means of a narrow peduncle (*Molluscum Pendulum.*) These elevations often have a depression with a dark spot upon their apices, and occasionally present an indistinct lobulation. They are somewhat translucent, of the natural color of the skin, though sometimes brownish, enlarge very gradually, remaining unchanged in other respects, sometimes ulcerating and discharging their contents, or else, becoming inflamed and sloughing in mass, leaving behind either a pyriform warty appendage, or a permanent cicatrix. The contents of these tumors are, a white, waxy, or semi-fluid matter, oil globules, epidermal cells and granules, contained in a cyst sometimes consisting of several sacculi opening into a common cavity.

The *cause* of molluscum is unknown; it has been attributed to hypertrophy and alteration of the sebaceous glands; to an alteration of the structures concerned in the development of hair, especially of the cells at the base of the hair-follicle; and to alteration of the follicle itself, with hypertrophy of the subcutaneous areolar tissue. Its most common seat is on the body, the neck, the face, and the scrotum, and it is more common to children, though all ages are liable to it. No constitutional symptoms attend it.—The *treatment* is to open the tumors, and rub the inner parts with Nitrate of Silver, or touch them with pure Carbolic Acid, neutralizing the acid in a few seconds after its application by a drop or two of a solution of the Carbonate of Soda, of Potassa, or of Ammonia. If a pedicle be formed, cut it off with scissors, and then touch the exposed surface with one of the above-named agents.

Elephantiasis Græcorum. Greek Elephantiasis, or True Leprosy, is a terrible disease, now but rarely met with except in inter-trop-

ical climates. It appears to be a blood disease, and manifests itself by the deposition of an albuminous substance into and beneath the skin and mucous membranes; or, by exudation into the nervous structures producing anæsthesia and atrophy. It is a very chronic and intractable disease, is endemic in Lisbon and some other of the southern parts of Europe, in India, Africa, and also in some of the Polar countries. It may last for years becoming cured spontaneously, or terminating in death. The disease more commonly attacks males, and is more frequently observed between the ages of ten and thirty; it may be transmitted hereditarily, but is not contagious. In the countries where it prevails, the poorer classes suffer the most from it. According to the manner of manifestation, it has been divided into two varieties:

1. *Elephantiasis Tuberculosa*, is characterized by the presence of an eruption of dull-red or purplish erythematous patches, from six to twelve lines in diameter and somewhat hard; the patches are round or irregular in form, are sometimes more deeply colored in their centers, and at other times around their circumferences, and become of a brownish, tawny hue, and, in the negro, black. The skin in their vicinity generally becomes lessened in sensibility, though occasionally its sensibility has been augmented. These patches appear and re-appear, on different parts, the face being more generally affected, though the eruption may attack nearly all parts of the body; the patches are deeper-colored on their re-appearance, and have a tendency to become confluent. Finally, the patches become permanent, and in their midst are developed smooth, shining, dull-red or purplish, and very indolent tubercles, which eventually assume the bronzed color of the skin, or are whitish from deposition of albumen. These tubercles are of various sizes, of irregular shape, and tend to suppurate and ulcerate, though they may remain unchanged for years, or disappear by resolution.—The hairs of the parts affected, become white and fall out. When the tubercles ulcerate they discharge a whitish, granulous, albuminous matter, and a yellowish-white, ichorous secretion, which upon drying forms thick, prominent, grayish-brown crusts. The ulcer is deep, with irregular, livid, callous and raised margins, and often painful. The disease is indefinitely prolonged by the constant and successive formation of ulcers, which, when they heal, leave white, hard, irregular, and projecting cicatrices. The constitutional irritation they produce often occasions death.

The disease may be confined to a very small district, or it may be very extensive; it is preceded by constitutional symptoms, as, lassitude, drowsiness, nausea, chills, depression, etc., which gradu-

ally subside as the eruption appears, and the severity of these symptoms is generally proportioned to the extent of the local disease. Mucous membranes are very liable to become attacked, as of the tongue, mouth, fauces, larynx, nose, conjunctiva, etc., and internal organs also frequently become involved, as the spleen, liver, kidneys, bladder, uterus, mesentery glands, etc., but this involvement occurs only in an advanced stage of the disease. "The parts affected are swoln or enlarged generally, the forehead is uneven and traversed by deep furrows, the eyebrows are tuberculated and overhanging, the nostrils sinuous and dilated, the ears pendulous and lobulated, the lips enormously thickened, the chin greatly increased in size, and the whole of the surfaces affected unctuous and tawny to the eye. In this state matters may continue for an indefinite length of time. But no long interval usually elapses before additional symptoms make their appearance. The tubercles are also apt to fall into a state of ulceration, when sores succeed, of an unhealthy aspect, and pouring out an ichorous fluid, which concretes into thinner or thicker, brownish or black-colored incrustations, under which cicatrices are slowly formed. The sense of smell becomes blunted; that of touch, too, is strangely affected; the voice grows husky, and is often entirely lost; the patient is affected with cough, quick pulse, and is singularly dejected in spirits, as well as weakened in his muscular power."

The *prognosis* is always unfavorable, and the *treatment* is based upon general principles; change of climate has been advised. M. Lemaire states that cures have been made by the internal and external use of Carbolic Acid. Commencing with two grains per day, internally, and gradually increasing the quantity to forty-five grains per day, diluting the acid well with water. The diseased parts were slightly cauterized from time to time by Carbolic Acid mixed with an equal part of Alcohol, or of Vinegar; and upon the disappearance of the disease, a weaker solution was applied locally for some time. M. Bazin remarked, "Carbolic Acid is much preferable to anything I have ever employed to overcome this malady."

2. *Elephantiasis Anæsthetica* is the variety attended with exudation into the nerve-structures; it is slower and more insidious in its attack, and the constitutional symptoms are less severe, though there is much greater depression of spirits. Brownish or brown spots are followed by white patches and large bullæ, which suddenly arise from some slight irritation, or, spontaneously. These bullæ soon break, discharge a greenish-yellow or milky fluid, and leave inflamed and sometimes painful ulcers, over which thin, brownish crusts form, which falling off, are succeeded by others,

and so on; on healing, the ulcers leave cicatrices, with a white, smooth, depressed, partially-sensitive, and bald skin. Itching and pricking pains often accompany the disease; but in the advanced stage, when the anæsthesia produced by the disease is more complete, a fire may be applied to the skin, or the eye may be cut with a knife, without the patient being at all aware of it. The bullæ may be successively developed for several years, succeeded by the white patches, without further change. The parts affected are dry, while other parts perspire as usual. As with the preceding variety, any part of the system or of internal organs may be affected.

From atrophy of the glandular organs, the skin is left pale, insensible, dry, sordid, discolored, and like parchment; the countenance becomes emaciated and cadaverous, the features non-expressive, the conjunctivæ assume a dry, dull, and pale aspect, the lashes fall out, the lips become atrophied, the muscles of the limbs from atrophy become thin and insensible, and anæsthesia gradually but certainly comes on, being, as it progresses, attended with loss of appetite, thirst, chilliness, vomiting, torpor, drowsiness, and exhaustion of mental and physical powers,—when the eyeball is destroyed severe deep-seated pains in the orbit, and necrosis,—pains in the bones, pains and livid swellings around a toe or finger, followed by ulceration and loss of the toe or finger; caries, ulcers, diarrhea, perhaps anasarca and albuminous urine, tetanic spasms, or coma, and death.

But little can be done in the way of *treatment*. A nourishing diet, pure air, regularity of the bowels, and an observance of other hygienic conditions, together with diuretics, sudorifics, and alteratives, have sometimes been advantageous. Bromide of Potassium, Hydrocotyle Asiatica, Bromide of Ammonium, Cod Liver Oil, Nitric Acid, Iodine, Gold, etc., have all been recommended as internal remedies, in conjunction with local applications to the tubercles of stimulants, as, Nitric Acid, Sulphur and Iodine Fume Bath, Carbolic Acid, Sulphuret of Carbon, Chloroform, etc. Happily, these diseases are not met with in this country.

Elephantiasis Arabum, Arabian Elephantiasis, Bucnomia Tropica, Barbadoes Leg, etc., although of a similar name, with the preceding Greek disease, and referred to at this place, is a very different malady, having no affinity whatever with true elephantiasis, yet frequently confounded with it. Greek Elephantiasis consists of tubercles formed by the deposition of an albuminous substance in the

affected tissues, while Barbadoes or Elephant Leg is a simple hypertrophy of the skin and subcutaneous cellular tissue.

E. Arabum may attack any part of the body, but is more frequently observed upon the leg, the arm, the scrotum, or the breasts. Sometimes it commences without any premonitory symptoms; at other times it begins with active febrile symptoms and severe pains. A violent, deep-seated pain is felt in the affected part, which, together with a feeling of tension, extends along the principal superficial lymphatic vessels of the limb, in the course of which, and as high up as the groins or arm-pits, enlarged and painful lymphatic glands can be felt, and the superficial veins occasionally become hard and corded. In most cases a diffuse erythematous redness manifests itself, and the skin and subjacent cellular tissue commence enlarging and thickening. These attacks may disappear and occur again and again at irregular intervals, continuing thus for several months; but after each seizure the swelling not wholly subsiding, the limb gradually becomes harder and larger, ultimately acquiring an enormous size. Eventually, the febrile symptoms, local pain, and uneasiness pass entirely away, leaving the enlarged, unsightly limb. When the scrotum is attacked it may attain a size the weight of which may vary from fifty to one hundred pounds; and an affected leg may weigh nearly as much as the rest of the body.

The cuticle often remains unchanged, at other times it is thickened; the skin changes its pale, smooth, and shining appearance, enlarged vessels are seen permeating it; it becomes rough, hard, thickened, wrinkled, and covered with knotty or warty projections, and foul horny-looking scales or incrustations upon the epidermis, as in ichthyosis; or, it may crack in various directions, giving rise to deep and painful fissures. The hard and swoln lymphatic glands often inflame and suppurate, giving rise to abscesses which discharge a fetid matter; sometimes the glands slough. Cases, however, will be met with, in which the general health appears to be good, the only inconvenience being the enormous size of the swelling.

The disease is not contagious nor hereditary, though it is endemic in the tropics; it is more common among adults, and attacks rich and poor of both sexes indiscriminately, generally remaining for life. Its *causes* are unknown. Although not an immediately fatal disease, it undoubtedly tends to shorten life, and from its obstinacy to treatment, its *prognosis* may be considered unfavorable.

There is no successful *treatment* known for this disease; Iodine and its salts, friction, and kneading of the affected parts, regulated

pressure, repeated purgatives, and the local applications named in the treatment of the varieties of Greek elephantiasis, have been found useful. Soothing applications should be applied to fissures and excoriations. When the scrotum is greatly enlarged, its removal has been followed by success, so has the amputation of the affected leg or foot, when of enormous size; ligature of the femoral artery is also stated to have been of benefit.

Kelis, Keloid, or Cheloidea was first described by Alibert. Its precise nature is not known, though supposed to be due to some poison in the blood. It first manifests itself by a slight swelling of the affected part of the skin which increases in size and prominence, giving rise to small, hard, shining tubercles, oval, roundish, or quadrilateral, of a dusky or dark-red color, hard and resisting to the touch, and ordinarily accompanied with itching, pricking, shooting, or dragging pain in the part. Sometimes the tubercles are isolated and single; but when two or more are together they are apt to coalesce, and form an elevated, flattened mass, sometimes of considerable extent, and usually depressed in the center, giving to the thin and wrinkled skin covering them an appearance of the cicatrix of a deep burn. Usually, but one patch or mass is formed, but at times, several may exist at the same time on different parts of the body. The tumor varies in size from a few lines to two inches in diameter, and remains stationary for life, after having attained a certain size; or else very gradually increases in size, extending by small tapering claw-like processes, which give rise to a puckering of the skin. Sometimes it is accompanied with heat, puffiness, but no redness of surrounding parts, and, perhaps, considerable pain. The disease may, occasionally, disappear spontaneously, leaving a white and firm cicatrix; it never ulcerates. The anterior surface of the chest is more liable to it, but it may appear on the neck, arms, or any other part of the body. It generally occurs between the fourteenth and fortieth year, and is common to both sexes. It is frequently developed upon an old scar, or bruise, as well as upon the sound skin. When developed upon sound skin it is termed *Kelis Vera;* when upon the cicatrix of a burn, scrofulous ulcer, etc., it is named *Kelis Spuria.*

The affection is not contagious, nor is it a dangerous malady, as it does not appear to interfere with the patient's general health. It is, however, troublesome and annoying from the local inconveniences. No *treatment* for its cure is known; when removed by

caustic or the knife it re-appears. Sulphur fumes, Compound Iodine Ointment, Sulphuret of Carbon, Iodide of Ammonium Ointment, as local applications, have seemed to favor resolution.

ORDER VIII. XERODERMATA.

This Order is characterized by roughness, dryness, and loss of elasticity of the skin, without any eruption.

ICHTHYOSIS.

Ichthyosis, or Fish-skin disease is characterized by a morbid condition of the skin, which appears thickened in various degrees, with the development of hard, dry, somewhat fish-like scales of different sizes, and unattended by inflammation, heat, pain, or itching, but attended with a morbid alteration of the subjacent cutaneous layers. It is divided into the following varieties:

1. *Ichthyosis Vera*, *I. Simplex*, or *Xeroderma Ichthyoides*, is characterized by a defective nutrition of the skin, as manifested by its dry, rough condition, and the formation of grayish-white and thin, or dark-colored, green, brownish, or even blackish particles or scales of epidermis, with ragged edges, which are firmly adherent, and are marked by deep lines or furrows, dividing the surface into quadrangular, roundish, or irregular-shaped segments, greatly resembling the outer bark of a tree. When the scales are removed they soon form again, and the exposed surface is never red. The roughness is like that of the surface of a coarse file when the hand is passed over it. The skin may be thinner or thicker than natural, and soft, or hard and stiff like leather; dry, wrinkled, and mealy, with an absence of cutaneous fat; and that of the face may present a peculiar coppery redness, and an oily polish. The pores of the follicles are prominent from an accumulation of a dry, hard substance within them, and the hair is dry and brittle, broken off, or altogether wanting.

Ichthyosis vera is a general disease, though modified in appearance in different parts of the body; it appears to avoid the palms of the hands, the soles of the feet, the axillæ, the flexures of the arms, and the popliteal spaces, in most instances. It is due to malnutrition, and is commonly congenital, though sometimes accidental, when it may be confined to one region, particularly the limbs. When congenital, the disease is not strongly marked at birth, though the skin presents a dry, thick, rough aspect, but its

characters become more fully developed, presenting different appearances, as the child grows. The disease is rarely curable, though considerable benefit may be derived from a palliative treatment. It is not contagious, and is not, as a general rule, accompanied with any constitutional symptoms.

2. *Ichthyosis cornea* is the term applied to a more aggravated form of the disease, in which the hardened sebaceous secretion forms darker-colored squamous layers, or rough, almost horny prominences or spiculæ, so as to resemble a serpent or the integument of a porcupine. The spines may become three or four lines in length, and, as well as the scales, drop off after a time, and reaccumulate. The enlarged orifices of the sebaceous glands may be seen when the scales or horny concretions are removed.

The *treatment* consists of tonics and alteratives internally, together with nutritious diet, and general observance of hygiene measures. Cod Liver Oil, Bromide of Ammonium, diluted Carbolic Acid, Tincture of Chloride of Iron, etc., may be employed internally. As local external applications to arouse the skin and to remove the scales covering it, as well as to render it more supple and soft, warm alkaline baths, strong alkaline soap baths, vapor baths, etc., may be used, together with frictions; and applications of Oil, Glycerin, diluted Carbolic Acid, diluted Sulphuret of Carbon, etc., should be well rubbed into the skin. The Sulphur Fume Bath may also be found of service.

ORDER IX. MACULÆ.

The affections of this Order are characterized by a change in the color of the surface affected, from too much, too little, or altered pigment in the parts; thus, there may be a white, gray, yellow, red, blue, brown, or black color, and the spots may vary in size from that of a point to four or five inches in diameter. The seat of these alterations is the rete mucosum and papillary layer of the derma.

With many persons an exposure to heat and light, increases the cutaneous pigment, and gives rise to small, yellow, yellowish-brown, or greenish-yellow, round or irregular spots or patches, *Lentigo* or *Ephelis Lentigo*, popularly termed "freckles." Sometimes they occur, even from the period of birth, when the persons are not exposed to the sun's rays or its reflection. They are more abundant in childhood and youth, and are peculiar to persons of light hair and fair complexion, and especially to those with red hair. They are generally observed on the face, neck, hands, and other parts exposed to the light, but are also frequently seen on

other parts covered by the dress. When due to the action of the sun, they frequently disappear in the winter.

Treatment will not always remove these spots, although they have been occasionally removed by the persevering and continued use of local applications, as, a dilute solution of Citric Acid in Infusion of Roses; a liniment of Lime-water and Oil, to which a small quantity of Liquor Ammonia has been added; a mixture of three parts of Cologne to one of a saturated solution of Oxalic Acid; a weak solution of Lactic Acid; a mixture of ten parts of Carbolic Acid, ten parts of Vinegar, forty parts of Cologne, and one or two hundred parts of water, etc.; or, the following: Take of Lobelia Seed, Beef Gall, each, half an ounce, Guaiac Resin, Bicarbonate of Potassa, each, one drachm, Oil of Turpentine one fluidrachm, Spirits half a pint; mix. Allow the articles to macerate for ten or twelve days, frequently shaking, and apply to the spots two or three times a day.

There are several other affections belonging to this order, among which may be named *Vitiligo*, white or colorless spots or patches of the skin, and *Nigrities* or *Melanopathia*, in which certain parts of the skin or the entire surface becomes darker colored, presenting brown or black spots, a mottled appearance of the skin, a bronzed appearance, etc. The former disease is of no consequence, and is not benefited by treatment; the latter is only of serious import, as an indication of some disease of the system, for instance of the supra-renal capsules, etc., and only requires treatment for the malady of which it is a manifestation, when this can be ascertained.*

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*ERYSIPELAS.

Erysipelas, or St. Anthony's Fire, is an inflammatory affection which the chronist will sometimes be called upon to treat, especially by those in whom it frequently manifests itself, appearing and disappearing at regular or irregular intervals, and with various degrees of severity; and as the disease has been omitted in its proper place, a few remarks in relation to it will be made here.

The nature of the *cause* of erysipelas is not satisfactorily understood, though the disease may be considered a humoral and constitutional inflammatory disease, induced by a vitiated condition of the blood, which is present in all cases, whether they be epidemic or sporadic. Some particular atmospheric condition is also undoubtedly present when the disease appears as an epidemic. With some persons there exists a *predisposition* to the disease, an "erysipelatous diathesis," the disease appearing and disappearing frequently without any attributable exciting cause. Strumous-anemic persons are often subject to erysipelatous attacks, either during certain seasons, or from other very slight exciting causes.

Among the exciting causes may be named intemperance in eating or drinking, unhealthy or indigestible food, depressing mental emotions, fatigue or over-exercise, intestinal, menstrual, renal, or hepatic derangements, injuries or wounds,

ORDER X. SYPHILIDES.

Syphilides or Syphilodermata are cutaneous diseases that are associated with or due to the presence of the syphilitic poison in

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etc. It is often the case that a meal consisting of improper food, or, of healthy food eaten in excess, will be followed by a more or less severe attack of erysipelas, among those predisposed to the disease; while on the other hand, a strict attention to diet will lessen the severity of the disease, and often entirely prevent its re-appearance.

Every part of the body is liable to erysipelatous inflammation, but it more generally appears on the face, legs, and feet, when manifested externally. The disease is not confined to any particular age, sex, or constitution, though young and elderly persons appear to be more liable to it than the middle-aged. Females appear to be more subject to it than males, especially those of sanguine and irritable habits, as well as those who are intemperate, or who suffer under some derangements of the reproductive organs. Pregnant women, especially those about to be confined, are very liable to puerperal peritonitis, after an exposure to the poison of erysipelas. There is no doubt in my mind that erysipelas, which is observed as comparatively confining itself to the true skin, very frequently attacks internal organs, causing sudden and unexpected loss of life; and this may be the result of its recession or metastasis from the surface, or, it may primarily attack an internal organ, as in puerperal peritonitis.

The *symptoms* of erysipelas are chills, loss of appetite, nausea, constipation, and other febrile symptoms, at the commencement, and which are succeeded in three or four days by an inflammatory condition of some parts of the external surface, attended with more or less pain, burning heat, pricking or stinging sensations, a remarkable florid redness, with a well-defined margin, and swelling of the skin, and which is characterized by a momentary disappearance of the redness upon slight pressure, a white spot remaining until the redness re-appears. In the milder forms of the disease the commencing symptoms are rarely observed; in the severe forms, typhoid symptoms are by no means uncommon.

In the mild cases, there will be heat, roughness, and redness of the skin, perhaps slight febrile symptoms, which cease in a few days; the surface of the affected part becomes yellow, and desquamation ensues, the disease terminating in resolution. In the severe forms, the inflammatory symptoms will be more or less intense, with pains in the head and back, great heat, thirst, restlessness, small and frequent pulse, and the disease terminates in resolution and desquamation, or in suppuration, forming disagreeable, indolent, ill-conditioned ulcers, and very rarely, in gangrene.—The fluid contained in the vesicles is colorless, or yellowish, containing a free acid, and becoming thicker and more opaque.

There are three forms of erysipelas, viz.; *simple* or *idiopathic*, in which the inflammation is superficial; *phlegmonous*, in which the deeper-seated tissues are involved and the redness is less vivid than in the simple form of the disease; and *traumatic*, or that which follows wounds or injuries. Simple erysipelas is subdivided into, 1. *Erysipelas Erraticum*, in which the disease spreads and increases in extent, or suddenly leaves one part to appear at another more distant.—2. *E. Metastaticum*, in which the disease suddenly leaves the surface, and affects some internal organ, as, the brain, pulmonary mucous membrane, stomach, intestines, etc.—3. *E. Miliare*, in which the eruption appears in the form of crops of minute

the system, and which have certain features in common that distinguish them from non-syphilitic cutaneous eruptions. They

vesicles, containing fluid.—4. *E. Phlyctenodes*, a common form of the disease, in which the vesicles or bullæ are quite large, discrete or confluent, and of irregular form; they contain a colorless limpid fluid, which becomes yellowish, sometimes opaque, and, in unfavorable cases, purplish.—5. *E. Œdematodes*, which occurs in debilitated systems, and among lymphatic persons; the redness is not so bright as in the other varieties, and the parts attacked, usually the inferior extremities, are more or less œdematous.—6. *E. Gangrenosum* is that form of phlegmonous erysipelas in which the disease terminates in gangrene.

Erysipelas has also been named according to its seat, thus: 1. *E. Faciei*, its more usual form, viz., on the face. It may be of various degrees, from a very mild to a very intense attack. In the more severe attacks, it often commences with stupor, more or less delirium, full and frequent pulse, and high inflammatory symptoms. The face swells, becomes red or purplish-red, the eyelids tumid, the cheeks enlarged, and the features hardly recognizable; respiration is difficult; the fauces and nose very dry, and the disease may terminate in resolution, abscesses in the neck, or fatally, by metastasis to the brain.

2. *E. Capitis*, when the scalp is affected, and which is generally the consequence of a wound or injury. The inflammation partakes more of the œdematous variety and may terminate in resolution, suppuration, gangrene, or by extension to the brain.

3. *E. Mammæ*, when the breasts are affected; they swell and become very hard and painful, with frequently a severe pain in the axillary glands. The disease assumes the phlegmonous character, and may terminate in resolution, extensive suppuration, or gangrene.

4. *E. Umbilicale*, when, as in the case of infants, the disease locates itself in the umbilical region, from which it may extend to the neighboring parts. It may terminate by resolution, or by gangrene and death.

Erysipelas is frequently complicated with diseases of internal organs, which are either idiopathic or secondary; in the latter case being due to the erysipelas (metastasis). In either instance, the internal affection is rendered more severe and unyielding to treatment, requiring us to address our therapeutical measures more especially to the erysipelatous disorder. Among the organs more generally met with in this association, are, the nerves, the brain, the respiratory organs, the heart, the stomach, the liver, the intestines, the kidneys, the bladder, the uterus, the peritoneum, etc., and the character of the malady may vary from a mild to a very severe one.

The *diagnosis* of erysipelas may be readily made out by the inflammation and swelling or vesiculated character of the inflamed part, and its uniform redness; the great tendency to spread; the burning or stinging of the parts; the more or less febrile disturbance present; and the momentary disappearance of the redness upon pressure. In the phlegmonous variety the local and constitutional symptoms are more severe, the tumefaction extends more deeply, and the redness soon becomes less vivid.

The *prognosis* of erysipelas in the milder forms is favorable. The more extensive the disease, and the more severe the local and constitutional symptoms, the more unfavorable will be the prognosis; more especially when coma, delirium, or typhoid symptoms are present. It is also more unfavorable among the aged, the intemperate, those of enfeebled constitutions, and where a metastasis or exten-

present themselves in nearly all the orders of maladies of the skin, heretofore referred to, and may, consequently, be exanthematous, vesicular, bullous, pustular, papular, squamous, and tubercular.

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sion to important internal organs takes place. When occurring in cases of dropsy, diabetes, or renal disease with albuminaria, it is very apt to prove fatal. Death may also occur from serous effusion closing the chink of the glottis, in those cases complicated with disease of the larynx.

In calling attention to the *treatment* of this disease, I shall not notice its more severe forms; the means I employ for these will be found in my American Physician, page 232. I shall merely refer to the treatment for the milder varieties, and for those cases where the erysipelas is complicated with chronic affection of some internal organ.

When the disease attacks the face or other part, the bowels must be kept regular, and any gastric acidity be removed by the Compound Powder of Charcoal. At the same time, to remove the erysipelas, the patient should drink freely of an infusion of equal parts of Maiden Hair, Elder Flowers, White Indian Hemp, and Burdock Seed; about a pint and a half should be used daily. In some instances, Cleavers may be substituted for the White Indian Hemp. To allay the burning, stinging sensation, the following should be applied to the affected parts several times a day: Take of Hydrochlorate of Ammonia four drachms, Water two fluidounces; mix, dissolve the Ammonia, and then add Tincture of Lobelia one and a half fluidounces, Tincture of Poison Hemlock one fluidounce. These measures should be perseveringly pursued; relief occurs in a short time, followed by a disappearance of the eruption in five or six days.

Ulcers following erysipelas, should be touched daily, with a drop or two of Oil of Turpentine, and, when the pain thereby produced has passed away, dress them with Indigo-weed Ointment, or, Red Oxide of Lead Plaster. As soon as the ulcer assumes a healthy aspect, the Turpentine should be omitted, but be re-applied whenever it tends to become indolent. The Turpentine should be placed upon the center of the ulcer, and not be allowed to come in contact with its borders, or with the surrounding skin.

Patients who are subject to frequent attacks of erysipelas, occurring with but little constitutional derangement, may effect a permanent cure, by a continued and persistent use of the above-named infusion; of the preparation of Blue Flag, and soluble Pyrophosphate of Iron, etc., with Glycerin and Water, on page 774; or of the following preparation: Take of Ground Centaury (*Polygala Nuttalli*) four ounces, Beech Drops, Burdock Seed, each, two ounces, Water, Glycerin, No. 2, each, three pints; mix, and form an infusion. The dose is a wineglassful three times a day.

In erysipelas complicated with some internal chronic disease, in addition to the measures employed for the chronic affection, one of the preceding preparations should also be constantly used; or, they may be employed alternately, using first one for a certain length of time, then the other, and so on, until the cure is effected.

The bowels must be kept regular, the skin and kidneys in as healthy a condition as possible, and gastro-intestinal acidity, or derangement, be promptly remedied. An especial attention must be given to the diet, avoiding everything that will cause flatulency, acidity, irritation, constipation, diarrhea, or other disorder of the alimentary canal. Means to give tone and nutrition to the system are especially valuable; all depressing or debilitating measures must be avoided.

It may be important to refer here to the peculiarities of these syphilitic eruptions. In some instances they may exist for a longer or shorter time without presenting any, or but very few of the symptoms about to be stated; but in the majority of cases, several or all of the following general symptoms will be present: There will be a deep-seated change in the system, a derangement of the functions of various organs, and all the tissues and organs will suffer more or less from being supplied with blood contaminated with a poisonous material. The brain loses its energy, and becomes, as it were, torpid, giving rise to lassitude, weakness, indolence, despondency, inquietude, and apprehension; the nervous system becomes more or less prostrated, and nocturnal neuralgic pains are common; the tongue becomes pale, coated white, broad, and indented by the teeth; the pulse more rapid; the fauces more or less congested, with swelling of the tonsils and soft palate; the larynx irritated, with mucous cough, and sometimes nausea; the bowels more or less deranged, as well as the urine; the conjunctiva congested and muddy, and the whole skin presenting a yellowish, dirty appearance. (*Wilson.*) The more the system becomes tainted with the syphilitic poison, and the greater the debility and constitutional derangement, the more severe, extensive, and obstinate will be the accompanying syphilide.

In the *diagnosis* of syphilitic eruptions, there are antecedents for the practitioner to gain a knowledge of, as, a prior inoculation with the syphilitic virus and the existence of chancres, and buboes, which, having passed away leave behind cicatrices, indurations, and discolorations upon the penis and in the groin; there may have been, and may even still be ulcerations in the throat, osteoscopic pains, loss of hair, nodes, etc., though it must be recollected that the syphilitic virus may be communicated in a secondary or tertiary form, without any primary disease whatever, as is frequently observed among females who have been thus infected by their husbands who were, perhaps unconsciously, laboring under the constitutional form of the disease.

Syphilitic eruptions may appear suddenly, like an exanthema, and may disappear and appear in the same individual at different times; they may likewise present themselves from time to time under different manifestations, so that at one time the same patient may have vesicles, at another pustules or tubercles, etc., and even several different kinds, as papules, pustules, scales, etc., may exist at the same time upon a patient; and this *polymorphism* is a peculiar character of these eruptions. These eruptions may appear upon any part of the body and limbs, but their favorite locations are,

upon the face, the vicinity of the alæ of the nose, the angles of the mouth, near the roots of the hair upon the forehead, and the back of the neck, the inner angles of the eyes, the center of the chest, the inner surfaces of the limbs, and in the vicinity of the axillæ and groins.

Itching and *pain* are, as a general rule, absent, though there are some exceptions, as, when the scalp is affected, and in the early stage of some eruptions, there may be more or less itching; and in the softening period of tubercles, there may be some pain and tenderness. When itching is present, care should be taken to determine that it is not due to pediculi.

These diseases always present a *circular*, *oval*, or *crescentic* form, but which is likewise met with in some of the non-syphilitic eruptions; they likewise have a tendency to extend peripherally. The confluence of two or more patches, may, however, prevent or destroy this circular appearance, often giving rise to forms of figures of eight. The *scaly eruptions* usually consist of small circular spots, with thin, frequently very fine, gray, and few scales, with a circumscribed whitish borders, the result of the separation of the epidermis from the cutis around the diseased patch. The *vesicles* are flattish and do not readily rupture. The *crusts* formed are thick, hard, uneven, firmly adherent to the skin, having a stratified surface and presenting eminences and depressions; they have a peculiar dark-green or black tint. The *ulcers* have rounded, sharply-cut, perpendicular edges, their surfaces are ashy-gray, covered with a pultaceous substance, and discharging a sanious and plastic pus, and around their borders may frequently be seen the characteristic copper color. Ulceration is a common feature of these eruptions. The *cicatrices* are circular or crescentic, at first violet-brown, then tawny-brown, and then whitish and reticulated, more or less depressed in their centers, with the skin wrinkled, or even and fine.

One feature upon which much stress has been placed, is the *color* of the eruptions, but it has been overrated, as it occasionally appears with non-syphilitic eruptions, and is by no means a constant and certain diagnostic sign; it is described as *copper-colored*. The decided coppery tint is not apparent at first, but is dull-red or violet, and becomes dull reddish-brown or coppery after a certain length of time; and as the eruptions disappear, a dull-red or dirty-yellowish discoloration remains for a longer or shorter period. When *any* eruption presents the several features just pointed out, they will greatly aid the practitioner in forming a correct diagnosis as to its syphilitic or non-syphilitic character.

A brief reference to the several forms assumed by the syphilides may be of service, and I will treat upon them in the order heretofore given of non-syphilitic eruptions.

Roseola Syphilitica, an *exanthema*, is one of the simplest and earliest forms of constitutional syphilis, and may be ushered in with febrile symptoms. It usually appears in from six to sixteen weeks after the primary disease; and may come on gradually or suddenly, affecting almost the whole surface of the body, or extending from the chest to the abdomen and extremities; rarely on the face and neck. Scabs on the hairy scalp are very frequent concomitants. The patches are irregularly rounded, frequently confluent, but slightly elevated, and of various sizes, closely resembling, at first, the eruption of measles, or ordinary roseola. They have a rose color at first, which gradually becomes pale copper-colored or dingy red, and, as they fade away, grayish. These patches may present a mottled redness, or assume the form of circular blotches, or congested rings. Sometimes itching may attend the eruption; the affection disappears, generally without desquamation, in the course of four or five weeks. The erythematous roseola occasioned by copaiba and cubebs, is not syphilitic, and is attended with pruritus.

Lichen Syphiliticus, a *papular* eruption, sometimes manifests itself in an acute form, the same as Roseola, and the lichenous papules may accompany or follow the latter affection. The papules are small, numerous, distinctly elevated, may be isolated or in clusters, present a tint similar to that of Roseola, and terminate by a fine furfuraceous desquamation. They may appear on any part of the surface, but principally on the face, and continue for several days, or longer. The hair follicles are often involved, the hair of the affected follicle soon falling out. In the more chronic form of the disease, which lasts for many weeks, the papulæ are larger, from three to six lines in diameter, circular, less elevated, and of a decided coppery color, they are also less numerous, are slowly and successively developed, rarely have a red areola surrounding them, and appear on the forehead, the scalp, the back, the shoulders, and also on the limbs, in the same situations as the non-syphilitic papules of lichen. They end in resolution, with a pellicular and frequently repeated desquamation, leaving dingy-red discolorations behind them.—The transition from the papular to the squamous

form is natural and easy, the scales becoming thicker, laminated, and successively renewed.

Eczema Syphiliticum, a *vesicular* disease, may be distinguished from the non-specific eruption by the vesicles being larger, fewer, and less confluent, occurring in groups, or irregularly distributed; there is hardly any irritation, the secretion is not very profuse, and the vesicles are each surrounded by a copper-colored areola, and remain unruptured for a long time, or, their contents may be absorbed without rupture. The disease is seldom observed on the face, and runs a chronic course; it is very apt to be accompanied with erythema, papules, or pustules. The affection is a rare one, and usually appears quite early after the primary syphilitic disease. The eruption is principally located at the hair follicles, and numbers of them may be observed with a hair passing through them.

Ecthyma Syphiliticum is a *pustular* eruption, greatly resembling that of the non syphilitic variety of ecthyma, but differs from it in having a copper-colored areola, and thick, hard, greenish-brown crusts larger than the pustule itself, sometimes depressed at the center, and of concentric appearance, and which, upon becoming detached, leave deep ulcers, that are followed by pitted or depressed scars, frequently permanent. The pustules are seldom in great number at a time, and usually occur on the inferior extremities, the body, and the scalp, frequently with baldness; syphilitic roseola or papules upon the body, may co-exist at the same time. This is a very common form of the pustular syphilides.

Impetigo, of a syphilitic character is likewise met with, and usually appears at an early period after the primary disease, isolated, or in groups. It may occur on any part of the body, but more commonly on the scalp, or face, and is generally accompanied either with an exanthematous or papular rash. The pustules are small, flat, superficial, soon dry up, and form somewhat thickish, brown, grayish, or greenish-yellow crusts, having a copper-colored border, and leaving discolorations of the same tint, after healing. The ulcers are generally superficial unless the syphilitic taint is of long-standing, when they are deeper and more extensive.

Rupia Syphilitica, sometimes termed a pustular syphilis, is, according to the preceding arrangement, a *bullous*, or bullo-pustular

eruption, of very frequent occurrence, and usually observed upon the legs, arms, and lower parts of the body, though sometimes on other parts. It is only met with in adults who have become infected with the venereal poison. It is characterized by an eruption of a few small purulent bullæ, or large pustules, of circular form, flattened on their summits, about six or nine lines in diameter, which ultimately contain a purulent fluid, which after a few days is discharged, and forms upon drying, broad, circularly-wrinkled, thick, dark-greenish or blackish, very hard, and firmly-adherent crusts, and which, from the gradual discharge of purulent matter, slowly increase both in thickness and in extent. The bullæ or pustules are developed on a livid or dingy-red blotch, rather tender under pressure, and the crust is surrounded with a copper-colored areola. When the scabs are removed they expose more or less deep, foul, indolent ulcers, presenting the peculiarities already pointed out of such ulcers, and upon which new crusts rapidly form. The cicatrix presents the characters heretofore indicated, being abruptly depressed and indelible. When the eruption is not very severe, the crusts not very thick, and the inferior parts of the body and legs are its usual seat, it is termed *Rupia Simplex*. When it is more extensive, with larger pustules, more prominent and conical crusts, resembling those of non-syphilitic rupia, very deep and obstinate ulcers, and usually seated upon the forehead, face, or limbs, it is termed *Rupia Prominens*. Syphilitic rupia is a very obstinate and intractable disease, is late in its appearance, manifesting itself only when the system has become greatly impaired and debilitated by the syphilitic poison.

Syphilitic Pemphigus generally manifests itself as the result of hereditary syphilis, and may be met with among infants at birth or soon after, and is rarely observed in the adult as a consequence of acquired syphilis. It presents a violet-colored patch upon which bullæ are formed, from six to twelve lines in diameter, flattened, not much raised above the surface, which contain a fluid of a purulent character, or sero-purulent, and which is discharged when the pustule ruptures. The disease is usually observed upon the palms of the hands, and soles of the feet, though it may be seated on other parts, as, the arms, chest, abdomen, etc. The eruption terminates either in desquamation, or in ulceration, and its prognosis is more serious in the hereditary cases.

Lepra Syphilitica (*Psoriasis Syphilitica*), is a *squamous* syphilide, which is usually developed in the later stages of the disease, and

may follow an eruption of erythema, papules, pustules, or tubercles, assuming a variety of characters, which, however, may present one or more of the features of the different forms of non-syphilitic lepra. Like Rupia it is more common among impaired and anemic persons, and almost invariably adults, and ordinarily prefers the inner aspect of the limbs, the soles of the feet, and the palms of the hands, sometimes it may be observed on the face and body, but rarely or never on the elbows and knees. Generally, the eruption is not very extensive, is in circular patches not over an inch in diameter, sometimes, in very small circles or segments of circles, the borders more elevated than the centers, and presenting a distinct coppery color after it has become chronic, but occasionally very dark, or black. The scales are thinner and less laminated or imbricated than in the non-syphilitic disease, are often of a grayish color, adherent, and the disease is seldom attended with itching. When the scales are removed they expose a smooth, soft, dingy copper-colored, and shining surface, and on disappearing altogether, they occasionally leave a slightly depressed cicatrix, the result of interstitial absorption of the tissues. This affection is very chronic in its course, and ends in resolution and repeated desquamation, never in ulceration. It is often exceedingly intractable to treatment.

Lupus Syphiliticus, is one of the *tubercular* syphilides, and which is sometimes difficult to distinguish from ordinary lupus non-exedens. There are two forms of the disease, one terminating in desquamation or resolution; the other in suppuration and ulceration. In the first form, *Syphilitic Lupus Non-exedens*, there are small, hard, shining, round, dusky-red, somewhat purplish tubercles, from one to six or eight lines in diameter, but slightly elevated above the surface, their bases occupying the entire thickness of the skin, and encircled with a copper-colored areola; these tubercles are arranged in circular or crescentic groups, and sometimes the skin in the center of the group is of a leaden-gray color. Each tubercle frequently, though not always, becomes covered with a hard, dry, and grayish scale, and is not attended with itching. The tubercles are commonly isolated, rarely confluent, and extend concentrically from the circumference of the first formed group. They usually occur on the face, end of the nose, forehead, or neck, rarely on the arms and thighs, or body; are very indolent, often persisting for many years; rarely end in ulceration; and leave dusky or livid-red discolorations.

Syphilitic Lupus Exedens, is the term applied to the pustular or tubercular syphilides when followed by ulceration, and which occurs at an advanced period of the syphilitic disease, usually in connection with tertiary symptoms. The ulcers are of two varieties:—1. *Serpiginous*, when they extend circumferentially; they usually appear in the vicinity of the larger joints, and often on the back, chest, shoulders, and even on the face, with a rather thin, greenish-yellow crust, and leaving a pitted cicatrix of the depth of the ulceration. The disease is very slow in its progress, is apt to be accompanied with itching and pain, and the ulcers have a great tendency to become extended.—2. *Perforating* ulcers are those to which the term S. Lupus Exedens is more especially applied; they generally follow the tubercular syphilides, and are seated on the nose, lips, or face. A few moderately-sized, flattened tubercles appear, their apices become red, then soften, ulcerate, and discharge an offensive matter, which forms a thick, rough, dark-colored crust. Generally but one eroding ulcer is formed. This ulcer extends in depth, even destroying the cartilages and bones, has a grayish surface, and when one crust is removed from it, another is speedily formed by the plastic sanious, offensive pus discharged. The disease is of a very grave character, progressing very slowly, being more unyielding to treatment than the preceding variety, and causing great and extensive destruction and deformity. It is usually associated with great constitutional impairment and cachexia. When the ulceration heals, coppery-red or brown cicatrices are left, which are marked with depressions, are either smooth or bridled by bands of inodular tissue, are of circular or irregular outline, and which eventually become dull white. It may be *diagnosed* from *cancroid ulceration*, which presents prominent everted edges, and is accompanied by lancinating pains. (*See Lupus Exedens.*)

Acne Syphilitica is not a common syphilitic eruption, and usually appears upon the face, forehead, neck, and upper part of the trunk, though it may extend to, and even be confined to the legs. The tubercles are very small, isolated, conical or acuminated, with an inflamed, red, but subsequently, copper-colored base. Each tumor requires three or four weeks for its development, when it ruptures, and the discharged matter upon drying forms a small, dry, grayish, or yellowish-brown crust. When the crust falls off a slight desquamation of the exposed surface may ensue, occasionally a very superficial ulceration exists. On healing, or when the eruption disappears, a slight depression of a dark color remains,

which sometimes forms a persistent, white, rounded cicatrix. The disease occurs as a tertiary affection, or rather at the period between the secondary and tertiary symptoms. It lasts several weeks, but may be prolonged by the development of successive crops of the eruption. It strongly resembles Acne Indurata, which, however, is of a more lively red color, and does not occur on the legs.

The above are the principal varieties of syphilides met with in practice; others may occasionally be observed, but they all require exactly the same *treatment*, viz., that heretofore named for Constitutional Syphilis, *which see*. It speaks but little for the judgment, skill, or knowledge of any medical practitioner whatever, who administers mercurials or arsenicals for the cure of this disease—it is a strong indication, either that he is behind the age, is a prejudiced servant to these minerals, or both.

It may be proper to state that in the treatment of these syphilides, when anemia, or great debility are present, they must be met by chalybeates, tonics, nutritious diet, moderate exercise, etc.—I have frequently derived much benefit in the Syphilides from the following preparation, applied to the exposed surface or to the ulcer after the crust has been removed: Take of Chloride of Gold and Soda six grains, Hydrochloric Acid twelve minims, Nitric Acid three minims, Lard one ounce; mix together in a glass mortar, gradually adding to it very finely pulverized Hydrochlorate of Ammonia half a drachm. If too strong it may be weakened by the addition of more Lard. This ointment will also be found useful in several varieties of non-syphilitic cutaneous affections.

ORDER XI. PARASITICI.

This Order includes all eruptions of the skin in which a vegetable or animal parasite is developed. These parasites may always be detected under the microscope; in the epiphytic diseases, some of the hairs, the crusts, the dusty scales or exfoliated debris, should be removed, placed upon a glass slide, moistened with a dilute solution of potassa or ammonia, to remove fatty matters, etc., be covered with a thin glass cover, and then be subjected to the microscopic examination. A microscope having a magnifying power of from three hundred to four hundred diameters will be sufficient for these examinations.

There has been some doubts expressed by many writers whether

the parasites were the causes or the result of the eruption; but it must be recollected that unless the peculiar parasite common to the eruption is present, there is no eruption; and again, the contact of these parasites alone has produced their particular malady. It is almost impossible for these parasites to become developed upon *perfectly healthy* skin, yet, it is not always necessary that any constitutional disorder should be present in order that they may become developed,—a suitable soil for their production will result from neglect of cleanliness, filth, moistures, atmospheric changes, deficient exercise, bad hygiene, and contagion; the languid, unhealthy condition of many strumous children appears to be accompanied with a condition of the skin very favorable to parasitic growth.

Dr. T. Fox believes that vegetable fungi act, 1, directly upon the skin, either *mechanically*, by invading, irritating and destroying the cells of the tissues and the hair shafts, and living upon their juices, as in tinea; or, by inducing local *chemical change* leading to fatty degeneration of the tissues, as in favus,—the result of a process of oxidation in which the fungi absorbs oxygen and gives out carbonic acid. 2. Indirectly, by bringing about changes in substances out of the body, which are brought to influence the latter, as by *conveying the noxious poison* of certain diseases upon the skin or into the air passages; or, by setting up a kind of fermentative action in part due to the oxidation consequent upon the nutritive changes in the plant, or by giving rise to products having an acute or a chronic action,—or in other words, by *developing a poison*. I think he is correct in these views.—These fungi, or rather their germs, exist everywhere, and are constantly floating in the atmosphere, and as soon as they find a nidus, a congenial soil for their germination, they fasten themselves and grow. This has been verified so many times that is useless to do more than to refer to it here. In the human system a peculiar abnormal condition of the skin forms the soil for them; air, heat and moisture favor their vitality and development.

It is not yet positively settled whether the fungi observed in the various parasitic cutaneous maladies are distinct species, or only varieties of one species. Dr. Lowe believes the Tricophyton Tonsurans to be only the sporula form of Achorion Schonleinii, and this latter again to be, in its fully developed state, the yeast fungus, Aspergillus Glaucus; and it has also been satisfactorily ascertained that various fungi may produce skin diseases in every respect resembling the several kinds hereafter referred to.

VEGETABLE PARASITES, OR EPIPHYTES.

FAVUS.

This cutaneous disease has been known under many names, as, *Scall Head*, *Honeycomb Ringworm*, *Porrigo Lupinosa*, *Porrigo Favosa*, *Tinea Vera*, *Porrigo-phyte*, *Tinea Favosa*, etc. The disease is due to the presence of the fungus *Achorion Schœnleinii*, and is rarely observed among cleanly persons. It attacks the orifices of the hair follicles, the epidermis, and the nails, and is more generally observed on the scalp, though it may be developed on any part of the body. It is characterized by the presence of very minute, rounded, bright-yellow or sulphur-colored dry crusts, depressed in the center, and through which one or more hairs pass. At first, each crust is smooth on its inner aspect, and somewhat below the level of the surface, but as it gradually increases in size, even to three or four lines in diameter, it rises above the level of the skin, and its cup-shape or central depression becomes more distinctly marked, and presents a series of marks in the form of concentric circles. The crusts adhere firmly to the skin, and can scarcely be removed in the dry state without being followed by a little bleeding; but when carefully removed, they expose, each, a shining red, circular depression covered by a very thin layer of epidermis, which depression is due to compression of the crust, and which soon fills up when the crust is detached. But, unless means are taken to prevent it, a new cup-like crust becomes quickly developed in the place of the detached one. As the crust grows older, the cup-like depression gradually disappears, the crust becomes whitish, more dry and brittle, and ultimately breaks up.

When the disease attacks the hair follicles it is termed *Favus Pilaris;* when the crusts are scattered and isolated, it is termed *Favus Lupinosa* or *F. Dispersus;* when the crusts are numerous, thickly set together, blending and becoming united on their edges, so as to form a continuous irregular incrustation, it is termed *Favus Scutulata* or *F. Confertus*. And when the crusts, at an advanced period, lose their circular or oval form, their cup-like depression, their sulphur-yellow color, assuming a dirty whitish tint, and readily falling off, the disease is termed *Favus Squarrosa*. These, however, are not different varieties, but different stages of the same disease.

If left to themselves, the crusts remain adherent to the surface for months and even years; and fresh accumulations from the hair follicles go on producing additional crusts, until the entire scalp becomes covered by one dense and uniform crust. This, however, rarely happens, for the constant itching causes the patient to tear or rub them off in his efforts to obtain relief by scratching. And the disease may be propagated to other parts of the body by the fungus thus carried beneath the nails by the scratching. The itching is often accompanied by an erythematous condition of the skin. If the crusts are allowed to collect to any extent, the chronic inflammation of the integument which is set up, will continue until the whole of the tissues of the scalp down to the bones of the cranium are involved in the morbid action. In severe or neglected cases, there is frequently an enlargement of the lymphatic glands in the neighborhood, and in some rare cases, the tongue presents vesicles and patches. If the disease be seated near the eyes, a troublesome ophthalmia, *tinea ciliaris*, will be produced, with an œdematous state of the lachrymal puncta. Secondary impetiginous eruptions frequently appear when there is great irritation present.

The hairs lose their glossy character, become dull, dry, whitish or ash-gray colored, very brittle, are often split longitudinally, and are easily pulled out. If permitted, the hair will become matted and in a very filthy condition, readily falling out, even at an early period of the disease. When the disease has lasted a long time, the hair follicles become destroyed, and patches of incurable baldness remain, the skin of the bald part being pale, smooth, glossy, very dry, and somewhat resembling parchment. Should the hair grow again, after an arrest of the disease by treatment, it will be flaxen or woolly, weak, thin, of a lighter color, and often gray.—The odor exhaled from the parts diseased is very offensive, and has been likened to that of mice or cat's urine. Pediculi are very apt to be engendered, often in large numbers, more especially if there be a want of cleanliness, and thus add to the irritation.

Favus of the epidermis, and of the nails, are less frequently encountered than the above variety. The disease, as with other varieties of parasitica, is contagious; one of its most active predisposing *causes* being uncleanliness, and especially in a scrofulous or badly nourished constitution.

By observing the characteristics of favus as just described, its *diagnosis* will be easy. When the crusts have been removed by parents or guardians before presenting the children for treatment, the scalp will manifest at the points from which the crusts were detached, a deep redness, a depression, and a distinctly-circum-

scribed surface, with a thin shining epidermis, and a few scattered pustules may also be observed.

In *impetigo* of the scalp, the color of the scalp is light red, diffused; the hairs are not altered, there are no patches of baldness, although hairs may fall out here and there.—In *lepra* of the scalp, the crusts are whiter, and much more adherent, and the whitish-silvery scales of lepra may be detected on the elbows, knees, and other parts of the body; beside, there is no change in the condition of the hair, no baldness, and but little, if any odor.—In cases of doubt, the hairs or the crusts may be examined under the *microscope*, when, if the case be favus, the parasitical fungus will be detected, and the roots of the hair will be found split up.

Achorion Schœnleinii under the microscope, presents the following characters, viz.,—isolated spores, or filaments composed of them in chain-like forms. The *spores* are minute, numerous, oval or rounded bodies, from the one eighth-thousandth to the one three-thousandth of an inch in diameter, with clear, well-defined margins, and containing in many instances granules in constant motion, when water is added to the specimen under examination. The spores are not affected by water and acetic acid, and their contents are strongly refractive and homogeneous. Numerous *receptacles* or *spore-tubes* will also be observed, analogous to those of the mycelium, but usually less flexuous, empty thoughout a great part of their length, and containing throughout the rest small granules, varying in diameter from the nine ten-thousandth to the one three-thousandth of a line. Other tubes may also be seen containing granules nearer to each other but not touching, and others, again, full of spores of various sizes. The enveloping tube is not always visible. All these tubes vary in length from the one five-hundredth to the one one-hundred and twenty-fifth of an inch, and in diameter from the one twenty-five thousandth to the one five-thousandth of an inch. The *mycelium* is formed of flexuous cylindrical, simple, branched, inarticulate tubes or filaments, of uniform thickness throughout, about one eight-thousandth of an inch. The cavity of these tubes frequently communicates with that of the ramifications; while these appear simply applied against this tube and separated from its cavity by a partition. The margins of the tubes are simple, clear, of dark color, and their cavity is transparent without any internal granulations. This fungus appears to grow between the epithelial layers just at the orifice of the hair follicle; from this point, it may spread downward between the hair and its capsule, and upward around and even in the substance of the hair.

When a vertical section is made of a favus crust, and examined under the microscope, it presents the following characters: The outer periphery consists of a granular crust about the one one-hundred and fiftieth of an inch in diameter, the stroma, apparently a hardened exudation from the surrounding parts; this is lined by the mycelium passing in from it; next the mycelium, proceeding inward, come the receptacles and the spores. The bulbs of the hairs will also be found covered with chains and masses of spores around them, and also between the laminæ of the split and broken up roots.

The *prognosis* is favorable, as the disease can always be cured by appropriate treatment.

In the *treatment* of favus, it is very important that we remove the crusts and expose the affected parts so that they may be reached by our parasiticides. This may be accomplished by cutting the hair close to the head, and then applying Flaxseed or Elm poultices; or else freely scrubbing the hair with soap and water, having some hours previously thoroughly oiled the parts,—and repeating this operation once or twice every day. Epilation, or the careful removal of the hairs from the affected parts by a properly made pair of forceps, will aid materially in effecting a rapid and thorough cure, and should be pursued in very obstinate cases, though not absolutely necessary in every case. It is not, however, a very practicable operation; and it must be recollected that the disease itself is the best depilatory.

Immediately after the removal of the crusts, or of the hairs, the parasiticide should be applied, not merely superficially, but it must be well rubbed in, if it be an oil or liniment; or, the parts should be well impregnated with it, if it be a lotion.—Although constitutional measures are not always required, yet where the patients are strumous, or of delicate, weakly, or anemic habits, it will be found advantageous to administer remedies internally, with a view to effect beneficial constitutional influences, and bring about a more healthy action of the skin and its functions. For this purpose, the long-continued use of Bromide of Potassium will frequently be found useful; or, Tincture of Chloride of Iron; vegetable tonics and alteratives; together with pure air, moderate exercise, cleanliness, nutritious and digestible diet, etc.

The best parasiticidal agents are the following: 1. Take of Sulphite of Soda one drachm, Distilled Water three fluidrachms, Glycerin one ounce and a half; mix. This should be applied frequently, and will be found especially useful in those skin diseases due to a vegetable parasite.

2. Take of pure Carbolic Acid one fluidrachm, Pyroligneous

Acid, of 8°, four fluidrachms, Distilled Water fifteen fluidrachms; mix the two acids, and then add the water. By means of a brush this liquid should be applied upon the affected parts, thoroughly impregnating them with it. It should be applied once or twice a day, and be continued for some time after all traces of the disease have disappeared; also being careful to cleanse the clothing, etc., and impregnate them in the same manner. This is useful for both vegetable and animal parasites.

3. Take of Sulphurous Acid one part, Water, Glycerin, each, one and a half parts; mix. Applied similar to the preceding; or, it may be kept constantly applied, over the part, on lint moistened with it, and then covered with oil-silk.

4. Ointment of Pyroligneous Oil of Juniper, rubbed in two or three times a day; or the Oil of Cade alone.

5. A saturated solution of Oxalic Acid, to one fluidounce of which, add thirty minims of Creosote. Apply once or twice a day.—Phenol Sodique has also proved serviceable.

When it is desired to cleanse the scalp from ointment or greasy applications, it may be readily accomplished by means of benzole on lint; this will also aid in removing crusts that have been previously softened by oil or ointment.

TINEA TONSURANS.

This disease, also known by the names of *Trichosis Tonsurans*, *Trichosis Furfuracea*, *Porrigo Scutulata*, *Pityriasis Decalvans*, *Common or Scurfy Ringworm*, *Tinea Capitis*, *Herpes Tonsurans*, *Ringworm of the Scalp*, etc, is due to the presence of the fungus *Tricophyton Tonsurans*. There are three varieties of it, as follows:

1. *Tinea Tonsurans* commences with an itching, mostly experienced at night, and which varies in degree; at the same time, circular or oval patches of a dry, scaly inflammation will be observed on different parts of the head. This eruption may appear as an erythematous slightly elevated or papillated ring, or it may present very small vesicles, which rupture at an early period. The patches are quite small at the onset, but gradually increase in diameter. A change also occurs in the hairs, they become dry, dull, twisted, and easily extracted, and acquire a reddish, or ash-gray color; and as the disease progresses they become very brittle, and even spontaneously break off within a line or two of the skin, giving the appearance of bareness or seeming baldness of the parts, and are sometimes matted together in small bundles. The hairs also be-

come covered with grayish-white dust, the surrounding skin puffy and slightly elevated, with little prominences, and when the head is kept clean, the skin of the patches looks parched, of a grayish, yellowish, or reddish color in blondes, and bluish or slate-colored in brunettes.

As the disease advances, pustules and yellowish crusts may be formed. It may last for an indefinite time, or may spontaneously terminate, either in a thorough recovery, or permanent baldness from destruction of the hair follicles.—When the itching is severe, the irritation resulting from scratching will increase the inflammation, giving rise to sores, ichorous and purulent discharge, and enlargement of the lymphatic glands of the neck.—The disease is not confined, like favus, to the poorer classes of society, but is also met with among the wealthy, and is often very obstinate to remedial agents. It may be conveyed by using the combs, brushes, towels, wearing apparel, etc., of affected persons, or by direct contact, especially by sleeping with them. Children are more subject to the disease, it being very rarely met with among adults.

Tinea tonsurans is not difficult of *diagnosis*. In its first stage, the itching, the *circular* or oval red patches, with or without vesicles, pustules, papules, or scales, the dull, dry, reddish, or grayish appearance of the hairs, their tendency frequently to become twisted, or to break off near the surface of the skin, will determine its nature; and, in the second stage, the erythematous rings, the broken off hairs, and their tow-like appearance, the grayish-white parasitic dust on them, the slight swelling, and the darker hue of the integuments. In the third stage pus is formed, which destroys the fungus, so that it can no longer be seen, the hair follicles often become destroyed, and permanent baldness results; this is more generally observed, however, when the disease is seated upon the chin, *Sycosis*. The crusts formed are usually small, of a gray or yellow color, and when they become large, the movements of the scalp breaks them up into somewhat angular fragments.—It is by no means uncommon for Herpes Circinatus to be found co-existent with Tinea.

The disease may be determined from *pityriasis capitis*, which affects the whole head instead of appearing in circular patches, and the hairs are more adherent, and not brittle. From *favus*, in which the crusts are cup-shaped. From *alopecia areata*, in which the patches are smooth, and the hair follicles quite faint. From *impetigo*, in which the hairs are not diseased. In cases of doubt, an examination under the microscope will solve the difficulty; the hairs will be found thickened, the bulbs flattened, more or less

disorganized, or destroyed, with the presence of the fungus causing the disease. If, however, suppuration has occurred, the fungus being destroyed by the pus may not be found.

2. *Herpes Circinatus* or *Ringworm of the Body* is the second form of Tinea Tonsurans, and like it is due to the presence of the fungus, Tricophyton. It is met with in all classes, sexes, and ages, and is located in the hair and the epidermal lining of the hair follicles, and is usually met with on the neck, arms, and other parts of the body. It generally commences with circular, reddish, slightly elevated patches, varying in diameter from two lines to two inches, which soon become covered with extremely fine, furfuraceous, white, dust-like scales, and attended with more or less itching and tingling. The margins of these patches often consist of very minute vesicles or papules, that are extremely evanescent, and leave a simple furfuraceous desquamation. These circular patches have a tendency to increase in diameter, new erythematous rings forming around their circumference, and which may continue until they attain a diameter of five or six inches. While the disease is thus spreading circumferentially, the central portions of the patches gradually heal, and the skin recovers its healthy condition; or if, as is sometimes the case, the central parts do not heal, then the whole rounded patch is entirely covered with the characteristic minute scales. There may be but one circular patch developed; but more commonly several, and even a number of them, located on different parts of the body.

Sometimes, especially in advanced cases, the disease loses its circular form, and manifests itself under the form of segments of circles, probably from a healing of the other parts. The disease may last an indefinite length of time, and then disappear spontaneously for want of nourishment.

Herpes Circinatus is of easy *diagnosis*. The red, elevated circular patches covered with minute furfuraceous scales, the seat of the eruption, and its being frequently associated with tinea tonsurans, or sycosis, are its peculiar characters. It may be determined from other eruptions in cases of doubt, by these characters, and by the detection of the parasitic fungus under the microscope.

3. *Sycosis*, *Mentagra*, *Sycosis Menti*, *Sycosis Contagiosa*, or *Barber's Itch*, is the third form of Tinea Tonsurans, and is likewise owing to the presence of the fungus, Tricophyton. It is a disease met with

principally among male adults, and is conveyed from one to another chiefly by means of the razor in shaving; a sharp razor especially. Its principal seat is the chin, though it may attack the hairy parts of the cheeks, the lips, whiskers, eyebrows, etc. When in the axillæ or other parts, females may also labor under it, but such cases are very rare.

The disease commences with a sense of more or less tension, unpleasant itching, and even slight pain, which is succeeded by an eruption of several small red spots, which increase in size circumferentially, the same as in herpes circinatus, are also of circular form, and covered with furfuraceous scales in which the parasite may be found. The hairs become affected, and may be extracted without difficulty.

The attention of the patient is, however, rarely called to the disease, until the deeper-seated tissues become involved in the irritation as manifested by the presence of small, acuminate, distinct indurations, upon the tops of which are formed pustules containing a pale-yellowish pus, which exudes when they rupture or are punctured, and which form, by drying, dark-brownish crusts that fall off in a week or two, leaving persistent, indolent, and purplish tubercles. In many instances large, fleshy-looking indurations, with lobulated or mulberry-like surfaces are present in the advanced stages of the eruption, from the disease extending into the deep-seated cellular tissue. The hairs, in this disease, lose their color, become very brittle, break off, or fall out, and, from partial or entire destruction of the hair follicles, more or less permanent baldness frequently remains. Upon the decline of the disease, the eruption and pustular elevations cease to be developed, the tubercles or indurations gradually diminish in size, and the epidermis is thrown off by repeated desquamations. However, the disease usually lasts for years, rarely disappearing spontaneously, but is kept up by a succession of eruptions around the circular patches, and also by improper local applications. In the advanced stages of the disease, the fungus becomes altered in its character, or else is wholly destroyed by the suppuration.

The *diagnosis* of Sycosis is not difficult; the red patches and circles among the hair of the chin, and perhaps also upon the neck and face, or wrist, the conical elevations, the pale-yellow pus, the mulberry-looking tubercles, the change in the hair, and the patches of baldness, will determine its true character, in conjunction with the microscopic examination, which should always be had in cases of doubt. Sycosis may be determined from *impetigo*, in which there are no circular patches; its seat is more superficial, and the subcu-

taneous swelling and induration is of less extent; the hairs adhere more firmly, and present no alteration, and the disease is not contagious; besides, no parasitic fungus is present. From *acne sycosiformis* which is not contagious, presents no parasite, is often accompanied with acne of the non-hairy parts of the face, and is not associated with the circular patches of herpes circinatus on the neck or other parts. From *syphilitic eruptions*, by their appearance, the enfeebled or cachectic constitution, and the history of the case. But the *microscope*, by detecting the presence of the Tricophyton, will always enable us to positively ascertain the correct nature of the malady in any of these cases.

Tricophyton Tonsurans, under the microscope, presents the following characters, viz.,—a number of round or oval, transparent, colorless spores, with smooth surfaces, homogeneous interior, and varying in diameter from the one two-hundred and fiftieth to the one one-thousandth of a line. Some present a distinct spot in their interior, or a badly circumscribed nucleus, and others, that are elongated, have a constriction at their center. These spores appear in the interior of the root of the hair in the form of a round mass. They give rise to some articulated filaments consisting of spores in chains or moniliform filaments, which, in becoming developed, creep into the thickness of the substance of the hair in a longitudinal direction. They only appear upon the external surface of the hairs after these break or split. The chains or bead-like filaments formed by the spores have borders tending to form an undulated line, but in the interior of which the spores may be seen very slightly separated from each other. Very rarely will the spores be elongated enough to resemble cryptogamic filaments; they are generally isolated, or accumulated in large groups, sometimes they are suspended to a very finely-fibrous thallus. Caustic potassa, and acetic acid do not affect the spores, but they are completely dissolved by tincture of iodine. The affected hairs are opaque, swoln in some places to nearly double their natural size, split up and ragged at the ends, broken off with a fibrous fracture, and studded all over with the spores; the medullary portion of the hair is either disorganized or has disappeared. In the early stages the hair bulbs are flattened and more or less disorganized; in the advanced stage they are wholly destroyed.—This fungus is primarily seated in the root of the hair, extends upward into the hair substance, splitting the hair; it also extends outward, even on to the skin between the hairs.

The *prognosis* of these three forms of Tinea Tonsurans, as to a cure, is favorable under proper treatment; when not treated, their course and persistency has already been explained.

The *treatment* is about the same as advised for Favus. When there is great irritation or suppuration, soothing poultices should be applied over the parts. It has been advised to extract the hairs, but this is not always easy, nor indeed is it always necessary, though they should be cut as close to the surface as possible, in order that the local remedies may be properly applied. Instead of depilation, it has been advised to apply the Acetum Cantharidis prepared with glacial Acetic Acid, painting it upon the eruption with a small brush, until it produces considerable pain. The vesication is effectual in curing the disease, and should be repeated once in every week or two, if necessary, being careful to well shake the bottle that contains the fluid, each time before using it. However, the parasiticide agents heretofore named will generally answer the purpose without this vesication, which can only be safely used in sycosis, or in the other forms when there are but few circular patches. Painting the eruption with Tincture of Iodine, or with a Compound Tincture of Iodine and Iodide of Sulphur will occasionally prove useful, as well as the Iodized Oil of Juniper.

ALOPECIA AREATA.

Alopecia Areata or *Accidental Baldness*, also known by the names of *Tinea Decalvans*, *Porrigo Decalvans*, *Ophiasis*, *Vitiligo Capitis*, etc., is a parasitic affection, due to the presence of the fungus, *Microsporon Audouini*. It may attack any of the hairy parts of the body, but more commonly the scalp, and may persist and extend itself until there is not a hair left upon any part of the body. The disease gives rise to more or less circular or oval, smooth bald patches, sometimes but one, but more commonly, many; there is but little or no desquamation from the skin, which sometimes becomes slightly paler than the surrounding skin; and the patches may vary in diameter from a line or two to several inches, or may even cover the entire scalp, leaving a permanent and complete baldness. Like the preceding parasitical maladies, it is contagious, but apparently much less so.

The disease is seldom noticed until a bald spot makes its appearance, although there may have existed some slight itching previously. At an early period the hairs of the affected parts are found dull and lusterless, and are very readily extracted; the surface from which they are taken is somewhat reddened and presents an œdematous-like swelling, but which does not pit on pressure. A

whitish substance, the parasite, will also be found upon the affected skin and hair. The hair soon falls out leaving circular patches of baldness, and the skin becomes white, smooth, and often slightly depressed. Frequently, the lost hairs are replaced by light, fine, downy-like hairs, which ultimately disappear, leaving the baldness complete. There is neither inflammation of the dermis, hypertrophy of the epidermis, vesicles, nor pustules in this disease. Itching is usually present.

The *diagnosis* is not so easy in the early stages as in the period when the disease is fully formed. But the *microscope* will render it accurate by showing the atrophied condition of the hair bulbs, and the presence of the parasite around the hairs.

Microsporon Audouini, under the microscope, presents a number of very small spores, together with an abundance of filaments. The spores are round or oval, cover the filaments, and sometimes their branches, are transparent, without internal granules, have a diameter varying from one twenty-five hundredth to one three-hundred and fiftieth of a line, and swell up when placed in water. The filaments are short, undulated, and arranged in the direction of the length of the hairs, parallel with their striæ, and have a diameter of from one eleven-hundred and twelfth to one one-thousandth of a line; they have no granulations in the cavity of the elongated cellule that constitutes them ; sometimes they bifurcate at an angle of 30° to 50°. The branches are also short, and of the same diameter, and together with the filaments form a felt-like sheath around the hair, of the thickness of about one one-hundred and forty-fifth of a line. The branches may be distinguished from the filaments by the spores which accompany them. When the fungus is met with in the interior of the hairs, they collect into small masses and give rise to considerable swellings of the hairs.— This fungus is seated on the outside of the hair, forming a kind of sheath around it, and extending upward as far as the one twenty-fifth to the one-eighth of an inch from the surface.

As far as a cure is concerned the *prognosis* is favorable; though it must be remembered that the disease may disappear spontaneously, and either leave a permanent baldness, or be subsequently followed by a return of the growth of the hair.

In the *treatment* the same measures are to be pursued as named in the preceding parasitici. Previous to applying the parasiticide, it has been advised, in order to prevent the disease from extending, to carefully extract all the healthy hairs within a couple of lines of the circumference of the bald patch. Or, the disease may be treated by blistering the diseased patches, as named under

the treatment of Tinea Tonsurans, page 1087, or, by means of Cantharidal Collodion. The head should be frequently cleansed with soap and water. The following forms a very excellent wash for the head in these cases: Take of pure Carbolic Acid ten parts, Cologne (or other essence) two parts, Tincture of Quillaya Saponaria fifty parts, Water one thousand parts; mix. To be used with considerable friction, once or twice a day.

PITYRIASIS VERSICOLOR.

This malady, also known by the names *Chloasma*, *Liver Spots*, *Teigne Pelade*, *Leberflecke*, *etc.*, is parasitic, and is due to the presence of the fungus *Microsporon Furfur*. It may occur upon any part of the surface of the body, but is more commonly met with on the anterior part of the chest, the abdomen, and neck, rarely upon the face and extremities, its favorite sites being the parts of the body that are habitually covered with clothing. It is a common affection, is met with in all classes of society, and is more frequently observed in youth and adults, very seldom in children. It is of a contagious character, but less so than some of the other parasitici, as it must find a congenial soil in which to flourish. Lymphatic persons, and those disposed to struma appear to be more liable to it; yet uncleanliness is undoubtedly a predisposing cause. It is frequently encountered among those who are in the habit of wearing the same shirts or flannel next the body for two or three weeks at a time, without changing, and especially among those who continue to wear them in this manner both during the day and night; also among those who do not wash the surface of the body sufficiently often. It also frequently exists with patients laboring under syphilitic affections. The disease has been called "liver spots," from an erroneous supposition that some unhealthy condition of the liver occasioned its presence. The discoloration of the face, morph, that frequently accompanies pregnancy is an entirely different affection. If the disease be allowed to run on without treatment it may last for several weeks, months, or even years; and often, when nearly well, it is liable to relapse. The general health remains unaffected, the disease, being purely local in its nature.

The disease is characterized by the presence of one or more small circular spots of a pale or saffron-yellow color, sometimes brownish-yellow, and again almost black, (*Pityriasis Nigra*), which gradually increase in diameter, unite, and form large irregular

patches of various sizes and forms; in some instances their outline has been compared to that of a map, representing continents and islands. These patches usually present at their edges little convex spots about the size of small pin heads. Sometimes, the color will be so light as hardly to be detected from the healthy skin, unless it be attentively observed. The patches may or may not be very slightly elevated above the surrounding surface, and, as they advance in size, their centers do not heal, as is the case with those of herpes circinatus. Itching may or may not be present; more commonly, when present, it is quite slight, but occasionally it is rather troublesome. These patches impart a roughish aspect to the skin, which in many cases is barely perceptible to the touch, and are covered with a more or less, very fine, furfuraceous or branny desquamation which readily falls off upon scratching or rubbing the parts, the scales having somewhat the color of the eruption, and consisting of epithelial debris and the spores and tubes of the parasite.

The *diagnosis* of pityriasis versicolor is by no means difficult; its more usual seat *upon the body*, its irregular form, its yellow or dark color, its scarcely perceptible elevation above the surrounding healthy surface, the slight itching or its entire absence, the fine, mealy desquamation which becomes renewed with great facility, the color of the minute scales that are shed, together with the presence of the parasite, when the scales are examined under the microscope, will enable us to readily recognize it. It may be determined from *nigrities*, which is due to an augmentation of pigment, without any elevation of surface, itching, or desquamation. From *ephelis* or *freckles* which are also owing to an increase of pigment, without elevation or desquamation, and are more commonly observed on parts of the body that are kept constantly uncovered. From *pityriasis vulgaris*, and *P. capitis*, in which the scales are more abundant, larger and thicker, are not yellow, and, any patches that are presented are red. From *syphilitic erythematous patches*, by the little eruptive spots about the size of a pin's head that are present in pityriasis, around its edges, but which are absent in the syphilides. But in all cases of doubt, the presence of the fungus, under the *microscope* will at once render the diagnosis accurate. A few of the scales may be scraped off, placed upon a glass slide, moistened with a few drops of Liquor Potassa diluted with two parts of water, covered with a thin glass cover, and then placed under the microscope for examination.

Microscopon Furfur, under the microscope, presents a net-work of short tubes or filaments with terminal spores. The spores are gen-

erally in groups or grape-like clusters, are round or oval, strongly refract light, present no granules in their interior, but often show a double outline or margin, and vary in diameter from one three-hundredth to one six-hundredth of a line. The fungus grows in the epidermic cells.

The *prognosis* of pityriasis versicolor is favorable.

In the *treatment*, the general health must be attended to, and some parasiticide be applied locally to the eruption two or three times daily. I more commonly give a Solution of Bromide of Potassium internally, and, as a local application, a mixture of Carbolic Acid one part, Vinegar or dilute Acetic Acid fifty or one hundred parts. In very unyielding cases, an exposure every other day to a fume bath of Sulphur and Iodine, and which should be kept up for two or three weeks, in conjunction with the preceding-named measures, will effect a permanent cure. The solution of Sulphite of Soda in water and glycerin, named under Favus, will frequently prove an effectual local application.

To prevent a return of the disease, the patient should frequently bathe the surface of the body with soap and water; should not wear the under-clothing used while the disease was present, but should procure new flannel, etc., and be careful to change it frequently, and especially to remove it every night, wearing, during sleep, a night-garment expressly prepared for such purpose.

ANIMAL PARASITES OR ECTOZOA.

SCABIES OR ITCH.

This is a very common contagious affection of the skin which is due to the presence of a minute insect called the *Acarus Scabiei*, or *Sarcoptes Hominis*, and which is transferred from one person to another by actual contact, as, in sleeping together, shaking hands, etc., or, through the medium of clothing that has been worn by an infected individual. Persons who neglect personal cleanliness are especially liable to it, hence, it is very frequent among the lower classes; and when the disease is met with in respectable families, it will generally be found that servants or hired persons have communicated it. Certain professions, as, weavers, tailors, dyers, mattress-makers, shoemakers, etc., appear to be more obnoxious to it than

others. The disease may appear upon all parts of the body, except the face, which is almost always exempt; but the spaces between the fingers, the wrists, elbows, axillæ, abdomen, thighs, and penis, are the parts more especially liable to be affected. Parts of the skin exposed to pressure are also liable to be severely attacked. When left to itself it may continue for years, or even during life.

In the young and healthy the disease will manifest itself in from two to six days after contact; if the system be enfeebled, it will require a longer time. In the adult from seven to ten days is required in the spring and summer, and from fifteen to twenty in winter; older persons require a still longer time before the characteristic papules will be developed. It is more frequently met with in summer than in winter.

When the itch insect comes in contact with the skin, it burrows in the epidermis, and the irritation produced thereby gives rise to itching, and the development of an eruption of distinct, pale, slightly acuminated, and conical papules or vesicles, with transparent summits, and which contain a viscid and serous, or opaque fluid, which is discharged when they are ruptured by scratching or otherwise. The itching is sometimes almost insupportable, and is augmented by warmth, heat of the bed, excessive exercise, and the use of alcoholic drinks, as well as of high-seasoned food. The irritation produced by the scratching gives rise to a number of small, red, inflamed spots or eruptions, and may even cause a degree of inflammation resulting in the formation and discharge of pus.

The *diagnosis* of itch may be frequently made out by the character and situation of the eruption. A papular, vesicular, or pustular rash on the back of the hands between the fingers, on the abdomen, inner part of the thighs, etc., attended with much itching, which is augmented greatly when in bed, are the common *symptoms*. If there is any doubt, the channels or cuniculi should be looked for, by means of a magnifying lens; they have generally a serpentine shape, look like streaks or lines, are from half a line to three lines in length, or even longer, and present a whitish dotted appearance, the dots being due to the eggs deposited in these cuniculi; and if it be desired to examine with the microscope, one or more of the cuniculi may be sliced off with a sharp knife or pair of scissors, and the whole be examined in mass; to remove the parent acarus we must cut rather deeply. The young acari may frequently be procured by cutting off the heads of some of the vesicles or papules. If the parent acarus can be seen, a small delicate pin may be passed along the cuniculus, and on reaching its farther extremity the insect will be brought out on the point of the pin; it may

always be known by being situated at the termination of the cuniculis, which has a slight elevation over it, and by the grayish or yellowish-white speck beneath, which is the insect itself. The parent insect is never found within a vesicle or pustule.

The female itch insect varies from one one-hundred and forty-seventh to one-seventy-seventh of an inch in length, and from one-three hundred and third to one-ninety-fourth of an inch in breadth; it is almost egg-shaped, being broader anteriorly than posteriorly, is whitish, and has no true head, but a projection beyond the body, having a rounded edge, a central, mouth-like fissure, and, anteriorly, proboscis-like mandibular organs furnished with four bristles. There are eight legs, four, anterior, are inserted into the thorax by the side of the proboscis or head-like projection, they are conical, tapering toward a point, each one consisting of several jointed segments, and the last joint terminating in an adherent disk or sucker, from the side of which arise several small hairs and bristles. The four posterior legs have no suckers, but terminate, each, in a very long curved bristle. The body presents numerous, wavy lines, and the back is convex and furnished with numerous little angular spines, as well as with small round tubercles, upon each of which is seated a small conical spine. The male is much smaller than the female, and its posterior legs are furnished with suckers like the anterior.

The animal burrows in the epidermis, and forms minute channels (*cuniculi*), at the end of which it may often be discovered, and from which it can not emerge, but may continue to eat its way through the skin, until it ceases to lay eggs, when it dies; it does not inhabit the vesicles or pustules which constitute the eruption and are simply excited by the irritative action of the animal. A fresh egg is laid every day, perhaps two, and after the deposition of each egg the insect penetrates further, so as to leave room for the next. The eggs are about one-twenty-fifth of a line broad and one-eleventh of a line long, though their size will be found to vary. The eggs inhabit the cuniculi, and the young acari, which, at first, present but two posterior legs, may often be found in the vesicles and pustules.

Itch is a purely local disease, and exerts no influence upon the general constitution, except when severe and occasioning intense itching, with constant scratching, causing extensive, varied, and loathsome eruptions. Its cure is very easy. The *treatment* consists in allaying any excessive irritation by emollients and anodynes, and, destroying the insect by the local application of a parasiticide. In all instances, previous to this application, the whole surface of the body should be thoroughly washed with soft soap and warm water.

The parasiticides that may be used are,—1. The preparation of Carbolic Acid, No. 2, under the treatment of Favus, page 1081.—2. Phenol Sodique.—3. Benzole or Benzin.—4. Liquid Sulphuret of Lime, made by boiling together Lime half an ounce, Sulphur one ounce, Water half a pint; it should be constantly stirred till a homogeneous mixture is produced, and then passed through a sieve.—5. Compound Ointment of Sulphur.—6. An ointment composed of Sulphur two drachms, Subcarbonate of Potassa one drachm, Lard twelve drachms; mix.

One of these parasiticides should be applied to the *whole surface of the body*, except the head, every night, and be continued thus for ten or twelve days, or until all the insects have been destroyed.

The clothing, as well as the bedding, should also be exposed to the action of one of the parasiticide fluids, to the vapor of sulphur, or to boiling water, in order to destroy any of the insects that may have become deposited upon them; and, in cases where the disease has proved uncommonly obstinate, it would be desirable to destroy the infected clothing.

The *Acarus Folliculorum*, is an insect often met with in the sebaceous glands of the nose and face, the outer extremity of which presents a black point; it is popularly termed a *grub* or *worm in the skin*, and is frequently pressed out between the fingers by many persons. It is also frequently met with in acne, and is more common among strumous and lymphatic persons. Its presence gives rise to no morbid condition, though quite annoying to some persons on account of its appearance. It may be removed by the use of Soap and Water, in conjunction with one or two applications every day of a mixture of Carbolic Acid one part, Ether fifty or one hundred parts. Apply to the parts on lint, and cover to prevent evaporation; then wash with soap and warm water.

The human body is liable to three kinds of lice which vary in their appearance and location; they are termed *pediculi capitis* or head lice; *pediculi corporis* or body lice; *pediculi pubis* or crab-lice. They may be removed by daily bathings with Cologne; with Tincture of Staphisagria; with a solution of Carbolic Acid one part, Acetic Acid four parts, Cologne, Water, each, seven and a half parts. There is no necessity for the use of filthy and dangerous mercurial ointments. In cases where the pediculi are in great abundance on the head or genitals, the hair should be cut as short

as possible before commencing the application, in order to facilitate the destruction of these parasites.

Having referred to the treatment of *Warts* or *Verruca* in several places, I will make a few brief remarks thereupon at this place. These growths are too well known to require a description; the *cause* of their appearance is not understood. They may be removed by touching them daily with Nitric Acid, Nitro-hydrochloric Acid, Concentrated Acetic Acid, or Carbolic Acid, removing the disorganized material as fast as it is produced. A saturated solution of Bichromate of Potassa, or of Chromic Acid, has been successful; being careful, in all cases where caustics are used, not to touch any of the surrounding healthy tissues. Manganic Acid also forms a very effectual remedy. The juice of Milkweed, of Celandine, or, of Marigold Flowers, are very popular remedies among the country people. Hydriodide of Ammonia, and also a solution of Copper dissolved in strong Aqua Ammonia, have both been found serviceable.

For the treatment of *Syphilitic Warts* or excrescences, see pages 465 and 957.

PART IV.

SPECIALTIES.

CHRONIC DISEASES OF THE PROSTATE GLAND.*

PREVIOUS to puberty the prostate gland is in an immature condition, and, therefore, not so liable to attacks of disease as when fully developed and in the exercise of all its functions; and its tendency to disease becomes more marked after puberty, as we advance in years.

The prostate gland may be detected through the anterior wall of the rectum, by placing the patient upon his back, with the legs separated and drawn up toward the abdomen; then, having oiled the index finger, carefully pass it into the rectum, (which must have been previously evacuated), keeping the hand in a supine position, that is, with its back downward and its palmar surface upward. As soon as the extremity of the finger has passed beyond the sphincter ani, it will, at first, come in contact with the posterior extremity of the urethral bulb situated directly above the sphincter, then with the membranous urethra, and as the finger advances, the apex of the prostate, and finally the rectal face of its body. This will be found hard, somewhat concave at its median line, from each side of which it widens outwardly to its base in a convex form. If the patient lie with his face downward during the examination, the hand of the surgeon must be held with its back looking upward, and its palmar surface downward. The average measurements of the gland are, from its apex to its base,

*In the selection and preparation of matter furnishing the preliminary remarks, causes, symptoms, etc., of prostatic diseases, I am principally indebted to Thompson, Velpeau, Beraud, Cruveilhier, Vidal, Horion, Mercier, Brodie, Rayer, Leroy, (d' Etiolles), etc.

from one and a quarter to one and a half inches; its greatest transverse diameter, from one and a half to one and three-quarter inches; its greatest thickness, from five-eighths to seven-eighths of an inch; and, the distance from the center of the urethra or median line of the prostate to its extreme border at its vesical extremity, is from six-eighths to seven-eighths of an inch.

It is only within the present century that the various affections of the prostate have been carefully studied. The tumefaction of this gland, its engorgements, and abscesses, the urethro-prostatic discharges so frequently met with, and for so long a time misunderstood and neglected, may all give rise to such results as to seriously endanger the life of the patients laboring under them.

Diseases of the prostate are serious, not only of themselves, independently of the obstacle they may present to the passage of urine, but they also frequently determine inflammation of the kidneys and ureters. More or less extensive abscesses have frequently been observed at the autopsy of individuals who have fallen in consequence of tumors and inflammations of the prostate; it is also known, from experience, that the greater part of organic diseases of the kidneys, and the various functional disturbances of these organs, with regard to the quantity and quality of the urine, generally depend upon diseases of the urethra and bladder, and upon disorders observed in the functions of this last-named organ.

Prostatic diseases also exert a great influence upon the genital organs. The intimate connections which exist between the gland, the seminal vessels, the spermatic ducts, and the testicles, perfectly account for this. The greater part of men affected with engorgement, or any other chronic disease of the prostate, experience a marked derangement in the reproductive functions; only it may not be so clearly and prominently manifested in all cases by symptoms fully appreciated by them. More frequently we will observe a considerable diminution of the sexual desires, or, of virile energy; the acts are repeated at longer intervals, and to the sensation of voluptuousness is added another, partaking of fatigue and labor. An indisposition, not previously observed, is experienced, a depression, which causes the person in many instances, to avoid the approach of a woman. The testicles are sometimes atrophied or growing smaller; sometimes soft and hanging low; occasionally, on the contrary, they become firmer and larger, but almost always more or less painful to pressure.

One of the most frequent causes of diseases of the prostate gland is the abuse of coition, and various analogous acts of the genital functions. It is undeniable that a licentious life, especially

among men of advanced years who desire still to keep up an excitation of the genital organs, is very frequently productive of prostatic enlargement. Indeed, most of the diseases of this gland are the result of venereal excesses.

Inflammations of the urethra, especially gonorrhea and the various runnings to which young men are so frequently subject during the first years of their manhood, also exert a great influence in the development of the various lesions of the prostate. Yet I have observed serious affections of this gland among persons who never had any gonorrhea, any runnings, nor any urethral stricture, and among very continent and very studious men.

Whatever may be the original cause of the prostatic disease, the patient's age will exert a great influence upon it. Among old men, the prostatic alterations are hypertrophy, abscess, excrescences, and productions which indicate a prolonged excess of nutrition. Among adults, diseases of the gland present special characters, they may coincide with affections of the seminal vesicles, they may be associated with excessive continence, or, they may depend upon the various acute diseases with which the genital organs may be attacked, particularly retentions of urine the consequence of obstacles in the urethral canal. Among old men, the mode of life and all the circumstances which concur more or less directly to determine the circulation to the inferior parts of the body, are to be regarded as powerful aids in bringing on prostatic diseases. Horseback riding, which sometimes determines hematuria and rupture of the veins of the neck of the bladder, may also contribute to the production of disease of this gland, especially when previous causes have occasioned a tendency thereto.

The little attention generally manifested toward establishing a correct diagnosis of the various and frequent diseases of the prostate, involves serious consequences, as, in the treatment of several other affections of the urinary apparatus; thus, we frequently see vesical catarrh, hematuria, incontinence of urine, and paralysis of the bladder, in which the resources of art prove powerless, and we may, as a general rule, safely attribute the persistency of the symptoms to a deep-seated and unknown lesion of the prostate gland. Fortunate indeed, will be the patient, if he has not been robbed of precious time, during which the affection has been placed beyond all known remedial measures, by hazardous and unskillful attempts at cure. The diseases, etc., of this organ are as follows:

Absent Prostate.—The prostate gland will necessarily be absent when the genital organs are not present; it may, however, be absent,

when the faulty conformation is less radical. Thus, in cases of exstrophy of the bladder it is by no means uncommon to find the prostate wanting; and its absence has likewise been verified among certain persons with whom the balance of the genito-urinary apparatus was present, and in a normal condition. These faulty conditions of the gland have been very rarely met with, and are beyond the resources of art;—the term "Congenital Atrophy," which has been applied to them, is not strictly correct, as we can not well conceive of the atrophy of an organ that has never been developed.

Double Prostate.—When there is a failure of the symmetrical union of the prostate during the process of development of the genital organs, the urethra may open inferiorly and the gland be separated into two distinct lobes, forming what has been termed a "double prostate." Art can effect nothing in such cases, which fortunately are by no means common.

Atrophy of the Prostate.—Atrophy of the prostate gland is of more frequent occurrence than the faulty conformations just referred to; it consists in a gradual wasting away of the gland, or of some of its elementary structures, so that the organ diminishes both in volume and weight. It may exhibit itself under several forms, as follows:

1. True or complete atrophy, involving all the constituent structures of the gland proper.
2. Atrophy involving only one of the elementary structures of the gland; or, a partial atrophy, in which the unaffected parts remain normal or stationary.
3. Atrophy of certain structures or portions of the gland, with hypertrophy of others.

The *causes* of atrophy of the prostate are various, and are principally comprised in the following list, viz.: Structural disease of the organ, as, tubercular deposits, malignant affections, ulceration or abscess, which, either by interfering with the nutrition of the gland, or by disintegrating more or less of its tissue, occasion a partial or complete wasting away; mechanical compression, as, bougies frequently introduced and retained for a long time; calculi in the bladder or deposited in the tissue of the gland; neighboring tumors or hypertrophy of the muscular fibers of the prostate, etc., either of which occasion considerable diminution both in bulk and weight, of the entire gland or of only certain portions of it, owing to the continued pressure which they exert upon it; certain diseases, which,

by their exhausting influence upon the general system produce atrophy of all the tissues of the body as well as of the organ under consideration; and lastly, senile atrophy, or that which is occasionally met with among aged persons, and which occurs independently of the preceding causes.

As a general rule, there are no *symptoms* which may be considered peculiar to simple atrophy of the prostate, and its discovery is more apt to be the result of chance than of any sufferings on the part of the patient; cases, have, however, been observed, where the patients were troubled with some derangement in micturition, or were partially or entirely impotent, and, in a few instances, very severe deep-seated pains were experienced. Ordinarily, the health remains but little affected, and the disease, when uncomplicated, presents no serious aspect.

If, in a case of atrophied prostate, a bougie be introduced into the bladder through the urethra, and a finger be also passed into the rectum, and pressure be then made with the finger upon the bougie, and parts around it, instead of finding the hard tissue of the gland, regularly widening outward on each side of the urethra, the parts will be found soft and yielding, and the bougie will be very readily distinguished. Should a catheter be introduced into the bladder instead of a bougie, it will be observed to enter the bladder rather suddenly, as it were, as soon as the instrument has passed the curvature of the urethra, and this, too, without requiring the operator to elevate its beak as must be done when the gland is hypertrophied. In many cases the urine will also be observed to flow as soon as the perforations in the catheter have passed the urethral curve, and which is due to the fact that in atrophy of this organ, the prostatic portion of the urethra is commonly very short and considerably dilated, while the membranous part may be reduced in length.

As to *treatment*, all that can be done will be to obviate the derangements that may occur in the function of micturition; nothing can be done which will restore the atrophied organ to its normal condition. However, should the atrophy be due to stricture, ulceration, tumors, etc., a successful treatment of the cause may be followed by more or less benefit to the affected gland.

CONTUSIONS OF THE PROSTATE.

From the position of the prostate, and its protection from external mechanical influences by the neighboring bones and the perineal

aponeuroses, it is rarely that contusions of the gland are met with. However, they do sometimes occur, and may be occasioned by a very violent blow or fall from a height upon the perineum, or a fall in which a small blunt body comes forcibly in contact with the perineum. Severe and long-continued horseback riding may also give rise to contusion of this organ, as well as the introduction of too voluminous bougies or catheters; it may likewise originate from the operations of lithotomy and lithotrity, especially when the calculus is very large, requiring the neck of the bladder to be dilated.

There is always an infiltration of blood, or a collection of it in a certain portion of the contused gland, the quantity of which depends upon the degree of the injury; and these sanguine effusions are supposed by some writers to be the commencing point of certain prostatic tumors, while others believe that the color of small blackish gravel sometimes observed in the prostate is due only to the coloring matter of the effused blood.

There are no positive symptoms for diagnosing a contusion of the prostate; but when the circumstances lead to a suspicion of this injury, we should administer *treatment*, which, from its promptness and efficacy, will lessen the chances for the future development of tumors, which are almost always difficult of cure. For this purpose, leeches may be applied to the perineum, or cupping may be substituted. Sitz baths as well as general baths will also prove useful. An infusion of St. John's Wort may be drank freely, and a portion of it may likewise be carefully injected into the prostatic portion of the urethra, several times a day. The following may also be rubbed, two or three times daily, over the rectal portion of the prostate, by means of a speculum (especially made for the purpose), introduced into the rectum, through which a curved probang holding some of the mixture may be passed up to the desired point: Take of Alcoholic Extract of Aconite one drachm, Alcohol q. s. to dissolve the Extract,—when dissolved, rub it up with one ounce of Glycerin. In a similar manner solutions or ointment may be topically employed, of Hydrochlorate of Ammonia, Conium, Stramonium, Iodide of Ammonium, and other resolvents, either alone, or in various combinations.

WOUNDS OF THE PROSTATE.

Wounds of the prostate may be divided into two classes, viz.: incised, and lacerated. In the former, the tissues are smoothly divided by a sharp-cutting instrument; the latter may include deep

or superficial punctures, either narrow or wide, straight or crooked, occasioned by a blunt body, as well as cases where the tissues of the gland, having been forcibly torn apart, present a wound with ragged and irregular edges. These wounds may be confined to only a single part of the gland, or they may involve it in several directions, and throughout its whole extent, and even pieces of the organ may be detached from it.

Wounds of the prostate may occur either from without inward, or from within outward, and, as just stated, are caused by blunt, pointed, or cutting instruments; in most of the operations for the removal of stone, this gland is cut or wounded to a greater or less extent, and rents of the prostate made by instruments (*lithotriptors*) frequently become fatal in a short time. It may also be wounded by a fall upon a somewhat pointed body, as upon the end of a pole, the pointed part of a chairback, upon the point of a knife, or similar objects; blows upon the part with pointed or cutting bodies, may likewise result in severely wounding this organ. Hard substances in the rectum, as fruit-stones, pins, gravel, fragments of bone, and the like, by causing ulceration or dividing the tissues above the sphincter, may also wound the prostate. When shot by fire-arms, the ball may pass through the pelvis and wound this gland. In the operation for puncture of the bladder, the enlargement of the prostate may be so excessive as to materially alter the relations of the pelvic organs, so that, at the moment of puncturing, the trocar will penetrate into the prostatic tissue.

Wounds from within outward are much less frequent than the preceding; they may occur in the course of operations on the prostate, or in the extraction of a large calculus, during which the gland is very liable to be torn, etc.—Perforations or false passages will be considered separately under the next head.

Whatever may the extent of the incision in the prostate, the lips of the wound generally remain in contact, and are seldom separated or slightly gaping; the principal causes of this are the various aponeuroses which surround the gland, together with most of its anatomical conditions. And if to these physical conditions we add the physiological ones of contraction and vascular congestion, we may readily comprehend why solutions of continuity, produced during life, should have so little tendency to separate or gap.

There are certain *symptoms* indicating the presence of wounds of the prostate, as the flowing of urine,—semen, or blood, and which fluids may escape through the external wound, the rectum, or the urethra; in the latter instance, it may occur under wholly different

conditions, and we will then have to observe the character of the symptoms in order to determine the diagnosis.

When the wound is through the perineum, the flow of urine will afford a sufficiently exact indication. If the urethra alone is involved, the urine will flow through the wound only when the patient expels it voluntarily. If the prostate be divided, the urine will escape through the wound from the commencement of the vesical contraction, and will continue to flow through it for some moments after it has ceased passing through the meatus. If the wound extends so as to involve the neck of the bladder, the urine will be constantly escaping in spite of all efforts on the part of the patient to the contrary.

The escape of semen will furnish less certain indications; beside, it passes from its reservoirs only at more or less distant intervals. If the seminal vesicles empty themselves, we may discover the spermatic fluid on the linen applied over the surface of the wound, and then we may diagnosticate with certainty that the ejaculatory canals are wounded. And in order that we may not confound this fluid with the prostatic liquid, it should be examined under a microscope having at least three hundred diameters.

If the wound be inflicted through the perineum, in addition to the escape of urine, semen, or blood from it, we may, in many instances, confirm the diagnosis, by feeling the wound in the gland by means of a finger.

If the wound be through the rectum, the same indications will be present. But when it has occurred through the hypogastrium, we can only point out the constant flow of blood through the meatus urinarius; and even this indication may be wanting, because the blood may pass into the bladder, or it may continue to flow through the urethra for so short a time as to lead us to mistake it for only a wound of the bladder.

Wounds of the prostate may be *complicated* with hemorrhage, which, although of frequent occurrence, generally ceases without the assistance of art. Phlebitis is also a very frequent accompaniment of these wounds, and which very likely is the cause of the death of most of the old men who have undergone the operation of lithotomy. Obliteration of the ejaculatory canals may be a consequence of these wounds, especially in the operation of lithotomy by the method of Mariano, or Apparatus Major; and which is a serious accident to a young man or an adult. Finally, wounds of the prostate may be accompanied with inflammation or suppuration of the organ.

Ordinarily these complications are not present; if the wound

be effected by a cutting instrument, the surfaces swell, and, coming in contact with each other, prevent the urine from any longer escaping through the divided parts. In lithotomy operations where the prostate is cut into, we frequently observe the wound to close toward the fifth day. So that in simple wounds it is very seldom that a fistulous opening remains.

But when the wound is a contused or lacerated one, in which the tissues are torn apart or present a loss of substance, the case is different. There may be such violent pains and so great a degree of prostration, as to endanger the life of the patient; and should he survive the injury there will probably be a lengthy period of suppuration, followed by a very troublesome urinary fistulous opening.

The *treatment* of these injuries will be given under the following head:

PERFORATIONS OR FALSE PASSAGES IN THE PROSTATE.

These are true contused wounds, and may be produced purposely, as in cases of forced catheterism, but they are more frequently the result of imprudence or unskillfulness, and are much more liable to occur when the prostate is hypertrophied or softened.

Perforations of the prostate have been divided into incomplete, complete, simple, multiple and complicated. They may occur in all directions, above, below, or at the sides; the most frequent are met with at the sides, the most infrequent above or in the upper portion of the gland.

Incomplete perforations consist either in a simple abrasion, or a furrow formed on the surface of the gland, or, in a hollow canal made in the thickness of its tissue. Complete perforations pass entirely through the tissue of the organ in any of its diameters, causing the urethra to communicate with the rectum, with the cellular tissue of the pelvis, or, with the interior of the bladder, by a second collateral canal, the length of which is susceptible of many variations. Multiple perforations or false passages are frequently presented, and are quite common among old men who are in the habit of introducing the catheter into their urethræ themselves. Complicated perforations are those in which the urethra is made to communicate with the rectum or with the bladder; but, in the last instance, by a different opening from that which naturally leads to the neck of the bladder. These various forms may occur separately, or two or more of them may be found existing at the same time in the same person. Sometimes small calculi or gravel engage

in the prostatic portion of the urethra, producing a distension of the mucous membrane at that part, and terminating by hollowing out an excavation into the substance of the gland, producing symptoms that may require prompt remedial treatment.

The *symptoms* of false passages in the prostate are not well marked; indeed it is almost impossible to detect them except by an exploration of the prostatic portion of the urethra, and even then we may not always be successful. The hemorrhage, pain, and sense of laceration, which are more commonly present, are valueless as diagnostics. When a false passage exists in the prostate, and the perforation is not complete, either on the side of the rectum, or on that of the surrounding cellular tissue, if we pass a catheter or bougie, it will almost invariably engage in this artificial orifice, and will not reach the bladder; we feel an obstacle to its further advance. This is all we have upon which to base our diagnosis; because, the hemorrhage which accompanies the withdrawal of the bougie may be due to several other causes,—and even the obstacle that we have detected may itself be a bridle, a fold of membrane, a tumor, etc., instead of a false passage. However, if the engaged extremity of the instrument can not be turned from right to left, and if the resistance to its farther advance be great, we will be justified in diagnosing a false passage; and more especially if, immediately previous to meeting with the obstacle, the bougie suddenly slipped from its position, with an accompanying rough or grating sensation, and the stem of the instrument assumes a direction not coincident with that of the canal. Again, if the false route is found to be at a greater distance from the meatus urinarius than five and a half inches, and if a finger introduced into the rectum feels that the bougie is separated from the walls of this intestine by merely a slight thickness of tissue, these are still additional indications of a false passage.

Incomplete perforation is less serious, all things being equal, than complete, because the tissue of the prostate is less susceptible of inflammation, and is not readily infiltrated with urine. An incomplete false passage may be eventually obliterated; or it may remain as a diverticulum, which, if it be large, will necessarily receive some of the urine, and thus favor the development of prostatic calculi.—Among complete perforations, those which reach into the bladder have been considered the least serious; from which fact, forced catheterism or puncture of the bladder through the prostate, has, in certain difficulties, been recommended and successfully performed by several eminent surgeons.—As to the perforations which communicate with the bladder through the cellular tissue surrounding this organ, they are almost invariably followed by infiltration of

urine. The greater part of the wounds made in the prostate gland by incision, or by tearing it, no matter what instruments occasion them, are cured with much facility. We have the proof of this in the various operations of lithotomy performed by the perineal section, as well as in the results produced by catheters and bougies unskillfully introduced, and by the hazardous employment of some of the instruments used in lithotrity. These facts are so numerous and so conclusive that we can not doubt the power of the resources which nature displays in like cases. Nevertheless, there are some exceptions, and it is by no means rare to see wounds of the prostate degenerate into abscesses and ulcers, terminating in the total destruction of this gland, and even in death. We can readily comprehend the irritating and injurious effects arising from the flow of urine over these wounded parts.

No special medication is required when wounds and perforations do not open into the urethra. If they open into the rectum, the bowels must be kept free to prevent the accumulation of fecal matter. Prostatic fistula has not been observed as a consequence of these lesions.—When the wounds communicate with the urinary passages, catheterism must be frequently repeated, and means be adopted to protect the wound from the contact of urine; when the wound opens at the same time into the urethra and the bladder, the same course may be pursued.

If the wound be purely urethral or vesical, there will be no necessity for the employment of the catheter; it will be better to regulate the diet and regimen of the patient, and administer emollients and other agents to keep down inflammation.

CHRONIC INFLAMMATION OF THE PROSTATE.*

Chronic Prostatitis has been entirely ignored by many medical writers, and more, probably, from the fact that attention is not

* Although not included in the plan of the present work, it has been deemed advisable to make some reference to the *Acute form of Prostatitis*, the anatomical characters of which have not been sufficiently based on observation. Acute inflammation of the prostate is an affection of adult age, and is more commonly the result of gonorrhea. Thus, an inflammation of the mucous membrane of the urethra may extend along the whole canal, and affect not only the prostate, but even pass beyond to the bladder, ureters, and kidneys, according to the same law which admits, for instance, of the extension of an inflammation of the nasal mucous membrane to the throat, bronchi, and even to the lungs; the inflammation progressing from without inward, and not from within outward.

If a person having gonorrhea, is suddenly taken with frequent desire for urinating, accompanied with sensations of weight and pain about the perineum and

generally called to it, until it has resulted in some one of the forms of prostatic disease in advanced life, than from any other cause; and

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anus, and perhaps succeeded by a retention of urine, these are undoubted indications that the urethral inflammation has reached the prostate; at this period there may also be inflammation of the testicle, due to an extension of the urethral inflammation to and beyond the prostatic region, and not to a metastasis.

Among the other causes that may give rise to acute prostatitis, are, unskillful attempts to pass a bougie or catheter into the bladder; the operation of lithotrity to remove calculi from the neck of the bladder; the injection of irritating fluids; cauterization; inflammation of the bladder; sitting upon cold and damp places, especially when the body is heated; and any mechanical violence done to the parts.

Other causes have been named by writers, which, although they may occasionally induce the acute form, are, however, more apt to give rise to the chronic form of prostatitis, as, the improper use of cubebs, copaiba, oil of turpentine, cantharides, alcoholic drinks, excessive masturbation, excessive sexual intercourse, and urethral stricture. Riding on horseback, obstinate constipation, drastic purgatives, falls or blows upon the perineum, piles, irritation of the rectum, and sedentary habits, have likewise been named by writers as causes of prostatitis, but it is very doubtful whether any of these have ever occasioned it in the acute form, and very seldom even in the chronic form unless there were already existing a tendency to this affection.

Acute inflammation of the prostate may be limited to the mucous membrane of this gland; it may be seated in the prostatic ducts; or the whole organ may be affected.

The *symptoms* of acute inflammation of the prostate, when the mucous membrane only is attacked, are, frequent desire to urinate with some pain in micturition, and a sense of weight and fullness about the perineum, eventually followed by a muco-purulent discharge from the urethra.

When the body of the organ is affected, symptoms similar to the above are present at the commencement, but they soon become more intense, and an examination per rectum will detect a certain degree of sensibility in the gland. The sense of weight and fullness extends to the anus; the pain, at first dull, becomes more severe, lancinating, and throbbing, and is accompanied with a sensation of heat; fever establishes itself, and all the symptoms of a general reaction rapidly manifest themselves. Motion of the limbs or of the body, or a sitting posture, is more or less painful. An evacuation of the bowels is productive of so much suffering, that the patient will retain his stools as long as possible in order not to increase his distress. The voiding of urine is yet more painful; the desire to urinate increases rapidly and becomes more permanent, until a true vesical tenesmus is established. The urine passes in a small stream, then drop by drop, with much straining on the part of the patient, and as it is voided it causes so much heat, burning, and pain at the neck of the bladder as frequently to compel the sufferer to cry out aloud. It is not uncommon to observe a retention of urine complete the symptoms.

In connection with these symptoms, there will frequently be more or less pain in the back, loins, and thighs, also in the glans penis; a constant desire to stool; the body will be flexed forward, as is usual in acute attacks of any of the abdominal viscera; the urine will be high-colored, and, on standing, deposit a sediment in which pus, or a muco-purulent matter may be seen under the microscope.—

yet it is well known that a violent attack of gonorrhea, affecting this gland, may terminate in a gleet which will continue uncured

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If an attempt be made to pass a finger into the rectum, it will cause the patient much pain; but when introduced, the prostate will be felt hot, swoln, and very painful upon pressure. If a catheter be passed into the urethra, it will give rise to severe pain when it reaches the prostatic portion, which it will traverse with more or less difficulty, or, perhaps, it will be completely arrested at this point.

Acute prostatitis is rapid in its progress, generally passing through all its stages in from eight to ten days. In its mildest form it may terminate by resolution or by a plastic exudation often passing without being observed by either the patient or physician.—When the inflammation has attacked the prostatic ducts it generally progresses less rapidly, and more commonly terminates by induration. It may pass into a chronic form of the disease. Engorgement or hypertrophy of the prostrate is more ordinarily the result of this variety of prostatic inflammation.—When the prostatitis is phlegmonous, suppuration is almost inevitable; and it may even prove fatal.

Whatever may be the form and the degree of the inflammation, it may terminate either by resolution, by induration, by ulceration, gangrene, or suppuration, or, it may pass into a chronic state.—If there be a subsidence of the symptoms, the desire for urinating becoming less frequent, and the pain gradually disappearing, with a more natural flow and appearance of the urine, the attack is terminating by resolution.

If the symptoms obstinately continue, the gland remaining swoln and painful upon pressure, for an unusual length of time, it is terminating by induration.—The termination by ulceration is very rare, and the symptoms indicating it will be explained under the head of Ulceration of the Prostate.—The termination by gangrene is occasionally observed, and is apt to be the result of constriction or a kind of strangulation produced by the presence of calculi in the tissue of the prostate itself, or by tumors.

When the case is complicated with symptoms of peritonitis, with tympanitic abdomen, nausea, vomiting, frequent ejaculations, with purulent, or bloody semen, or both, very small and quick pulse, very violent pains, and shrunken countenance, it is very probable that the disease has terminated by abscess which will prove fatal.

In forming our *diagnosis* of this disease, we must bear in mind that it may be confounded with acute inflammation of the bladder, and with stone in the bladder. If the inflammation affects the *neck of the bladder*, there will be frequent desire to urinate, with pain in passing the urine, but never to that degree common to prostatitis. Besides, an examination per rectum will fail to detect a swoln and painful condition of the prostate, when the bladder only is inflamed.

In *stone in the bladder*, we may have dysuria, the same as in prostatitis; but, by changing the position of the patient, resting him upon his knees and elbows, so as to place the calculus against the anterior face of the bladder, and thus free the vesical orifice of the urethra, he will pass urine very readily; in the prostatic inflammation, change of posture does not overcome the difficulty of urinating. In fact, a position such as the above, would be very apt, in prostatitis, to check the urinary flow completely, on account of the compression of the prostate and the neck of the bladder occasioned by the contraction of the diaphragm and abdominal muscles.

The *morbid anatomy* of simple uncomplicated acute prostatitis in its first stages

until the chronic inflammation succeeding the acute prostatitis, and which keeps up the gleet, has been overcome.

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has rarely, if ever, been observed. Post-mortem examinations are rarely had until at a greater or less period from the subsidence of the active symptoms. The gland is usually found firm and considerably swoln; the mucous membrane is of a deeper tint than in the normal state, as well as the tissue underneath it. The mucous membrane will sometimes not only be redder than usual, but thicker and soft like velvet; or it may be found ulcerated, or attacked with gangrene, but these conditions are present only when the inflammation has been violent, obstinate, and of considerable duration. The blood-vessels running along the external part of the organ contain dark-colored blood. Upon pressure, after having made an incision, the gland discharges a muddy, reddish mixture of blood, serum, effused lymph, prostatic fluid, and a small amount of pus. If the inflammation has reached a more advanced stage, the pus, which is of a sticky, viscid character, will be present in greater quantity; and, at a still later period of the disease, small abscesses will be discovered in various parts of the prostate, with more or less grumous blood. Softened or even gangrenous portions of the organ may also be present; conditions, which will be referred to hereafter.

In the *treatment* of acute prostatitis, if the attack be very violent, resisting the baths, narcotic cataplasms, Gelseminum, etc., it may become necessary to apply leeches around the perineum and anus, varying in number from twelve to twenty according to the constitution, the age of the patient, and the intensity of the inflammation. These may be succeeded by a hot hip bath, which should be used in all cases whether leeches be applied or not, and which may be repeated as often as required during the treatment of the disease; the bath being at a temperature of from 98° to 105° F., and the patient remaining in it for a period not to exceed six minutes at a time, the design being to relax the cutaneous vessels, without determining a flow of blood to the parts and subsequent persistent congestion. In many cases, the Spirit Vapor Bath, will have a very beneficial influence, in consequence of the general diaphoresis it occasions, and the more equal circulation established in the blood-vessels.

After the bath, warm fomentations or cataplasms should be applied upon the perineum, and kept there during the intervals between the bathings, frequently renewing them; these may be composed of Stramonium, Belladonna, Hyoscyamus, Lobelia, Hops, etc. The fresh leaves of Stramonium pounded to a pulpy consistence, and then moistened with hot water, should be preferred whenever they can be procured.—(Hypodermic injections of Muriate of Morphia, in solution, into the tissues around the perineum, will sometimes prove valuable.)

The bowels should be evacuated at as early a stage as possible by emollient injections, repeating them occasionally whenever required, if the sufferings of the patient be not so great as to prohibit the repetition. Small injections, however, of anodyne solutions, not to exceed an ounce in quantity will be found very serviceable in arresting the more violent symptoms; a mixture of from two to four grains of Alcoholic Extract of Belladonna in half a fluidounce, each, of Water and Glycerin, forms a very efficacious injection, and which may be repeated according to indications every six or eight hours. In order to be more effective these anodyne injections should be retained within the rectum as long as possible; they will also aid in relieving the painful rectal tenesmus, when this is present. Anodyne suppositories will also effect a similar beneficial result.

As to internal medication mucilaginous drinks, to which some tincture of

The structure of the prostate is such, that if it be attacked by inflammation, this will not manifest a very prompt tendency to

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Opium, of Belladonna, of Aconite, or, of Veratrum, etc., is added, have been recommended, and also employed with advantageous results. I have obtained most decided and prompt benefit from the internal use of the Tincture of Gelseminum, given in doses of from twenty to sixty drops, repeated every hour or two, until the specific effects of the medicine were produced, and then maintaining this condition for several hours. Indeed, as the prostate is more of a muscular than a glandular organ, this effect of the Gelseminum might have been anticipated, as it appears to exert its power upon the muscular system more especially. In very violent cases, a few drops of the Tincture of Aconite may be added to each dose of the Gelseminum. The diet must be of a mild, mucilaginous character, avoiding all food and drinks of a stimulating character, or which will produce an irritating urine.

After the severe symptoms have abated, it will still be necessary to continue treatment, in order to guard against induration, enlargement, or chronic inflammation; and this treatment may be required for a period of six or eight weeks. The patient should continue the use of mucilaginous drinks, the occasional employment of rectal anodyne injections, and the use of the Spirit Vapor Bath, weekly; the bowels and bladder should not be allowed to remain distended with their contents, though it will frequently be found as difficult to pass a catheter into the bladder, for a shorter or longer time immediately after the active symptoms have abated, as while during their presence,—too much care and circumspection can not be taken in the introduction of this instrument, which may give rise to serious results in the hands of a rash or unskillful practitioner; the diet should be light and nourishing; active exercise, as well as sexual intercourse, should be positively prohibited; and every means be used to strengthen the general system, and to reduce the prostate to its normal volume, as it is exceedingly apt to continue enlarged for some time after having been attacked by inflammation.

In phlegmonous prostatitis, where pus is formed in the prostatic tissue, it may be recognized by the finger when introduced into the rectum; the fluctuation is so manifest that it can not be mistaken. I have witnessed cases where, from the favorable pointing of the abscess, an operation with the knife, through the rectum, had been decided upon; but, the physicians having been persuaded to postpone the operation, and make use of very thick emollient injections into the rectum, the abscess speedily ruptured spontaneously, the pus was discharged through the anus, the previous difficulty of urinating ceased at once, and the patients were soon cured.

Several cases of similar collections that opened spontaneously into the urethra or into the rectum, have been related by authors; but these abscesses have no relation with those that are developed at the perineum, or in the parts which are near the canal of the urethra and the anus. These last require to be promptly opened, without waiting for the fluctuation, and the incision brings away only a sanious and bloody matter. Experience has shown that these collections, at first circumscribed, manifest themselves under the form of a renitent tumor and without severe pains, and that, if we do not open them at an early period, the inflammation may suddenly become greatly extended, progress very rapidly, giving rise to serious symptoms, among others a communication of the abscess with the urethra, bladder, or rectum, and the evil is then beyond the resources of art.

resolution, but will continue for an indefinite period. And it is often the case that the treatment of the acute disease is too soon abandoned, and the hyperemia not having been sufficiently combated, there remains in the gland a constant cause which keeps up a low grade of inflammatory action. Again, an acute inflammation just on the point of disappearing, may be considerably augmented with a tendency to a morbid persistence, by the patient fatiguing himself, performing coitus, or committing some excess at the table.

This termination of acute prostatitis occurs more readily with lymphatic persons, and those who are subjects of rheumatism and scrofula. Sometimes, especially among feeble persons, suppuration will advance rapidly, notwithstanding the active employment of antiphlogistic measures; the inflammatory congestion is soon dissipated, but the little purulent collections provoke and keep up around them, for a long time, an inflammatory or irritant action that will remain until the pus has disappeared by absorption, or by evacuation.—Chronic prostatitis may be primary as well as consecutive, and in either case will present similar symptoms and pathological characters, requiring similar treatment.

One of the most common *causes* of chronic prostatis is gonorrhea; but it may also be occasioned by exposure of the adjacent parts to cold and damp; by excessive venery; excessive masturbation; stone in the bladder or prostate; long-standing urethral strictures; inflammation of the neck of the bladder; and by the imprudent or unskillful introduction of instruments through the prostatic passage.

Although certain tumefactions may owe their development to a previous inflammation of the prostate, the same as may be recognized for the origin of certain forms of atrophy, yet neither this hypertrophy, nor this atrophy, constitute chronic prostatitis. The hypertrophy and the atrophy are due to an increase or decrease of the healthy constituents of the prostate, the enlargement, rarely if ever, attracting attention previous to the fiftieth or sixtieth year; while the enlargement from inflammatory action is owing to the presence of lymph, pus, and other morbid products which have been effused into the structure of the gland, and which condition is more commonly met with between the ages of twenty and forty-five.

The first noticeable *symptom* of chronic prostatitis, whether this be primary or consecutive, is, a more frequent desire to urinate, and with less ability to resist the calls than previously; the urine, at first, will pass naturally as to color, stream, and character, but will

be expelled with less force; as the disease advances there will be a slight burning or pain at the commencement, or at the end of urination, more generally the latter, but this symptom is not always present. A sense of weight will be experienced in the perineum and at the anus, and sometimes transient or persistent dull pains; an itching or tickling sensation in some part of the urethral canal, generally in the glans penis, is frequently complained of. Not unfrequently there will be heat in the parts, sudden twitching pains, dull pains in the loins and thighs, and a sense of fatigue after coition. There may also be an almost imperceptible oozing of a transparent, viscous substance from the urethra, which imparts slight stains to the linen in contact with it; a drop of this fluid is generally more apparent in the morning; or, it may merely glue together, as it were, the lips of the external orifice of the meatus urinarius. This, however, may be produced by other causes.

If the prostatic ducts are involved in the chronic inflammation, there will, from time to time, be discharges of the prostatic liquor either spontaneously, or while straining at stool, or after urinating; these discharges have frequently been mistaken for spermatorrhea, but may be determined by an examination under the microscope. Spermatorrhea, or an abnormal discharge of semen, may be known by the numerous spermzoons or moving filaments observed in it; while the fluid of prostatorrhea or prostatic catarrh, presents a homogeneous liquid of mucous consistence, with numerous granules of a fatty aspect, having brilliant, yellowish centers, with dark outlines, to which it partly owes its whitish color. Beside, more or less numerous grayish molecular granules will be observed; prismatic or pyramidal epithelial cellules, more or less regular, but not very numerous, and some of which will contain vibratile cilia. These cellules sometimes inclose fatty granules around their nucleus; and, with some patients, reddish granules presenting all the characters of hæmatin. In the latter instance, some of these reddish-like granules will be seen floating in the liquid.

If the ejaculatory ducts are involved, there may be nocturnal emissions, loss of sexual desire, or of sexual power, and too premature a discharge of semen on attempting coitus, with more or less impairment of the general health; these symptoms are more common to masturbators and persons who have committed sexual excesses; but, it must be recollected, that they may also be due to disease of the cerebellum and spinal marrow, especially when these exist as complications with the prostatic disease.

More commonly chronic prostatitis remains stationary, or at all events, the patient experiences no very acute sufferings. The urinary and genital functions continue to be performed sufficiently well, so that sometimes, much to his detriment, he forgets or overlooks his disease. Patients laboring under this malady should always be notified that they are constantly liable to serious symptoms, especially when they commit any imprudence or excess that may arouse the apparently torpid inflammation into a more or less acute affection of the organ, with prostatic irritation, retention of urine, suppuration, abscess, and, sometimes, death.

The *morbid anatomy* of chronic prostatitis, has not received the same degree of attention as that of other parts. Prostates which have been for a long time the seat of chronic irritation, are usually augmented in size, occasionally diminished, and often form adhesions with some of the surrounding tissues by means of a denser substance than is customary. The mucous membrane is pale, ash-colored, or, somewhat livid, thickened, and spongy; sometimes, it will be observed much thinner than natural and more vascular; again, it may present a rough, opaque appearance at certain points, from deposits of lymph more or less organized.

The prostatic ducts will be found thicker, more voluminous, and of a firmer tissue than in the normal state, generally having their orifices dilated, and their cavities filled with an opaline, lactescent fluid, thick, but not mucus, rather purulent, and which may be traced within the bladder, where it has emptied itself by a retrograde movement; sometimes pus will be found in the sinus pocularis. The cellular tissue of the diseased gland will vary, sometimes being of greater density and cohesiveness than natural; at others, being found less firm, and having more of a spongy consistence, and, when cut into, the incised surfaces present a dark appearance, and, when the parts are strongly squeezed, yield considerable quantity of a dark fluid. One or more abscesses may also be present either in the diseased gland, or in some of the adjacent tissues.

As to the *treatment*, much will depend upon the degree of the inflammation, and the peculiar tendencies of the system. In recent cases, and especially when consecutive upon the acute form, the continuation of local and general measures to allay the inflammation, followed by emollients, a proper attention to diet, and an avoidance of all excesses, will be sufficient. And, in all instances, should there be great difficulty in urinating, the catheter should be employed as often as may be required. If, after a sufficient use of these means, the prostate still continues enlarged, it will be

proper to administer agents that will promote absorption of the effused matters, as Iodide of Potassium, Iodide of Ammonium, Bromide of Potassium, etc., together with the means named below.

When the disease is primary, it will very rarely be presented to our notice, until it has been in existence for several years; in such cases, our treatment must be more active, and every means must be employed to reduce the enlargement, and restore the gland to its natural size. For this purpose, in addition to the internal use of the iodides and bromides above named, they must also be employed locally, bringing them in contact with the gland both by the urethra and by the prostatic portion of the rectal walls, either in the form of fluid injections, suppositories, or ointments. Thus, as a fluid preparation, the following may be used: Take of Iodide of Potassium two grains, Extract of Belladonna five grains, Glycerin half a fluidounce; triturate thoroughly and strain. As an ointment, the same quantities may be used, substituting Simple Cerate for the Glycerin. These preparations are to be applied by means of instruments especially prepared for the purpose. We must not confine ourselves simply to these formulæ, but, if necessary, avail ourselves of the action of Bromide of Potassium, Iodide of Ammonium, Hydrochlorate of Ammonia, Chloride of Zinc, Stramonium, Conium, etc.; and, in many cases, the addition of Strychnia, or of Sulphate of Quinia to the mixture, will be followed by the most favorable results.

Suppositories composed of from two to five grains of the Iodide, or Bromide of Potassium to eight or twelve grains of Simple Cerate, and introduced into the rectum every night, have been highly recommended. Other suppositories have also been found useful, as Butter of Cacao six parts, Spermaceti one part, Powdered Opium one part; mix. Or, instead of the Opium, one part of Extract of Belladonna may be added; or, Sulphate of Morphia one-half to two-thirds of a part, with six parts of Extract of Conium; or, Opium two parts, with Extract of Conium six parts, etc. Each suppository must weigh about eight or nine grains. From the formulæ given, the practitioner can form an idea of the character of the remedies to be used, as well as of their general method of preparation; they will often require to be changed, as there is no specific remedy for this malady.

Cool or tepid sitz baths taken at least once a day, for ten or fifteen minutes each time, are also useful as a local measure. Anodyne plasters to the perineum frequently answer an admirable purpose, especially in recent or mild cases; while again, other cases, which are very obstinate or of long standing, will require counter-

irritation, as the constant or intermittent use of the Croton Oil Liniment, or of the Compound Tar Plaster, upon the perineum. The bowels should be kept regular but without active purgation; retention of urine should be overcome as soon as possible by the catheter; the whole surface of the body should be frequently bathed, and once in every week or two a Spirit Vapor Bath should be administered. The digestive powers should be sustained by tonics; the diet should be light, unirritating, and nutritious; coition and exercise should be avoided, as well as horseback riding, or too long sitting at a time. The character of the urine as to alkalinity, excessive acidity, etc., must be watched, and means be taken to keep it in as normal a condition as possible.

If the patient be scrofulous, suitable remedies may be conjoined with the others; if rheumatic, preparations of Cimicifuga, Caulophyllum, Senecio, Aletris, Iris, Chloride of Propylamin, etc., will be indicated, in conjunction with the other means; if feeble and anemic, preparations of Iron, as the Tincture of the Sesquichloride, Hypophosphites, etc. It may be proper to remark here, that in obstinate and long-standing cases, I have advantageously employed currents of electro-magnetism, and of galvanism, passing them through the gland by means of instruments expressly made for the purpose, one of which is to be introduced within the urethra, the other into the rectum. These currents should never be strong, but always of moderate power.

Cauterization has been recommended by Lallemand and other writers, and may have proven beneficial; I used it in my earlier practice, but with little or no success, frequently increasing the difficulty; of late years I have dispensed with it altogether in this disease.

When the chronic prostatitis is due to strictures of the urethra, calculus in the bladder or prostate, or to other diseases of proximate organs, the cure of these maladies will most commonly be followed by a disappearance of the prostatic inflammation. (*See Gleet, Stricture, Spermatorrhea, and Retention of Urine.*)

TUBERCLE OF THE PROSTATE.

Tubercle of the Prostate may occur under three conditions, viz.: 1st, in connection with general tubercular disease, as manifested by tubercles in the lungs, mesentery, etc.; 2d, in connection with tubercle of some of the urinary or reproductive organs, as the kidneys, ureters, or testicles, etc., and of which it may be either the starting point or the termination; and 3dly, it may exist

when all the other organs of the system do not show the least vestige of the disease. Some writers have divided these tubercles into *simple* or *benign*, and *malignant*.

As in tubercle of the lungs, that of the prostate may be met with in the state of crudity, softening, and of liquefaction, following, consequently, the same evolution as when in the other organs. The glandular tissue of the prostate is the first invaded by tubercle, and it is not until at a later period that the fibrous, muscular, and other tissues become involved in the degeneration.

At the commencement of the disease the tubercular formations appear to be more frequently met with on the urethral surface of the prostate; and instances are on record where this surface had undergone material alteration from softened tubercle, while the rectal surface presented no alterations at all appreciable to the touch. Yet, notwithstanding, it is by no means uncommon for the tubercle to commence in the center of the gland. Again, the two lobes of the gland are almost always attacked simultaneously, or, if one lobe is first invaded, the other very soon afterward becomes so likewise.

The *symptoms* which are common to tubercle of the prostate, as, frequent desire to urinate with pain in micturition, dysuria, sometimes retention of urine, blood in the urine, pus in the urine, pains in the back, loins, and pelvic region generally, debility, emaciation, etc., are of themselves of but little value in the diagnosis, as they may be due to calculus, or other genito-urinary malady; yet, if in connection with them, tubercles are suspected or discovered in the lungs, then they may prove of some assistance in determining the condition of the prostate. And if hemorrhage manifests itself during the intervals between urination, or is mixed with the semen in greater or less quantity, we will have strong grounds for believing that the flow of blood is due to prostatic tuberculosis.

The most important symptoms for *diagnosis* are the anatomical; catheterism may detect a slight swelling at the neck of the bladder, but this sign is not of much value, as a prostate affected with tubercles is not increased in size, or, at least, if there is any increase, it is inconsiderable. The examination per rectum affords the greatest aid in forming a diagnosis, for by it we can palpate the prostate and recognize its volume and consistence. When the finger is carried within the rectum, no very manifest augmentation of the size of the gland will be discovered; but if pressure be made with the extremity of the finger upon the rectal surface of the prostate, we will feel either a hard nucleus in the center of the gland, or softened points by the sides of others which are harder

and deeper, forming so many purulent centers. To be more certain, the examination should not be limited to the inferior part of the gland; the hand should be strongly pressed upon the perineum so that the end of the finger may be enabled to reach the base of the organ, at which point tubercle often begins. An incomplete examination might lead us to diagnose an inflammation of the neck of the bladder, or a neuralgia. It will also be proper to observe whether one or both testicles is swoln, indurated, with little knots or protuberances disseminated along the deferent canal or the epididymis, and if, with these, the patient complains of pain of the bladder, tenesmus, etc., we have certain indications of an invasion of the prostate.

Everybody knows the almost invariable fatal termination of tubercle of the lungs; that of the prostate progresses in a similar manner. Once seated in the prostate, tubercle undergoes its transformations, destroys the organ and ends by sooner or later effecting disastrous results. If tubercles co-exist in the lungs, those in the prostate may not run through all their phases. If the fatal termination is prolonged, the tuberculous centers soften, furnish a suppuration which discharges itself outwardly, and develops a new series of phenomena which will be studied hereafter; in this case, the prognosis is doubly serious, because of the constitution which is constantly forming or feeding the tubercle, as well as because of the local condition of the organ, which may of itself cause death by some great derangement in micturition.

If the tubercle becomes cretaceous, as it may, when the lungs are healthy, the progress of the disease will be less rapid and not so serious in its character.

Post-mortem examinations have found tubercle in the prostate, in the seminal vesicles, and in the testicles. The vas deferens and seminal vesicles, are often thick, hard, and crackle under the scalpel, and present ulcerations and tuberculous cavities upon their walls, while their canal is obstructed by tuberculous matter. Sometimes the walls of the bladder will be hypertrophied, especially in the prostatic region, the mucous membrane more particularly. Parts of the prostate and adjacent organs may likewise be completely destroyed from tuberculous ulceration, forming cavities of various sizes. Sometimes, the urethra will also be found involved in the disease.

The prostate will be found studded with more or less numerous tubercles in a miliary state or in more voluminous masses, the smaller ones resembling small, yellowish points, the others being rounded and of a cheesy consistence; at a more advanced stage,

these tubercles soften in the center, and ultimately pus is discharged from them, with more or less destruction of the tissues immediately surrounding them.

If a minute examination be instituted, it will be found that the fibres of the cellular tissue, and the muscular fibres of organic life which accompany them, can not be so readily separated as in the normal state; they break much more easily. There appears to be an amorphous matter interposed between these elements, which obstructs the examination and renders their outlines less distinct. But the presence of numerous fine granulations, will be very manifest; some of which will be grayish and soluble in acetic acid; the others, yellowish, insoluble, and distributed throughout the substance of the gland.

The tuberculous matter escaping from the prostate is of a yellowish white color, rather whiter and less yellow than softened tubercle, and, unlike this, is viscid. Placed in water, some of it will mix with the fluid, the other portion will remain intact. Under the microscope, that portion taken up by the water is found to consist of an amorphous, very granulous matter, the granules being very fine and of uniform size. The other consists of large corpuscles, from .0024 to .0042 of a line in diameter, somewhat polyhedric, with irregular outline, and very fine granules distributed throughout, but no nucleolus. These corpuscles become paler and clearer by acetic acid, without being dissolved, and more distinctly present a nucleus or nucleolus.

The *treatment* of tubercle of the prostate, like that of tubercular consumption, can only be palliative. The various means recommended for tubercles in other parts may be employed in this affection, as preparations of Iodine, Iron, strengthening tonic regimen, Iodine baths, sea-bathing, nutritious but properly selected diet, exercise, residing in the country, etc.; certain preparations may also be made to act upon the gland through the rectal walls, as Iodide of Ammonium, Iodide of Potassium, etc., with a view of at least postponing the fatal period, for, a cure may be considered as almost, if not entirely, impossible. Every means should be used that will strengthen and invigorate the system; avoiding coition, and the introduction of instruments, of whatever character, into the urethra. Pains should be combated with anodynes and sedatives; nervous irritability by nervines and antispasmodics; weakness by tonics and nourishment; and so on, as the various symptoms develop themselves combating them by the appropriate remedies. Very fortunately, tubercle of the prostate is an extremely rare disorder.

ULCERATIONS OF THE PROSTATE.*

Ulceration of the prostate may occur upon the rectal or perineal surface of the gland, or, upon its urethral surface. In the first instance, the ulceration is generally the result of some disease in the surrounding tissues, which has extended to the prostate, the ulceration of which gland is an epiphenomenon of some other disease. Indeed the prostate does not appear to be susceptible of primitive ulceration.

Ulcerations of the urethral surface of the organ, may be of greater or less depth, and may be situated either upon the right or left side, near the membranous portion of the urethra, or near the bladder; sometimes, even upon the apex of the trigone; but more frequently, in the small anfractuosities bordering upon the verumontanum, and on the verumontanum itself. These ulcerations may be of a simple character, or they may be sinuous, aphthous, varicose, tuberculous, or cancerous.

Prostatic ulcerations may be the result of a surgical operation upon the gland; for though in the majority of cases, these wounds may be cured, it sometimes happens that no such happy result follows, and then ulceration establishes itself. This has been verified by autopsy. Some authorities believe that these ulcers terminate by destroying the gland, and reducing it to a fibrous shell. To this *cause* may be added another, no less real and much more frequent, that is, excoriations produced by catheterism. Perhaps, it would be proper to state, that these causes are much more likely to give rise to ulceration when there is a predisposition to it, as in tuberculous subjects.

Ulceration of the prostate has also been occasioned by irregularly and angularly formed calculi, or fragments of calculi, becoming lodged in the prostatic part of the urethra, distending the lining membrane, and cutting their way through it into the body of the gland. It may also result from an urethral stricture of long standing; from retention of urine; from bougies or catheters being too long retained in the urethra; and is rarely met with among feeble subjects somewhat advanced in years, who have suffered for a long time from disease in the bladder, paralysis, etc.

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* Simple, uncomplicated ulceration of the prostate, is a disease very rarely observed; and, as the ulceration is almost invariably consecutive, many authors do not consider it at all, except as part of the primary disease. However, it has been deemed best to refer to it in this place under a separate head, in order that a few remarks may be made, which are not so fully applicable to the original affections more generally causing it.

This affection is very difficult to recognize, the *symptoms* not being very positive, but such as are common to other diseases of the neck of the bladder and prostate. We may suspect ulceration, when, upon introducing a catheter or bougie into the urethra, it gives rise to a sharp, acute pain upon coming in contact with the ulcerated part, and the point of it contains a few drops of blood when withdrawn; when there is a sensation of heat and throbbings felt upon a very limited point at the root of the urethra; but the same symptoms may be present with other disease of the parts where there is no ulceration present.

If, however, to the above symptoms, be added, a more frequent desire to urinate than natural, with a painful acute burning sensation in the prostatic region upon the accumulation of urine, or at the moment when the first drops commence flowing from the bladder, which sensation slightly diminishes as the flow continues, only to become more acute immediately after, we may hardly hesitate to diagnose ulceration, especially if there is nothing to indicate a tumor or bridle at the neck of the bladder, a fungus or other abnormal production. Indeed, even then, the conclusion would only be half erroneous, for the appearance of the blood, the pain from contact with the sound, and the burning during micturition, also indicate that some point of a tumor, etc., is denuded and in a state of ulceration. Another somewhat reliable symptom of prostatic ulceration, is a more or less profuse discharge of a muco-purulent character, and which must not be confounded with seminal losses.

The progress, duration and termination of prostatic ulceration, and, consequently, its *prognosis*, will necessarily depend upon the nature of the ulcer, its seat, depth and extent. As with ulcerations of other organs, simple superficial excoriations very seldom present a serious aspect, and are readily healed; anfractuous ulcers, which proceed from behind forward, hollowing out the parenchyma of the prostate, are usually of long duration, and render the prognosis more serious. Ulcers which occupy the surface of the gland only are more dangerous, because they continually irritate the orifices of the ejaculatory ducts, giving rise, not only to pains, but to seminal pollutions, which terminate by exhausting the patient.

In the *treatment* of ulceration of the prostate, we must endeavor to ascertain its true character, for, if it should be tuberculous or cancerous, we must then direct our means not specially to the ulcer, but almost entirely to the principal affection.

In simple superficial ulcerations, which alone require any special treatment, it will be necessary to bestow attention upon the general health, fortifying the system by tonics and nutritious diet, if the pa-

tient be feeble, or, by a spare diet, if he be robust and of full habit; the bowels and surface of the body should be kept in a normal condition; exercise of all kinds should be avoided; coition must not be indulged in at all; and all stimulating food or drink be dispensed with. Injections of warm water, or of warm mucilaginous infusions, as of Marsh Mallows, Buckhorn Brake, Comfrey, Barley, etc., to which some narcotic should be added in case there are severe pains, must be used at first. Anodyne injections into the rectum, or suppositories, may also be required to aid in relieving the more severe pains.

Then, a weak solution of Sulphate of Zinc, of Sulphate of Copper, of Chloride of Zinc, of Tannic Acid, or a decoction of Geranium Maculatum, Alum Root, Rhatany Root, etc., may be employed in injection.—In some cases of ulceration of the prostate, as well as of other portions of the urethral canal, I have derived marked advantage by administering injections of a solution of Chloride of Gold and Soda, five or ten grains to two fluidounces of Water. In administering the above articles by injection, a metallic or elastic catheter should be introduced into the urethra, at least as far as the bulbous portion, in order that the fluid may reach the ulcerated parts. If the catheter has an opening upon its extreme end, it will be preferable to those in ordinary use.

Powdered Alum brought in contact with the diseased surface will sometimes be beneficial; and, in some cases, a solution of Nitrate of Silver, ten grains to the fluidounce of Water may be injected with advantage; it has also been advised that the ulcerated part be slightly cauterized with the Nitrate; but great care and discretion is necessary in the use of this agent as a caustic; it frequently fails, and, sometimes, even augments the difficulty.

ABSCESS OF THE PROSTATE.

Abscess of the Prostate may be the result of a previous acute inflammation which has passed into the stage of suppuration; or, it may be present where little or no inflammation existed antecedently, being the result of contusions caused by lithotrity instruments; or, it may be due to pyemia; badly-treated, or long-standing urethral strictures. As a general rule, acute prostatitis is more apt to terminate in abscess among feeble, scrofulous, or cacochymous subjects. Abscess may also take place from long-standing diseases of adjacent organs, as, of the kidneys, ureters, or bladder, likewise from calculus, more especially if it be lodged in the prostatic portion of the bladder.

Whenever an acute prostatitis continues for six or seven days, without any amendment of the symptoms; and whenever throbbing pains are felt in the perineum in front of the anus, the formation of a prostatic abscess is to be feared. Our fears will be increased if the patient experiences a sense of weight, vesical tenesmus, frequent desire to urinate, followed with a burning sensation, and a severe pain with the last contractions of the bladder, together with rectal tenesmus, and frequent calls to stool, as if a fecal mass occupied the rectum. Sometimes the pain will be very violent, with increased difficulty in urinating, or a complete retention, difficult defecation, more or less severe rigors, and, perhaps delirium. All these physiological *symptoms* belong, however, to most of the diseases of the bladder, urethra, and rectum, and are only secondary aids in the diagnosis.

A rectal examination will furnish more satisfactory diagnostic indications.—As the introduction of the finger into the rectum generally causes severe pain, it should be passed slowly and with great gentleness; if suppuration has occurred, and a purulent cavity is formed in the substance of the prostate, the finger will find the gland swoln, and presenting to the touch a soft and elastic sensation; if the pus, instead of forming at one center, or cavity, is infiltrated, this sensation will not be so distinct. Should the abscess be directed toward the urethra or neck of the bladder, instead of toward the rectum, the diagnosis will be more difficult. However, if, at a period when the cessation of the inflammatory symptoms ought to be followed by a more ready flow of urine, we find it retained, or passing with difficulty, we may suspect a prostatic abscess forming upon the urethral portion of the gland. Should this be the case, a catheter introduced into the urethra, instead of meeting with a sensation of resistance at its prostatic part, will transmit a feeling as if it were in contact with a flabby and somewhat yielding body. The careful efforts made by the operator to pass the catheter into the bladder to empty this organ of its contents, will sometimes rupture the purulent abscess, and the flow of pus will remove all uncertainty.

However, when the diagnosis is not very readily made out, it will be better to simultaneously combine the rectal with the urethral examination. Having passed the catheter into the urethra, and the finger into the rectum, the instrument must be gently pressed upon the prostate, which will drive the pus toward the finger, which may then feel the peculiar sensation above named, and which would have escaped notice without this method of exploration.—When a prostatic abscess is about to open in the rectum, the retention of urine or difficulty in passing it, the pains at the neck of the bladder, and the burning sensation during the flow of urine will be by no

means so severe as the rectal tenesmus, the heat, throbbing and tension at the anus. Defecation will be attended with much pain, and any attempts at relief by injections will be accompanied with great suffering; all of which symptoms become suddenly relieved upon the rupture of the abscess.

An abscess in the forming stage, situated between the rectum and bladder, may be mistaken for a prostatic abscess; but the rectal examination will remove all uncertainty by determining the precise seat of the swelling. A prostatic calculus may also be mistaken for an abscess; the differential signs will be referred to when treating upon Calculi of the Prostate.

The progress of prostatic abscess may vary very much; in some cases, the pus may be carried back into the system, or be insensibly eliminated, as observed in submucous abscess of the urethral or rectal surfaces, and both patient and physician may be ignorant both of the formation and disappearance of the abscess. In other cases, the pus will be surrounded with a kind of cyst; then the pus will be concrete, taking the form of tubercle, and it becomes a difficult matter to distinguish between a tuberculous prostate, and a prostate with small purulent foci or cavities distributed throughout it. But more commonly the pus forms an external issue for itself either into the bladder, the urethra, the cellular tissue of the perineum and pelvis, or the groin.

The opening of the abscess on the urethral portion of the gland is of more common occurrence, the tissues in that location being more fragile, presenting less resistance, and consequently being more apt to become broken, torn, or ulcerated than at other points. As soon as the pain ceases, the pus is discharged from the urethra, either alone or mixed with the urine; the general symptoms improve, and the patient commonly experiences a prompt relief. But a spontaneous rupture does not always happen; the efforts during urination or defecation, or catheterism for a retention of urine, may also cause an opening of the abscess. Abscesses which form around the verumontanum, may have only a single opening, or, there may be many apertures, like the orifices in a watering pot, and which to a certain extent prevents the penetration of the urine into the purulent cavity.

The least serious cases are those in which the pus is discharged through the excretory ducts of the gland itself, which mostly open in an oblique manner upon the surface of the urethral mucous membrane, and form a kind of little valve at their mouths, which is directed from behind forward, a very favorable disposition to prevent the admission of urine. But, when the opening of the

abscess into the urethra is very large, the patient is constantly exposed to the accidents arising from the urine penetrating and remaining in a purulent center, such as, large cavities and fistulous canals.

The opening of the abscess into the bladder, generally occurs when the purulent center is seated upon the sides, at the upper and posterior part of the prostate.—The matter may be discharged by the rectum, when the case is, at least as favorable, if not more so, than when evacuated by the urethra or elsewheres, because the walls of the abscesses are not exposed to the contact of urine, and an adhesive inflammation will promptly effect cicatrization. In this case, the matter accumulates in the rectum, and may be observed mixed with the feces after stooling. The size and consistence of the feces are such as to prevent them from entering the cavity of the abscess.

Should the abscess open into the cellular tissue and between the aponeuroses of the perineum and pelvis, the case will be a serious one; the pus, instead of escaping from the external surface, constantly infiltrates and burrows in these tissues; developing a new active inflammation around the prostate, and an augmentation of the symptoms, instead of an immediate relief. The suppuration may extend in various directions, forming communications with the scrotum, the ischio-rectal fossæ, and the central portion of the perineum. When the course of the abscess follows that of the vas deferens, it may open in the groin, as has been observed in some rare instances. Should the same abscess form a communication with both the rectum and the urethra, a troublesome urethro-rectal fistula will be the result.

Prostatic abscesses may close up in several ways. In simple cases, the suppuration, at first creamy and laudable, diminishes in quantity, gradually assumes more plastic characters, and becomes exhausted, while the cavity continues to close up and heal. In other cases, the lips of the orifice of the abscess cicatrise, while its walls continue to produce pus; the cavity becoming filled, the recent cicatrix is distended, soon ruptures, and a new evacuation of pus occurs. These phenomena may be reproduced at greater or less intervals, and for a longer or shorter period; each time, however, the quantity of pus is diminished; and the cure eventually takes place. This reparatory process, as feeble as it may be, is sometimes wholly absent, and then the constitution may become debilitated by the continual flow of purulent matter, as is apt to be the case among persons of a tuberculous diathesis. It must not be forgotten that as long as a person is affected with abscess,

he is exposed to serious accidents, as, for instance, from purulent infection.

Pathologists have pointed out the relations which exist between affections of the urinary passages and those of the encephalic centers; thus, a patient is taken with symptoms characteristic of an inflammation of the prostate; at the end of several days, suppuration is manifested, and from this moment, delirium supervenes, which is soon succeeded by coma, and the patient dies in a deep state of adynamia.

The *prognosis* of prostatic abscess will vary according to the cause, the seat, and the extent of the purulent collection; it is difficult to form a general law, but we may arrange these abscesses into three classes, viz.: 1. Those which heal very quickly, or which are not accompanied with any very marked disturbance of the functions. 2. Those which present a greater degree of gravity, by reason of the phenomena preceding them, or accompanying them, as those which are complicated with stricture of the urethra, calculi in the bladder or prostate, or with tubercles. Of course, a cure of the abscess can not be expected until after the removal of the complication. 3. Those of inflammatory or tuberculous origin, which transform the prostate into a genuine excavation, terminating seriously.

Upon a *post-mortem* examination, prostatic abscesses will be found to vary in their seat, number, and size. Some, small and numerous, may be found disseminated beneath the mucous membrane of the urethra, scarcely affecting the prostate; these are generally produced during a gonorrheal attack, and may be situated in any portion of the urethra, into which they gradually open, and their contents are expelled with the urine. These abscesses are common, and frequently remain unperceived during life.

Others, may be situated more deeply, and are generally of greater size, but they are also less common. This kind of abscess may be developed in the prostate in a manner analogous to those which form in the uterine tissue; they may occupy the whole prostate, converting it into a purulent reservoir. There then exists a genuine pouch or cavity, which will be referred to hereafter.

Again, some abscesses may be met with occupying but one lobe, or only part of a lobe of the prostate. In this variety, the pus may remain for a long time, even in the tissue of the gland, without giving rise to any phenomena that may cause the physician to suspect its presence during life. And, finally, abscesses may be

discovered all around and in the vicinity of the gland, in the perineum, or in the pelvic cavity.

In the *treatment* of prostatic abscess we should endeavor to procure a discharge of the matter as soon as possible, not permitting the abscess to rupture indeterminately, or in a wrong direction. If the tumor can be felt through the perineum, giving the impression of a hard, fleshy mass, or if it be diagnosed as pointing toward the perineum, it is better not to wait for fluctuation, but to at once cut deeply into the perineum, with an elongated, narrow-pointed bistoury, being careful, however, to cut in the mesial line, and not to injure the bladder or rectum. The index finger of the left hand should be kept within the rectum during the incision, as a sort of guide to the direction of the knife, which should be entered into the raphe of the perineum at about the distance of nine lines from the anus, having its cutting edge looking upward; it should be boldly carried in the direction of the prostate, a little *below* its situation in a healthy condition, that is, if the rectal surface of the gland has been found swoln or increased in bulk. The instrument should be made to penetrate in this direction to the depth of not less than one and a half or two inches, and the incision should be made of sufficient width. Should no matter be discharged, the application of poultices will hasten the suppurative process, and thus the abscess will be prevented from communicating with the rectum or urethra.

Of course, such an operation is not to be attempted unless the physician is thoroughly satisfied that he has correctly diagnosed the case; otherwise, it were better to confine his treatment to the relief of urgent symptoms, until some positive indications are manifested. The advantage of thus opening the perineum is, that the pus escapes directly without involving other important organs, and the healing process may progress more rapidly.

If it be satisfactorily ascertained that the abscess is pointing toward the rectum, or, that the rectum presents the most convenient place for the artificial opening, it may be effected by means of a long, curved trocar. An internal blind fistula of the rectum may be the result, but usually it heals very promptly. The bowels should be kept as quiet as possible for several days after the operation.

If the abscess becomes somewhat prominent on that side of the gland toward the urinary passage, it is an indication that the rupture will occur on the urethral surface; we should endeavor, therefore, to make the artificial opening at this place. A metallic sound with a small curve, and a conical extremity may be employed, or an ordinary silver catheter. The instrument must be carefully intro-

duced within the urethra, until it meets with an obstruction behind the pubis, (the prominent abscess) when moderate efforts should be made to pass it onward to the bladder; frequently, by this means, the instrument will pierce the purulent pouch, and the matter will make its exit through the urethra. If, however, the swelling is not readily pierced, we may, by introducing a finger into the rectum, and pushing or pressing the prostate against the extremity of the catheter, to which we also communicate a slight impulsion, readily effect its rupture. Again, if the suppuration is not complete, and the symptoms present, as, retention of urine, etc., demand immediate interference, the operation may be performed with a lancetted stylet. In all these operations the physician can not exert too much care and prudence.

If the abscess tends to open into the bladder, the catheter may be passed into this organ with but little or no difficulty; it must then be moved about so that its beak will press upon the sides of the trigone or vesical triangle, or upon the root of the urethra; in this way the purulent swelling may be ruptured and the pus be discharged.

When there is an uncertainty in the diagnosis, and when, from a microscopical examination of the urine or feces more or less pus is discovered, leading to a mere suspicion of an abscess already formed and discharging, it is much better to treat the case by attending to the general health of the patient, prescribing such means as are calculated to strengthen and improve it, and omitting all instrumental interference. Indeed, even where we are fully aware of the presence of an abscess of long standing, it will be a much better course to discard the use of instruments, and devote all our appliances to the improvement of the system generally.

Where a calculus is present, it must be removed before we attempt to treat the abscess; and if this be due to the stone, its removal will be followed by a healing of the consecutive abscess.

CAVITIES, AND FISTULAS OF THE PROSTATE.

Cavities and Fistulas of the Prostate may be *caused* by wounds, inflammations, tubercles, and abscesses, and when they exist they develop new symptoms, and require new therapeutical treatment. The following hypothesis has been given, as to how these cavities may be produced: "The aponeurotic planes form a kind of cage or box in which the prostatic tissue is contained. Let us suppose the contents of this box removed, and then what will occur?

Instead of approximating toward each other, as would have taken place if a subcutaneous tumor had been removed, the walls will remain separated, not sinking in upon themselves to fill up the empty space; and from this time we will have the same result as in the ischio-rectal fossa, where the osteo-fibrous walls circumscribe a space filled with cellulo-adipose tissue. An empty space will exist in the aponeurotic cage, which can not be removed; and into which all the fluids and matters passing through the neighboring canals will have a tendency to lodge, constantly giving rise to morbid phenomena by their remaining there."

As to the *symptoms*, fistulas may be seen in the rectum or at the perineum by ocular inspection. The rectal touch will recognize an indurated cavity in the vicinity of the prostate, and upon pressure the finger will feel a purulent fluid passing through the fistulous orifices.

If the cavity opens into the rectum, an indurated point will be felt around its orifice, through which orifice a probe may be passed, and it will enter a cavity in which we may readily turn the instrument in every direction. When the cavities are tuberculous, the fistula may follow the anterior face of the rectum to pass through the fibres of the anal sphincter muscle; and then, on the first examination, we may suppose we have on hand merely a simple fistula in ano, when in reality the case is a much more serious one, having its origin in the prostate. Indeed, Ricord has made the inquiry whether the greater part of anal fistulas met with among consumptives were not due to tuberculosis of the prostate? This view of the matter may be an explanation for the opinion of several surgeons, viz.; that fistulas in ano among tuberculous subjects should not be disturbed by any operations.

Through the fistulous orifices issues a fluid which may present a great many varieties as to its physical and chemical properties, as well as in regard to its quantity. Sometimes it will be tinged with blood, at others it will be very fluid, and again it may be of a cheesy consistence, according as the cavity contains pus, urine, blood, serum, or tubercles.

As to the urine there will be many modifications: if the cavity communicates only with the urethra and this is not wholly destroyed, the urine will readily pass outwardly; but, if this canal have a stricture in its membranous portion, the urine may pass through this obstruction with some difficulty, and will then distend that portion of the urethra behind the stricture; in consequence of which some of the urine will be forced into the cavity, perhaps filling and distending it, and the bladder will be evacuated partly

into the cavity, and partly through the urethra, externally. If the cavity becomes accustomed to the presence of the urine, it will be held therein, from which it will escape drop by drop; the patient will then have a continual flowing of urine, or, as it were, a new kind of incontinence of urine.

If, with the prostatic cavity, there is at the same time, a complete solution of the urethra, and some perineal fistulas, the urine will not pass through its natural channel, but will escape through the fistulous orifices after having distended the cavity, which, in its turn, will allow this fluid to flow out, whenever the patient assumes any position favorable to its escape.—If the cavity communicates with both the rectum and the urethra, a portion of the urine will pass into the rectum, from whence it will be expelled during defecation.

If we are aware that the patient has had a previous violent attack of acute prostatitis resulting in an abscess, and that he is, at the period of examination, evacuating both pus and urine from the rectum, we may be almost certain of the existence of a prostatic cavity; if there is any doubt upon the subject, catheterism will readily solve it. The catheter, being introduced into the urethra, which it enters without any trouble or causing much pain, having arrived at a point beneath the symphysis pubis, will, notwithstanding the efforts of the physician, pass into a kind of cavity too small for the bladder, and too large for the urethra, in which cavity it may be inclined in various directions, and from which it extracts a certain quantity of pus, mixed with a more or less clear urine. If, while the instrument is yet in this cavity, we desire to form a more perfect *diagnosis*, we may introduce a finger into the rectum, when the beak of the catheter will be at once felt through a partition of more or less thickness. Great care must be observed not to confound this cavity with that of the bladder, especially in cases where the catheter is introduced for the relief of a retention of urine.

If the cavity communicates with the bladder alone, the diagnosis will be almost impossible. The physician will then have to base his views upon the antecedent condition of the patient, the rectal examination, and the discovery of pus in the urine, when this is observed under the microscope.

The *prognosis* of a prostatic cavity is always serious; these caverns do not undergo a spontaneous cure, even when recent; beside, they are causes of constant inflammation, or, of an unhealthy suppuration. When the urethra, and even the bladder has undergone considerable disorganization, the prognosis is still more unfavorable, because the patient is inevitably exposed, at a more or less distant

day, to all the consequences of a urinary infiltration, either between the peritoneum and the pelvic fascia, the superior and middle aponeurosis of the perineum, or, even underneath the inferior aponeurosis; and from thence, very formidable infiltrations of the anus and scrotum, which of themselves may cause death. In some instances, where these symptoms do not occur, the cavities develop very obstinate urinary fistulas, which are often beyond the resources of art. If the cavity has a tuberculous, and not an inflammatory origin, the prognosis will be still more unfavorable.

The mode in which these caverns are formed is very simple. An inflammation attacks the prostatic tissue, and terminates by suppuration or gangrene, and from thence to the production of the cavity is but a step. When there is gangrene, the disorganized tissue may be eliminated, either by pieces, or under the form of more or less considerable detritus from the urethra, or from the rectum. But more frequently, the cavity is the result of suppuration. The pus being lodged in the interspaces of the prostatic tissue, gradually compresses or destroys it, and when the pus is evacuated there remains only a pouch between the rectum and the urethra.

Tubercle also produces cavities, perhaps as frequently as inflammation; the tubercle accumulates in the body of the gland, then softens, liquefies, discharges, and leaves in its place only a cavity more or less anfractuous, containing some detritus of the gland and of the less softened parts of the tubercle.

Ordinarily, the prostatic cavity has the form and size of a turkey egg; it may either be simple, or with several compartments, which may be distinct, or communicate with each other. The cavity may occupy the whole gland, or even establish itself between the fibrous walls and the remains of the organ. If it be due to tubercle, it will co-exist with tuberculous disease in other organs, and not only the prostate, but all the surrounding organs may become disorganized by the tuberculous action, the degree and rapidity of which disorganization will depend upon the degree of the tuberculous diathesis of the system. The urethra may simply be perforated with one or more orifices, or, it may present a complete solution of continuity. Or, the cavity may open into the rectum, the perineum, or the bladder, forming prostatic fistulas. To undertake to treat these last independent of the cause producing them, would be to adopt an inefficacious therapeutics.

When a cavity communicates with the external surface, notwithstanding it receives fluids and irritating solids, it not only may not occasion still greater disturbances, but it neither becomes aggravated nor disposed to heal, except under the treatment of the

physician. It is not disposed to heal, because the walls which limit the prostatic area are formed by fibrous layers which can not approach each other, and also because, in forming itself, the abscess has created in this cavity a pyogenic membrane, a kind of mucous membrane, the surfaces of which in no wise favor a reparatory adhesion. Inflammatory disturbances are not developed, notwithstanding the presence of irritating matters, because this kind of protective membrane gives out a fluid which dilutes these matters and thus neutralizes a portion of their irritating properties.

In the *treatment*, the first thing to be done is to remove or discharge the abnormal fluid from the prostatic cavity, and to keep up this discharge. If the opening be at the perineum, and should it be too small, it must be enlarged. If it is tortuous, we must regulate it so that the abnormal fluids may find a ready issue as fast as they are produced. For this purpose, we must carry the knife into the sac, the finger serving as a conductor in dividing all bridles or anfractuosities which impede the free flow of these matters.—If there be a rectal fistula, it must be changed into a complete one, or rather, all the inferior wall should be divided, as would be done for an abscess the inside of which it was desired to stimulate.

When the prostatic cavity simulates a blind urethral fistula, it has been advised to make it a complete one by the establishment of a counter-opening in the perineum; but, this course will not in the least advance the cure, as the artificial fistulous opening will be as difficult to heal as the one formed originally by the cavity. It has also been advised to introduce a catheter, and allow it to remain. This may answer in the early stages, but the chances for being successful by this plan are, after all, doubtful. In fact, it only prevents a few drops of urine from entering the cavity,—it favors the accumulation of pus in this accidental pouch,—it also interferes with its cicatrization, and finally it acts as a foreign irritating body which may give rise to troublesome symptoms. On the other hand, if we catheterize the patient every time the bladder requires to be emptied, we run the risk of passing the instrument into the cavity, and thus may destroy, each time, the slightest reparatory process that may have been established. The better plan is, to introduce a catheter made for the purpose, into the bladder, removing it only occasionally, continuing its use as long as it gives rise to no symptoms contraindicating its further employment. This catheter should be made as follows: A small tube should be fastened within a larger one, in such a manner as to leave a sufficient space between the two for fluids to pass; the smaller tube, is designed for the urine to flow through, and communicates with this fluid in the bladder by means

of an orifice at the extremity or beak of the instrument; at about half an inch or an inch from the beak, the outer tube is perforated with numerous small apertures through which the pus and other liquids contained in the cavity may flow and be discharged externally. The two canals of the tube should not communicate with each other.

While employing these means, they should be associated with narcotic or emollient injections into the cavity, as may be indicated; and endeavors may also be made to bring about a healthy excitement of the walls of the cavity by detersive or stimulating injections. Great attention should also be bestowed upon the general health of the patient, employing tonics, nervines, anodynes, etc., as may, from time to time, be required.

While the resources of art are very limited for the cure of cavities of inflammatory origin, they may be said to be powerless when these are due to tubercle.

PROSTATIC CALCULI.

Under this head will be considered those concretions which have become imbedded in the substance of the prostate gland, and which may be divided into three distinct classes, viz.: 1. Those which have their origin and development in the gland itself. 2. Those which enter the gland after the operation for removing stone from the bladder. And, 3. Those which, having their origin in the bladder, escape, while yet small, from this organ, and become lodged in the prostate in a cavity formed by themselves, where they remain.

The *first class* of these calculi, more properly termed "prostatic concretions," are rarely observed by the naked eye previous to middle age, though they may be detected after the age of puberty, by means of the microscope; and there are very few adult persons, if indeed any, who are entirely free from them. So common are they in healthy prostates, that they have been considered as a normal product. They have, sometimes, presented more or less impediment to the seminal ejaculation, and, perhaps, have also been a cause of sterility, by interfering with the emission of this fluid. The "concretions" under consideration, vary as to number; there may be one, two, three, and so on, until they become too numerous to count; generally, they are in considerable numbers. They also vary in size, from that only visible under the microscope to that of a hen's egg. More commonly, when their number is considerable, they are very small, seldom exceeding the size of a pin's head. This last named size is rarely seen, except among individuals who have

attained or passed their fiftieth year, or who have hypertrophy of the prostate, or, phosphatic calculi.

When very small, they are more often colorless, sometimes amber-yellow, either pale, or darker when visible to the eye. They have also been seen whitish, chesnut-brown, and bistre color. In some instances they present to the naked eye a blackish aspect, having a resemblance to grains of snuff, but, when viewed under the microscope, they appear of a reddish color, similar to that of hematoidin. Their form is very variable, whatever may be their size, being sometimes rounded, ovoid, or triangular; when they have attained a diameter of from one-twenty-fifth to one two hundred and fiftieth of an inch, they are more apt to be quadrilateral or polyhedric, with rounded angles. Their great irregularity of form is, probably, due to the compression they exert on each other. When in the prostatic ducts, they present a somewhat arborescent form, occasioned by their formation along the ramification of these ducts. They usually present a smooth, shining surface, and, when their number is considerable, with facets. Their structure is very remarkable; they have an elegant appearance not observed in any other concretion. Some, generally whitish, and of very great consistence, are amorphous; but the others, which are more common, present concentric layers, having a focus or nucleus of small granulations. Around this nucleus, the mass of these concretions is composed of more or less regularly disposed concentric layers, the greater ones being proportionably nearer to the circumference and around smaller ones which are proportionably nearer to the center; and from the thickness and the regularity of these concentric layers may result an almost endless variety of appearances under the microscope. The larger the "concretion," the thicker are the concentric layers, and the wider are the intervals between the lines which separate them; in these cases, the substance of these concentric layers is finely granulous, instead of being wholly homogeneous as in the "concretions" invisible to the naked eye.

The nucleus of these concretions is more commonly granulous, and better formed than the rest of the substance. When the concretions are blackish or reddish, the nucleus, whether granulous or not, presents, as has already been remarked, the color of hematoidin, and seems to be formed by the hæmatin proceeding from some slight effusions of blood. We also find in the midst of this nucleus, and especially near its surface, epithelial cells, or some nuclei of the prostatic epithelium. Upon compressing these calculi between two plates of glass, they break, cleaving in some manner from the surface to the nucleus, which sometimes resists,

and, at others, yields to the pressure. The smaller and more recent ones divide, upon compression, similar to the division of soft bodies, while the larger and older ones are more brittle. It is common to see the concentric layers separate from each other, and exfoliate, as it were, under the pressure.

Their chemical characters are likewise variable. Whatever may be the size, when a transparent or translucent concretion is submitted to the action of hydrochloric or acetic acid, it becomes slightly paler but without any disengagement of gas. It is only when the concretion is opaque that the employment of these acids produces an evolution of gas, the same as if they were acting on concretions of carbonate of lime. Gas is also set free quite rapidly by the action of sulphuric acid. The tincture of iodine develops a yellowish-brown or reddish color in these calculi, similar to that which it determines with nitrogenous substances generally; and these actions have led to a belief in the minds of some that the concretions thus acted upon were of a nitrogenous character. When these bodies are soft they remain unaltered in the presence of nitric, sulphuric, hydrochloric or acetic acids, cold, sulphuric ether, and the alkalies; when large and hard, nitric and hydrochloric acids, also sulphuric acid, and the caustic alkalies exert an influence upon them in a greater or less degree. Heat eliminates a strong ammoniacal odor, and the soft ones leave no residue under the blow-pipe.

At first, these "concretions" are soft, but become darker, firmer, and more solid by age, and may eventually attain a size and hardness as to be "calculi," in the true sense of the word. They have their location in the glandular parenchyma, in which case they are small and numerous, and may readily be seen upon making an incision to lay open the gland. Sometimes they will be detected immediately beneath the urethral mucous membrane, the portion covering them being so thin, that it will rupture upon the least friction, and expose one of the surfaces of the calculi to the urethral canal. Their most frequent seat, however, is in the prostatic ducts and around the veru montanum; they are less frequent in the ejaculatory canals. They are found in normal prostates, as well as in those which are enlarged; indeed, it is seldom that a hypertrophied prostate exists, without an abundance of them being present, and which may be either invisible or barely perceptible to the naked eye. These formations must not be confounded with *phlebolites* or stony concretions sometimes discovered in the vesico-prostatic veins, nor with the cretaceous form of tubercle.

The origin of these concretions is not satisfactorily ascertained.

By some, a portion of the semen has been supposed to form in some way a lodgment in the gland, inspissate, and become a nucleus for other seminal matter to be deposited around it. By others, this action has been attributed to the prostatic liquor; and again, both the semen and the prostatic liquids have been referred to as the cause. The most satisfactory explanation that I have seen is, that there exists in the prostatic liquid, as well as throughout the substance of the prostate, numerous minute yellowish bodies, sometimes granular, sometimes homogeneous, resembling oil globules; these coalesce in the follicles of the secreting portion of the organ, fuse into a mass, and give rise to the early or purely organic form of the "concretions." Having thus formed in a follicle, and increased in size by fresh layers of secretion, their presence sooner or later creates an irritation, which results in the secretion of a fluid containing earthy matter, in the same manner as is known to be the case with secreting membranes generally when irritated; the deposition of this earthy matter, gives hardness, opacity, and dark color to the concretions; and with this earthy substance, are also intermixed in various proportions, mucus, gland cells, etc. When the concretion has reached a certain size, the walls of the follicle containing it become absorbed, from its pressure upon them, it then comes in contact with other concretions which have gone through similar phases, being now contained with them in a common sac, and they all acquire their various forms and facets by attrition or juxtaposition.

The *second class* of prostatic calculi, results from the lateral or bilateral operation for stone in the bladder, in which the prostate is necessarily involved in a greater or less degree, as it is through its tissue that the calculi are extracted. A small, hard calculus may be removed entire, without leaving the least fragment of it in the bladder, or in the incised portion of the prostate. But it sometimes happens that there may be other calculi by the sides of the principal one, the existence of which was not even suspected; it may also happen that by the pressure of the forceps, some layers of the calculus seized upon, are broken and remain outside of the instrument, in the form of scales, gravel, etc. These fragments may remain in the bladder or they may be dropped along the tract of the wound in the perineum. If they find their way into this last named place, they may be arrested there, be completely isolated from the urinary passages, and gradually become developed until they acquire a considerable size. Then, one or more years may pass before their existence will be recognized. There may be only one calculus, or several may be present; and

their chemical composition will be the same as when they were in the bladder.

These calculi present several varieties; thus, sometimes the wound made in the prostate heals on its urethral side and closes on the perineal side. After some months, or a year or more, the cutaneous wound re-opens, to close again. We then recognize a calculus in the prostate; it may be small, angular, and irregular; having preserved nearly the form it had at the time when the operation was performed, the period at which it became lodged in the prostate. This must be so, since, having from that period had no communication with the urine, this fluid has no longer furnished it with the materials necessary for a rapid growth.

At other times, the perineal wound closes completely and solidly; while the urethral wound closes imperfectly, ready to re-open on the least occasion. A calculus at the bottom of this wound, is, certainly, in a good situation for an increase of its size, because of the urine, which, coming in contact with it from time to time, is constantly depositing new layers upon it, so that it enlarges upon its vesical as well as upon its perineal surfaces.

Again, both extremities of the wound made in the prostate may firmly cicatrize, and then the calculus is enclosed as in a cyst, where it may remain for an indefinite period without growth, and without discovering its presence; or, if it be in contact with any fluid whatever, it may more or less rapidly be increasing in size.

The *third class* of prostatic calculi are those which form in the prostate independent of any operation. These may form in the same manner as named in the first class, and may be due to a rapid augmentation and hardness of the "concretions," from increased activity in the earthy depositions. They may vary in size from that of a grain of rice to that of a large pea; may be single or multiple, one mass being frequently composed of several accurately fitting fragments, and occupying a cavity in the prostate in which they are imbedded. They are white, fawn, or pale-brown, the surface being darker than the internal parts; have a rounded, or irregular form; are of very close texture, like porcelain, and quite hard, and are composed of a large proportion of phosphate of lime, with animal matters and a minute quantity of carbonate of lime. In their early stages the animal matters preponderate, but as they advance in age, this predominance is lost and the mineral constituents manifest themselves more and more abundantly. As they increase in size the cavity or cavities containing them enlarge by distension, and have occasionally reached a length of from three to five inches, having within them masses of coalescing calculi.

But, *another character* of prostatic calculi may be met with; thus, a small stone or gravel formed in the bladder escapes into the prostatic portion of the urethra, where its further progress onward is checked, and it becomes arrested in the lateral furrows of the veru montanum. If no symptoms manifest its presence, and if it is not expelled with the urine, it gradually depresses the urethral mucous membrane, excoriates and ulcerates the tissues beneath it, and is soon imbedded in their midst, from which place it continues to increase in size. If this calculus becomes so buried in the tissues as eventually to have no communication with the urethra, we may have the same phenomena as is common to calculus thus situated of the second class. If, however, its surface remains exposed to the urine, it may rapidly augment in size from the continual addition of deposits from this fluid. Velpeau states that such calculi are almost always multiple, have an excoriated looking surface, and, being developed in a kind of purulent sac, they seldom become very large.

If a calculus formed in the bladder near its neck, becomes of large size, it may press against the prostate, and even become engaged in its tissue, and it may then continue to increase in size both on the part of the bladder and on that of the prostate. This has been called a "vesico-prostatic calculus." Its most striking character is that of having two lobes of unequal size, the vesical lobe being the largest. A "prostato-vesical calculus," is exactly the inverse of the preceding, its prostatic lobe being the largest.

When prostatic calculi are of large size, we find the prostatic portion of the urethra become so dilated as to almost acquire the capacity of the bladder, which organ, on the contrary, gradually diminishes, so that there is, as it were, an exchange of capacity between the bladder and the urethra. Moreover, while the bladder is retracting so as to directly cover or envelop the calculus, its walls undergo a kind of hypertrophy, which renders their section difficult when we practise the High operation.—But, by way of contrast, the walls of the prostatic portion of the urethra, which form a kind of supplementary bladder, become atrophied and exceedingly thin.

However, it is not always by dilatation that this prostatic cavity increases its size; more frequently, the calculus advances by ulceration even to the center of the gland, and when the ulcerative process passes beyond the limits of this organ, the calculus may form a protuberance in the rectum, or even escape into it.—In a case of chronic abscess terminating in a large cavity communi-

cating with the urethra, the decomposition of the urine retained in this cavity may produce another kind of prostatic calculi.

The *symptoms* of prostatic calculi are not very marked when of small size; indeed, instances have been cited where quite large ones existed (in one instance the size of a hen's egg), without presenting any symptoms to attract the physician's attention.

Small calculi, generally multiple, manifest themselves by pain and a sense of weight at the perineum, and a frequent desire to urinate. A catheter introduced into the urethra, as it passes through the prostatic portion conveys a sensation of grating. A wax bougie, properly prepared so as not to break within the urethra, when left in for some minutes and then withdrawn, will present the characteristic impressions made upon it by its pressure upon the calculi.

With the large calculi, there will be added to the above symptoms, a more or less complete dysuria, a difficulty in the emission of semen, and, perhaps, a continual partial erection of the penis. These calculi, imbedded in the midst of the soft parts of the perineum, terminate by presenting an obstacle similar to that of a tumor. They may be recognized by introducing a finger into the rectum, passing it inward as far as possible, or until we meet the prostate, when, if this organ contains a calculus, we will feel it under the form of a small protuberance, which may be distinguished from any tumor by its hardness, its inequalities, and by the pain, sensation of pricking or of tearing, which it gives rise to when we press upon it as if to rub it against the pubis. In the case of multiple calculi, they will feel somewhat like a bag of small marbles, and the pressure just referred to will determine an evident crepitation.

Catheterism will also give further information to aid in the diagnosis. The existence of fistulas in the perineum, the catheterism of this fistula, the antecedents of a previous lithotomy operation, the cicatrices of which have re-opened, are all so many reasons for a belief in the existence of a calculus, especially if attention has already been called to the case by other symptoms. If a catheter be passed into the urethra, and the stone presents one of its free surfaces in this canal, the metallic instrument will, upon coming in contact with it, produce a characteristic sound or click; and the distance to which the catheter has to be carried before it touches the calculus, will determine whether this be in the bladder or in the urethra. The clicking sound will be more distinct, if the stone be brought in more direct contact with the catheter or sound, by a finger in the rectum pressing the gland up toward it.

These manœuvers are often interfered with or entirely prevented by the presence of an urethral stricture, in which case, they should be dispensed with until the canal has been sufficiently dilated.

Left to themselves, prostatic calculi may escape spontaneously, either through the urethra, previously ulcerated, or through the rectum or perineum, an abscess having been first formed. Sometimes, these calculi may escape into the bladder, where they increase in size, and constitute, at a later period, calculi of mixed composition.

In the *treatment* we must be governed by the symptoms present, and the number and size of the calculi. If a fistula is present, we must extract the stone through it, enlarging the passage by dilatation or incision, so that the calculus may be seized by forceps.—If there be no external wound, and the calculus is not very large, we may extract it by means of one of the modified or improved instruments of Hales, Hunter, etc. Weiss' forceps will frequently be found to answer. Or, if the stone can not be thus extracted, it may be detached from its situation, pushed into the bladder, and be removed from thence by such means as would be pursued in case of a similar original vesical calculus.—If the calculus is too voluminous to be extracted in this manner, it must be broken by means of a lithotrite, and the several fragments of it extracted successively.

But if these means are insufficient, the calculus being found too large to extract by the urethra, and too hard to be broken by the lithotrite, or when it is completely enveloped in the prostatic tissue, the only course to pursue, is, to introduce a grooved staff into the urethra, and cut down upon the prostate in the mesial line, through the raphe of the perineum, until the calculus is brought within reach, when it may be removed by the forceps or scoop. Great care must be taken not to allow any fragments to remain behind, as they will form nuclei for future calculi. This is a much safer operation than that of ordinary lithotomy, as the bladder remains untouched, provided there be no calculi of this organ, which should, in all cases, be positively ascertained previous to the operation. If the case be complicated with calculi of the bladder, lithotomy may have to be performed, either by the lateral or median operation.

After the extraction of the calculi, internal and other means should be used, to improve the patient's health, to overcome any untoward symptoms that may manifest themselves, to lessen irritability of the neck of the bladder, and to lessen the tendency to phosphatic deposits.

In cases of large prostatic cavities containing multiple calculi,

these have sometimes been extracted through an incision of the prostate by the rectum; the operation, however, is an unsafe one.

CANCER OF THE PROSTATE.

Cancer of the prostate is an exceedingly rare affection, and when it does occur it may be either in a primary or secondary manner, though more commonly the former. The encephaloid, scirrhus, colloid, melanotic, and fibro-plastic forms of this malignant disease are stated to have been observed upon the gland, of which the encephaloid is the most frequent. Children seem to be as liable to this disease as adults.

It is very difficult to diagnose cancer of the prostate; the local *symptoms* indicate nothing of the nature of the disease, or, at least, not until it has considerably advanced. If the finger be passed into the rectum in the early stage, the gland will be found hard and enlarged; in connection with this, the patient will frequently complain of severe pains in the part, which are sometimes very severe, and may occur either during, or in the absence of, urination; more or less profuse hemorrhage is likewise apt to be present; and the patient becomes weak and reduced in flesh. With these symptoms, there will also be either a partial or complete retention of urine, with a desire to pass water much more frequently than before, and other symptoms common to the various kinds of prostatic obstruction. At a more advanced stage, the rectal touch will find the gland softer; the pains continue, and will be felt shooting to some distance in various directions from the diseased organ; the hemorrhage will be more abundant than before; frequently enlargements of the neighboring lymphatic glands will be discovered; the urine may be bloody, and may likewise contain considerable debris, from the malignant growth; if present, cancer cells may be detected in the deposit from the urine, but it is not a common thing to find them; and with these symptoms the strength and embonpoint of the sufferer rapidly diminishes, so much so, in some instances, that he succumbs, even, before softening of the growth has taken place.

A *post-mortem* examination will reveal fungus projections from various points of the gland, more commonly on its urethral and vesical surfaces, which vary in size, hardness, and color; some being hard, others soft, sprouting, and presenting colors varying from an almost white to yellowish, brown, or dark-red; again, others will be pulpy, gangrenous, and presenting grayish tints. A sanious fluid may exude from the diseased surfaces; or a cream-like liquid; some-

times flakes of disintegrated structure will be found in the fluid; and small collections of pus may also be observed at various points. The disease appears to attack the glandular tissue of the organ at first, but ultimately invades the fibrous structures, so that as the disease progresses the prostatic tissues disappear to give way to the cancerous product. In other instances, no fungus or projections will be seen, but the prostate will be enlarged, the malignant affection confining itself to the limits of the enlarged organ, with ulceration and disintegration. Cancerous matter may be found to exist in the neighboring glands and veins, in all cases.

As to the *treatment*, we can not hope to effect a cure; palliation is all that we can do, relieving pain by sedatives and anodynes administered by mouth, and by injection per urethra and rectum; checking undue hemorrhages by the internal administration of astringents, also injecting mild solutions of them into the prostatic part of the urethra; as, Gallic Acid, Geraniin, diluted Sulphuric Acid, Oil of Turpentine, Warren's Styptic Balsam, etc.; supporting the strength by nourishing diet; overcoming prostration by stimulants; and, in case the catheter becomes absolutely required to relieve retention of urine, introducing it with the greatest care and gentleness.

Anodyne suppositories in the rectum will often be found useful in lessening severe pain; and the Peroxide of Iron will be found valuable as a chalybeate tonic. The anodynes which have been the most useful, are, Belladonna, Conium, and preparations of Opium.

CYSTS AND TUMORS OF THE PROSTATE.

Cysts are rarely, if at all met with in the prostate, and, consequently, any knowledge concerning them is extremely meagre and negative. Among old persons the follicles of the gland are apt to dilate, and its excretory ducts to enlarge and close, and it is possible that these conditions may have been mistaken for cysts.

Tumors of the prostate are by no means uncommon; they are met with both when the organ is of natural size, and when it is hypertrophied. Sometimes they may project inward so as to be imbedded in the prostatic tissue, but remaining unconnected with it, or else slightly united to it by means of a few fibres; at other times, they grow from the surface of the gland, and may be apparently continuous in structure with that portion of the gland upon which they are seated, or, may be only partially connected with the gland structure.

As to the *causes* of these tumors nothing positive is known;

as *local* causes, irritations, excesses, inflammations repeated more or less frequently, gonorrhea, diseases of the rectum, stone in the bladder, etc., have been named; as *general* causes, tubercle, cancer, and syphilis.

The *symptoms* of prostatic tumors vary, according to their size and location. Some patients may be affected with a prostatic tumor, without any troublesome symptoms that might lead to a suspicion of its presence. But when the increased size of the prostate effects a change in its position, as well as in the dimensions and the direction of the corresponding region of the urethra, we will then have, as a prominent symptom, more or less difficulty in micturition. The stream of urine may cease flowing for a few moments, and then come on again, as usual; or, beside this interruption in the flow, sudden checks to it may also occur, as if the neck of the bladder were closed by a valve. In certain instances, the urine is only voided drop by drop, and the greater the efforts made by the patient to empty his bladder, the less will be the amount of fluid expelled. Again, there may be a complete retention of urine. These several forms of dysuria may be transient or continuous, and sometimes they will follow each other in succession.—Incontinence or involuntary flow of urine, is sometimes present instead of the dysuria above referred to.

Other symptoms will also manifest themselves, as a sense of weight at the fundament, or a burning sensation, or, acute lancinating pains. Constipation is generally present, and the inferior portion of the rectum may be congested or subject to piles. Indeed, the symptoms very much resemble those named under "Hypertrophy of the Prostate," to which the reader is referred.

The prostate being accessible by the rectum, this mode of exploration should not be neglected to verify prostatic diseases; but, it does not always give positive indications. In fact, the finger introduced into the rectum will give, at the most, the sensation of any development of the gland, of the inequality of its lobes, its projections, its depressions, etc.; but, as all tumors generally develop themselves toward the urethra, the rectal exploration will be of little service. And when the tumor carries the prostate high up in the pelvis, it is but slightly, if at all, appreciable to the finger. In such cases, if the finger can be made to come in contact with the gland, the other hand may be placed upon the abdomen immediately above the pubic bone, and by a kind of palpation, the enlarged organ may be seized between the finger in the rectum, and the hand at the pubis, and its volume be thus verified.

Catheterism has been named as one of the best methods for determining prostatic tumors; but we can not rely upon it to form a positive *diagnosis*, as it may be extremely difficult, if not impossible, to determine between a hypertrophy of, and an outgrowth from, the gland. The operation requires much skill and experience; sometimes the instrument passes in very easily, at other times it passes with great difficulty, or, perhaps, can not be introduced at all. If there is no urethral stricture, the large catheters with rounded beaks pass the most readily. The necessity for considerably depressing the external extremity of the catheter, or of inclining it to the right or to the left, in order to enter it into the bladder, are so many evidences of a tumefaction of the prostate, indicating the deviation of the prostatic part of the urethra.

When the catheter is in the urethra, we may sometimes feel it through the prostato-rectal walls; if it appears to be separated from the finger by only a thin layer of tissue, we may conclude that the lateral lobes are enlarged, as well as displaced.—If the urine passes through the catheter with a normal projection, or, even slightly augmented in power, it indicates that the contractile force of the bladder still remains. If there is a slight hemorrhage at the commencement, or at the termination of the micturition, it will have the more value as a symptom, if the surgeon has practised the operation so carefully as to give rise to no suspicions of an accidental tearing of the tissues.

In our endeavors to form a correct diagnosis, we must be very careful not to confound a prostatic tumor with a stone in the bladder, much less with a fissure of the anus. The preceding descriptions will be sufficient for the differential diagnosis.

The surgical diagnosis, or a determination of the form, size, and position of prostatic tumors, as well as of the condition of the bladder, whether there be a calculus or other obstruction present, can not be established by means of ordinary catheters, but by those especially made for this purpose. There are three forms of the instruments which have been successfully used; one by Leroy D'Etiolles, the other by Aug. Mercier, and the third by Henry Thompson; they are straight instruments with a very short curve or beak at their extremity.

The sound or catheter of Mercier, is simply a stem, straight throughout nearly its whole length, or to within one-half, or three-quarters of an inch from its vesical extremity, where it is curved nearly at a right angle, 100° to 110° at the most. The external extremity is furnished with a polygonal plate perpendicular to the plane of the curved portion; a mark is placed upon that face of it

which corresponds with the beak. The stem ought to be graduated on the side of the beak as well as on the opposite side, and the end of the beak should be well rounded. The diameter of this instrument should be that of a rather large catheter.

The sound of D'Etiolles has its curved part somewhat less in length than that of ordinary catheters, having an expansion and a plate or disk at its external end, and the curve at its vesical extremity somewhat less than that of Mercier's.

The sound employed by Thompson is made of steel, somewhat like the one ordinarily used in sounding the bladder, with a short beak, not over an inch in length, slightly bulbous and solid, and curved at an angle less than the preceding ones, but much greater than that of an ordinary catheter. As it is useful to have these sounds hollow, so that the amount of fluid in the bladder may be diminished or augmented, without removing the instrument, this steel one is made hollow, having its eye or vesical orifice on the convex side of the beak about half an inch from its extremity.

In diagnosticating prostatic tumors, either of these instruments may be used; perhaps, in certain cases one form may be found more useful than the others, but this can only be determined by actual experience. Great care and gentleness is required in the manipulation with these sounds; and we must not expect in all cases to be able to succeed either in entering the bladder, or in determining the form, etc., of the tumor. The following are the modes recommended to diagnose tumors and hypertrophy of the prostate, by means of these catheters or sounds:

1. *Means of recognizing tumors which protrude into the bladder.* The instrument having been introduced into the bladder, the stem must be held nearly parallel to the axis of the body; we then draw the beak against the anterior margin of the vesical neck, and from thence slowly rotate it on its axis to the right and to the left, causing it to gradually pass all around the circumference of the orifice of the neck, constantly making slight traction upon the *external* expanded extremity so as to keep the beak close to the vesical neck. If the prostate is healthy, the beak will pass over the whole tract without undergoing any elevation, and the stem will remain in its original position; but if there is a tumor at the neck of the bladder, the beak will be arrested in its movement, and in order to pass the obstacle, we will have to elevate the beak proportionately to the height of the eminence, after which it will descend again as we continue the rotation and a moderate degree of traction. The plate at the external extremity indicates the side upon which the beak is arrested; the arc of the circle passed through from the moment the

sound commenced to ascend until it returned to its first level, will give, approximatively, the breadth of the tumor, and its depth or height is determined by observing the number of the degrees graduated on the stem, that are carried into the urethra with the elevation of the instrument. We may determine if the tumor is pediculated or has a large base, by the more or less abrupt manner in which the beak ascends and descends.

2. *Means of recognizing valvules, bridles, or bars at the neck of the bladder.* Prostatic bridles or bars have sometimes, a common character with tumors, requiring the beak to ascend in order to pass beyond them; but, in the former case this ascension occurs gradually, insensibly, while with a tumor it takes place very abruptly. In both cases, at the moment when the angle of the sound passes the neck of the bladder, it will be felt to approach the symphysis with a jerk; but this is more marked with a bar, than with a tumor. If the beak be turned downward to the bas fond, we may readily withdraw the instrument through the urethra, if the prostate be free from any tumefaction; if there be a bar, considerable force will be required to withdraw the instrument; if there be a tumor, the beak will hook against it, and will not leave the bladder until its position has been changed so as to free it entirely from the tumor.

If, in passing the beak through the prostatic portion of the urethra, we observe it to rise gradually, the external stem being at the same time depressed considerably below its original position, there is, probably, a spheroidal enlargement of the median portion.

3. *Means of recognizing prostatic tumors projecting into the urethra.* After having explored the bladder, gently draw the instrument back into the prostatic region of the urethra, pressing lightly upon it at the root of the penis, (its upper aspect), just under the symphysis pubis, so as to press the angle of the sound, or the salient part of its curve, against the posterior wall of the prostato-urethral region; then draw the instrument forward without elevating its stem toward the body as in ordinary catheterism, and without removing it too much from the axis of the patient's body (15° to 25°). When there is a simple enlargement of the prostate in the antero-posterior diameter, the beak traverses it easily, without inclining to the right or left. If, on the contrary, there is a projection of one of the lateral lobes, the beak, in passing this spot, inclines to the opposite side; the exterior plate or handle indicates this movement, and the direction in which it is made. This operation does not always give positive information; we can not always succeed

at the first trial, even when the tumor projects considerably, for a very simple reason.

If, the angle of the sound remains pressing against the wall or rather against the posterior groove, the beak not deviating, or, deviating but very little from the anterior, a change of direction will not be possible, because neither of these walls abandon the median line. To be successful with the exploration, we must, keeping the salient part of the curve against the posterior wall, pass the beak pretty near the tumor or close upon it, because it will not fail to incline toward the opposite side. Consequently, if a first attempt does not succeed, we must make a second and even several others, varying the degree of inclination of the sound each time. (*See Diagnosis of Urethral Strictures*, page 967.)

Whatever may be the nature of prostatic tumors, they may all cause mechanical disturbances in the functions of the surrounding organs, the mode of effecting which has been ascertained by *post-mortem examinations*. This influence may be exerted in several different ways, as follows:

1. *Displacement of the tumefied prostate.* When the prostate is tumefied, it can not advance toward the perineum, because it is checked by the aponeuroses; consequently, it ascends in the pelvic cavity and recedes from the anus, at the same time advancing toward the front. These prostatic displacements are important in the diagnosis. When we explore the parts per rectum, the finger will, in these cases, have to penetrate more deeply than in the normal state in order to reach the superior limit of the gland, and, it would be a great mistake to conclude there was no tumor, because, the finger, having been carried only one, two, or three inches within the rectum, has not conveyed a very clear idea of its presence.

The displacement above and in front, is sometimes very manifest; this is when the prostate ascends behind the pubic symphysis, dragging along with it the neck of the bladder, elongating the urethra which undergoes a considerable increase of curvature, and which does not occur when the tumefaction or tumor occupies only the sides. This displacement presents an important practical application. If, on the contrary, the tumefied prostate can be distinguished only with difficulty by the rectal touch, hypogastric palpation will furnish valuable information.

2. *Influence of prostatic tumors on the urethra.* This influence is manifested upon the length, form, and capacity of this canal.

a. Lengthening. Prostatic tumors when advanced to a certain degree, inevitably augment some of the diameters of this gland,

and, in some cases, even lengthening all of them simultaneously. From this, a considerable lengthening of the prostatic portion of the urethra frequently follows, and this elongation is carried toward the pelvis. The middle aponeurosis of the perineum embraces the membranous portion of the canal too solidly to permit this to move upward; while, on the contrary, the prostatic portion experiencing only a feeble resistance from the pelvic fascia, gradually encroaches upon the cavity of the lesser pelvis. This explains why the prostate advances upward and backward.

This elongation may extend from one-third of an inch to an inch more than in the normal state, and which it is important to bear in mind, lest the physician from an ignorance of the fact, may seriously deceive himself during catheterism.

In the normal state, the catheter having passed under the pubis, enters the bladder almost immediately, because there is only about an inch for it to pass, between the membranous portion and the entrance into the bladder. But, in the case of tumors or tumefaction, the urethra elongates more or less, and then the catheter must be introduced to a much greater depth in order to reach the cavity of the bladder. If not apprised of this fact, the physician may believe that the instrument is in the bladder when it is only at the prostatic part of the urethra. Cases are met with in practice, where this elongation is so great that ordinary catheters are hardly long enough for their beak to be carried even as far as the apex of the trigone, and, consequently, longer ones are required.

The extension of the antero-posterior diameter presents many varieties. If the tumefaction bears equally upon all the diameters of the gland, the conformation of the urethra will not be much modified. More frequently this tumefaction is irregular; sometimes occupying a single lobe, sometimes occupying both lobes simultaneously, but in an unequal manner,—from which it necessarily follows that the form of the canal becomes very irregular. It then presents bars or small protuberances and depressions, which are situated on each side of and behind the verumontanum. If, in such case, the superior and inferior urethral walls have their normal length, and if catheterism be practised and we do not abandon these walls, we will believe there is no tumor.

The superior part of the prostate does not modify the length of the urethra to any great degree, because of its fixity to the pelvis by the vesical and pubo-prostatic ligaments. It is different with the inferior part of the prostate, where tumors are more frequently located. The extension of the prostate, occasioned by these tumors, rarely, if ever, advances downward, where the middle

aponeurosis of the perineum hinders the further progress of the tumefaction in that direction. The abnormal development of the parts is especially established between the apex of the trigone of the bladder and the anterior extremity of the verumontanum.

The tumefaction being thus prevented from advancing upon the perineal side by the aponeuroses, it projects backward, and into the rectum, which it may constrict or flatten, and obstruct, to a greater or less extent, the evacuation of this intestine. If the swelling occupies only the median portion of the gland it will depress the rectum in the median line, as if to divide it into two equal parts.

In those cases where the sides of the prostate only are attacked, we may find a gutter, a kind of concavity in the rectum, in the shape of a half-moon which will tend rather to constrict the intestine transversally, than to flatten it from before backward.

b. Deformation of the urethra by tumors. At the first glance, we would be led to believe that a tumor in proximity with a depressible canal like the urethra, would compress it and diminish its capacity; but it is not the case,—the most superficial observation shows that the urethra is very much amplified in prostatic tumors. In subjects affected with an enormous prostatic tumor, the urethra has been found so enlarged as to easily permit the introduction of a finger. Strictures proper, never exist in the prostatic portion of the urethra, and if there be found an obstacle to the advance of the catheter in that region, it must be due to tumefaction or a tumor.

When the two lateral lobes of the prostate are tumefied, the urethra is flattened on the sides. If the tumefaction is regular, the two opposed faces will be in more or less close contact. If the tumors are rounded, globular, they will come in contact by their culminating points, from which there will result a kind of double channel in that part of the urethra; a canal with a superior and inferior branch at the point of contact of the two tumors. To reach the bladder, we may pass the catheter either into one or the other of these branches, according as we elevate or depress the beak of the instrument after it has passed the concave border of the subpubic ligament. A straight catheter, or one improperly curved, will not pass by the superior branch, but will, on the contrary, enter the inferior channel without much trouble.

The lateral walls of the urethra present many modifications. If a tumor be located on one side of the prostrate only, there may result three different dispositions. If the tumor projects forward, it will force the prostatic portion of the urethra on the opposite

side, to the left if the tumor is on the right side, and vice versa. This will give rise to a canal very obliquely directed from before backward in the pubis, and zigzag immediately behind; when the catheter is passed into a canal of this kind, its progress will be checked as soon as the beak reaches as far as the exterior part of the prostate. Under such circumstance we will be apt to make a false passage, if we do not incline the beak of the instrument toward the side of the first deviation, and immediately after incline it in an opposite direction.

If the tumor is situated at a part of the lateral wall of the urethra, it projects toward the interior of this canal, depresses the wall of the opposite side and forms a kind of hood or cap of it. In this case, the prostatic portion of the urethral canal forms a half-moon curve, concave on its healthy side, convex on its diseased, and which gives rise to the same difficulties in catheterism as the preceding, if this is the only deviation—being a little less abrupt on the perineal side, and rendering the passage of the beak a little less difficult.

If the tumor is situated behind the lateral wall of the urethra, in the neighborhood of the neck of the bladder, in projecting by its free side, it will place itself in contact with the other side of the vesical neck, in such a manner as to more or less completely, and often even completely, close the deep-seated orifice of the urethra. In such cases, this orifice is closed as if by a valve; and if catheterism be attempted, the instrument will be arrested only near the termination of its passage, and will not enter the bladder until after having undergone a deviation in the direction in which the opening into the bladder may be found.

If both sides of the prostate are the seat of tumors unequal in size and number, and if the single tumor is in the center, and corresponds to the double tumor of the opposite side, so that they reciprocally fit each other, they will give a half-moon curvature to the urethra, the same as stated in the preceding instance; but if, as frequently happens, each side of the prostate contains several tumors, we must expect to find them in some way toothed or dove-tailed, as it were, with each other, so that this part of the urethra becomes only a zigzag canal. If, instead of regularly occupying the sides of the gland, the several tumors are located here and there without order or symmetry, some in front, others behind, and others above or below, the difficulty in passing the catheter under these circumstances, may readily be comprehended. The urethra becomes, in this case, a kind of anfractuous canal, through which a sound or catheter may pass by chance instead of skill.

The vesical opening of the urethra also presents important modifications as a consequence of the proximity of these tumors. When both sides of the prostate are equally tumefied, the urethral orifice will resemble a funnel, or rather a gap directed from the pubis to the trigone. From this disposition of the parts, but little impediment to the flow of urine will be presented, and the tendency will be to an incontinence, instead of a retention of urine.

The posterior wall of the urethra undergoes several very variable modifications according to the size, situation, and form of the tumor. As all tumors of the urethral region generally have their origin behind the verumontanum, this part of the urethra becomes gradually enlarged, and eventually presents a concavity which may acquire a depth of from one-seventh to one-third of an inch on each side; if the tumor is broad, thick, and non-pediculated, it extends the walls of the gland so as to make the excavation of the inferior urethral wall as broad as it is deep. Tumors, with broad base, which project in the form of small embossments into the urinary passage, give a triangular form to the urethral opening, the base of which is represented by the vesical trigone, instead of a transverse button-hole form. (*Velpeau.*)

c. Valves, bridles, bars, or *urethro-vesical crests.* Tumors of the prostate very frequently develop projections into the urethra, which have been differently named by authors. These projections, bars, excrescences, etc., are seated above the verumontanum, at the apex of the vesical trigone, that is, at the entrance into the bladder. They form a transverse ridge or elevation, which may be more or less prominent. In the normal state, the trigone of the bladder in the adult, is placed upon the same plane as the prostatic portion of the urethra; but when these crests are developed, the urethra becomes gradually placed upon an inferior plane, so that the beak of the catheter having reached the inferior wall of the canal, is arrested in its progress by the projection. The height of this bar or excrescence, is sometimes very great, reaching, upon the urethral side, an elevation of nearly two inches, and upon the vesical side, an inch to an inch and a half, or more. Seen by its urethral surface, the projection represents a pyramid with its base at the neck of the bladder, and its free extremity or apex in the urethro-vesical cavity.

Under other circumstances the tumor of the middle lobe does not have this regularity; instead of being transverse, it has a globular form, slightly pediculated at its base, susceptible of being moved to the right or left, like a polypus, and, consequently, acting as a valve.

All these dispositions are important for the operator to be acquainted with; for if the beak of the catheter, having reached the neck of the bladder, comes in contact with one of these obstructions, and be forced onward to pass it, a false passage may be made through the obstacle. Indeed, these tumors or bars render catheterism very difficult, if not impossible.

One important point to elucidate is, the structure of these bridles or urethro-vesical obstructions. If we raise the mucous membrane, we will observe beneath it transverse fibres, the color, disposition, and relations of which, are of a muscular nature, and we will adopt this idea the more readily as the fibres are more considerably hypertrophied. In this case, the projection is transverse, regularly rounded, of slight thickness, and takes the form of a true bar. But, in another instance, this fibrillary disposition common to muscular tissue will not be present, there will be a dense, yellowish, irregularly-arranged tissue, having all the fibrous characters. This is the increased development of the middle lobe; the tumor formed by the projection of which has a more or less decided ovoid form. From which we may comprehend that retention of urine in prostatic tumors may not only be due to mechanical causes, but also to a more or less active power of the muscular contraction of the parts.

The bladder is often affected by the proximity of prostatic tumors. Its capacity may be diminished by the projection of these tumors into its interior; but, as there is frequently a retention of urine, the bladder may be considerably dilated thereby, and then the excess of the dilatation may counterbalance, to a greater or less extent, the diminution effected by the presence of the tumor. It is not, however, always so; sometimes the bladder does not enlarge, on the contrary, continually urged to contract itself, its capacity becomes more and more reduced, so that we have two causes present effecting one result, to wit, the presence of the tumor, and the contraction,—and the bladder may become almost as small as the prostate.

Sometimes, when prostatic tumors are present, they may give rise to, or be attended with, severe inflammation of the bladder. And it not unfrequently happens that the ureters and the kidneys become sooner or later attacked with inflammation, or some physical alteration.

Diseases of the prostate necessarily exert an influence upon the seminal vesicles. In simple hypertrophy they may be affected as well as the prostate, but in muscular or fibrous hypertrophy, they are more frequently atrophied. The ejaculatory canals are often compressed, or may have disappeared, and no pressure upon the vesicles will cause semen to make its appearance at the surface

of the urethra. In tuberculous tumors, the seminal vesicles are very often equally affected with the prostate. Changes may also occur in the vas deferens, and in the testicles, by prostatic diseases and tumors; having already glanced at them, under other heads, they will not be dwelt upon here. It may be proper to state that in some rare instances *polypus growths* have been found springing from the veru montanum, which are unlike any of the varieties of tumor heretofore named.

Varices of the prostate have also been met with; they more generally occupy the urethral part of the prostate, especially the superior segment of this gland; sometimes they exist in conjunction with varices of the bladder. Prostatic varices is more apt to accompany glandular than fibrous hypertrophy. Certain cases of urinary retention, which disappeared after a more or less abundant hemorrhage, have been attributed to the presence of these varices.

Other morbid changes have been occasionally met with in the prostate, as, osseous, and fibro-cartilaginous concretions; fatty matter in the interior of the gland; yellowish, glistening tracks, staining paper like oil, etc.

Prostatic tumors may exist alone, or they may be associated with hypertrophy of the gland; and as their *treatment* is in some measure similar to that adopted for hypertrophy, the reader is referred to the following article not only for this, but also for some remarks relative to symptoms, etc., which are equally applicable to either tumors or hypertrophy of this organ.

HYPERTROPHY OF THE PROSTATE.

By Hypertrophy of the Prostate is meant that condition of the gland which is characterized by increased growth of one or all of its parts, accompanied with an augmentation of its weight, volume, and sometimes of its consistence, but without any morbid change of its intimate structure. The disease is one peculiar to persons of advanced age; though some rare exceptions have been met with in adults, and even in childhood. Brodie says, "when the hair becomes gray and scanty, when specks of earthy matter begin to be deposited in the tunics of the arteries, and when a white zone is formed at the margin of the cornea, at this same period the prostate gland usually, I might perhaps say invariably, becomes increased in size."

The *causes* of chronic enlargement of the prostate are involved

in much obscurity, as will be observed by the following brief sketch of the views of the most experienced authors, relative thereto. My own opinion is, that anything which will create and keep up a continued low grade of irritation in the gland, may be considered a cause of this affection; and I am led to this belief from the fact that in the very numerous cases I have attended, there existed, without a single exception, at some prior time, long-continued irritations of the prostate, resulting from various causes, which were followed by the symptoms common to commencing hypertrophy of this gland, and which gradually increased in degree.

Sir Astley Cooper, considered the enlarged prostate as due to age, and not as the result of disease. And the remarks of Sir B. Brodie, quoted above, imply that he also coincides with this view. Yet how many old men are there who never experience any of the symptoms common to hypertrophy of this organ? Erichsen also considers it a malady of old age, seldom occurring before the age of fifty, and being commonly met with after this. He does not consider it as being a disease proper, unless the enlargement advances to such a degree as to interfere with the free escape of urine. He adds, "though age must be looked upon as the primary cause of this particular hypertrophy of the prostate, there can be little doubt that it may be predisposed to by any continued source of irritation of the urinary organs, such as gonorrhea, strictures, or hard living. Enlargement of the prostate is principally due to fatty degeneration of, with phosphatic deposits in, that organ, the texture of which is usually indurated, though sometimes it has been found to be looser and softer than natural."

Sir E. Home, Wilson, S. Cooper, and others, attribute the enlargement to stasis of the blood in the pelvic cavity; thus, Home names horse-riding as a proximate cause; Wilson states that he has met with cases justifying the observation that the hypertrophy occurs more frequently among those who, having been strictly continent, have not called the genital organs into that degree and kind of exercise naturally designed for them, as well as among those who have been excessive in their sexual acts. But, he also states that many persons who have lived a moderate and quiet life, without approaching either of the above-named extremes, have suffered from enlargement of the prostate. S. Cooper, after stating the cause of the complaint to be unknown, adds that he has known several very sedentary persons to be afflicted with it. Mercier, regards sedentary habits as predisposing causes, and names shoemakers, house-porters, weavers, and tailors, as forming a large part of his hospital cases; he also enquires whether a prolonged vertical

position of the body, may not develop the same results as a sitting one?

Vidal believes enlargement of the prostate to be promoted by irritations, by persistent urethral diseases, or which existed in early life. Sir Chas. Bell believed irritation of the bladder to be a frequent exciting cause where a tendency to prostatic hypertrophy was present. Desault speaks of the malady as being common among elderly persons who have suffered from repeated gonorrheal attacks. Amussat names, syphilis, foreign bodies in the bladder, urethral strictures, the long use of sounds or bougies introduced by the patients themselves, thereby causing a chronic inflammation of the gland, as among the most common causes. Organic stricture of the urethra has long been considered a cause of prostatic enlargement by nearly all authors, though denied by some. Calculus in the bladder has likewise been named as an exciting cause, though doubted by Mercier and some others.

Dr. Gross, in his excellent work on surgery, says: "Hypertrophy is always produced under the influence of causes which act in a slow and permanent manner. Whatever, therefore, has a tendency to keep up habitual engorgement in the organ may be considered as being capable of producing the affection. Augmented action necessarily occasions an augmented afflux of blood, and a corresponding increase of nutrition. Diminished action has a reversed effect. Among the more frequently enumerated causes of this disease, are excessive venery, stricture of the urethra, disease of the bladder, horseback exercise, gonorrhea, and the employment of stimulating diuretics; but, in general, the influence of these causes is rather apparent than real. They are, no doubt, all capable of inducing the disease; but, on the other hand, it is equally certain that they are often accused when they are entirely innocent. Some of the very worst cases of hypertrophy of the prostate occur in old men who have led the chastest lives, who have not rode on horseback for forty or fifty years, and who have never had the slightest disease of any kind of the urethra.

"Hypertrophy of the prostate is emphatically a disease of old age. The *senile* form of the lesion rarely takes place, at least not in any considerable degree, before the fiftieth year; slight manifestations of it are occasionally met with at forty-five, and, indeed, even at forty, but this is exceedingly rare, and constitutes an exception to an important general law. Hypertrophy, not the result of old age, may occur at any period of life, under the influence of inflammatory excitement and vascular engorgement." It must be borne in mind, however, that the hypertrophy referred to in

the last sentence quoted, is unlike that met with in advanced years; the former is due to a morbid deposit, an interstitial plastic effusion occasioned by the inflammation, while the latter is independent of such inflammatory action, and involves the prostatic tissue itself, being, in fact, an undue development of this tissue.

Exposures to cold, use of vinous, malt, or alcoholic drinks, gout, rheumatism, scrofula, lymphatic temperament, recession of cutaneous diseases, external violence, improper use of catheters or bougies, astringent injections for the cure of gonorrhea, habitual straining at stool, masturbation, seminal losses, the long-continued habit of holding the urine in the bladder for hours after experiencing the call to evacuate it, have all been named as exciting or predisposing causes of this affection; of the last three named causes I do not entertain a doubt.

The prostate has been termed the male homologue of the uterus, as there exists between the two organs a great similarity in the character of their constituent tissues, and in the manner in which these tissues are consolidated. H. Thompson, who has given considerable attention to hypertrophy of the prostate, considers it, as well as hypertrophy of the uterus, to be due to some force inherent in the structure of the organs, or associated intimately with some function peculiar to them, and that when the tendency to hypertrophy exists, all circumstances which induce active determination of blood to the locality may aid in its development.

My own view is, that the inherent force referred to by Dr. Thompson is a long-continued or oft-repeated irritation, of a certain degree, in the parts, not sufficient to excite morbid depositions, or decomposition of tissue, but capable of effecting a more or less active determination of blood, disposing the tissues to hypertrophy at that period of life when their vitality has become diminished in its plus or resisting power. And hence the reason why the remark of Dr. Gross is correct, viz.: "Hypertrophy of the prostate is emphatically a disease of old age." For, generally, the vital resisting power of the system begins to diminish at the fiftieth year, and gradually becomes more and more feeble.

Hypertrophy of the prostate is usually observed between the ages of fifty-five and seventy, rarely at fifty, and if not present prior to the age of seventy, it is seldom observed after this age. Although it is a disease peculiar to advanced age, yet all old persons are not subject to it; perhaps one out of every three or four may have a slight tendency to it, but any well-marked symptoms of considerable enlargement will be met with in only one out of

every eight or ten persons, on an average. It is seldom that prostatic enlargement is painful, at least not much so until at an advanced period of the disease. As the symptoms of this affection are nearly identical with some of those accompanying chronic affections of the kidneys, bladder, or urethra, great care must be taken not to confound it with any of them, and especially with those of stricture of the urethra.

As a general rule, the *symptoms* of prostatic hypertrophy, in its early stage, are so slight as hardly to be noticed; indeed, the disease may continue for months or even years before the patient's attention is called to it. In many instances, a sudden and complete retention of urine, following an exposure to some exciting cause, will be the first symptom noticed by the patient, indicative of the enlargement. These irregularities in the symptoms appear to be due to several causes, such as the partial or complete hypertrophy of the gland, the nature of the enlargement, the character of the constitution, habits of the patient, etc. The symptoms of prostatic tumors and prostatic hypertrophy, are so closely allied as to render it difficult to distinguish between them.

One of the earliest symptoms generally observed, is a loss of power in urinating, and the urine flows with less promptness than in former years; these symptoms gradually increase, until considerable effort or straining will be required to project the urine to an ordinary distance from the body. Sometimes, however, these efforts instead of causing a more ready expulsion of the water, tend rather to interfere with its flow. The calls to urinate gradually increase in frequency, the urine flows more slowly than natural, and when the stream ceases the patient does not experience the same satisfactory degree of relief as in former years; there remains a sense of slight irritation at the neck of the bladder, as if a portion of urine were still within this reservoir, and which is, indeed, generally the case. In some instances, the desire to pass water will occur every half hour or hour, and so strongly that the patient will have to make considerable efforts to retain it until he can reach a suitable place for its evacuation, and then, he will be surprised at the small amount of urine voided, or rather, at the disproportion between the degree of the desire to urinate and the quantity of urine ejected.

After a time, the first morning evacuation of the bladder will be followed in a few minutes by a renewed desire to urinate, which will result in the passage of a few drops or a small quantity of urine being discharged, but, generally, without the satisfactory sensation of a complete emptying of this reservoir experienced by persons in

health. Sometimes this desire will be repeated every few minutes for several times in succession. Finally, the patient will not only be frequently called upon during the day to discharge urine, but will also be disturbed through the night, one, two, or more times, by these calls. The sensation of uneasiness experienced at these times, from the irritation at the neck of the bladder, varies in degree from a sense of weight, fullness, or indescribable sensation, even to an actual pain, and extends from the perineum toward the sacrum in the direction of the urethra, and also to the inner and superior part of the thighs, to the pubis, and to the hypogastrium. This pain is especially apt to be felt after having remained for a long time in a sitting posture, in a car, or coach, with the whole weight of the body resting for several hours upon the perineum.

The character of the urinary difficulty will frequently be found to vary, and will not always be in relation with the development of the prostatic disease. Thus, many patients will preserve the faculty of freely urinating, even to the last, while others in whom the hypertrophy is much less advanced, will experience the most marked derangements. Again, in a great number of cases there will be experienced, particularly when the patient finishes urinating, or just after the last drops of urine have been expelled, at the moment when the walls of the bladder apply themselves upon the tumor formed by the enlarged prostate,—a more or less painful sensation, somewhat resembling that experienced by persons having stone in the bladder. More often the patient urinates frequently; awakes during the night to evacuate urine, and the fluid is not projected, but falls between the legs; the stream being flat and deviating as it passes out. In these cases the bladder is never entirely empty, its contents not being expelled below a certain level; this organ is constantly inflamed and irritated by the presence and the forced retention of the urine; a vesical catarrh soon comes on, which the physician as well as the patient may regard as the principal affection, but which, on the contrary, is only a consequence of the abnormal development of the prostate gland.

Among all patients who can not completely evacuate their bladders from prostatic hypertrophy, even the most timorous, those who dread the most the use of the catheter, a sudden and satisfactory feeling of relief and well-being is experienced immediately after their bladders have been emptied by this instrument. If we cease the use of the catheter too soon, or do not recur to it at the accustomed hours, more or less serious symptoms may set in.

As the hypertrophy advances, the uneasy sensations experienced about the pubes, perineum, etc., increase in severity; smarting sen-

sations, aching pains or shooting pains are felt in the urethra, frequently extending to the glans penis. The patient suffers from pains in the testicles, which are sometimes found swoln and tender to the touch. When there is considerable enlargement, attended with a constant feeling of weight and bearing down, or when frequent and great efforts are made to expel the urine, more or less rectal irritation or tenesmus is experienced; and the attempts made to evacuate the bowels, in these cases, eventually produce prolapsus of the anus or hemorrhoids. Evacuations of prostatic fluid, and occasional nocturnal emissions of semen, are by no means uncommon among patients afflicted with the malady under consideration.

The progressive development of the hypertrophy does not successively involve difficulty of urinating, incontinence, retention; this order is often inverted; sometimes the derangement commences with incontinence, sometimes with a complete retention. This incontinence is rather an overflow, or a condition in which the bladder is constantly filled with urine, the excess passing either by a partial urination, or leaking away by drops. This dribbling is more apt to occur at night, when the patient is in bed, though it eventually happens in the day-time also.

At almost any period of the hypertrophy a complete retention of urine may take place upon exposure to some of the exciting causes, as, irregularity in diet, irritating drinks, sexual excitement, cold or damp, retaining the urine for some time after the desire to pass it has been felt, etc., and if the retention be not relieved it will terminate fatally after a longer or shorter time. If the retention does not occur from the exposure just referred to, it will ultimately take place as a consequence of the enlarged gland obstructing the urinary canal. The symptoms, heretofore referred to, slowly increase in severity; it becomes very difficult for the patient to urinate, and it is rarely effected except by persistent straining, which straining augments the rectal difficulties, and not unfrequently gives rise to hernia. The patient makes use of various means to favor the flow of urine, he extends his legs to enable him to make more powerful efforts; he leans forward; pulls at the penis, etc.

As the symptoms become more aggravated, the constitution suffers more and more; there is a gradual loss of strength and appetite, the skin becomes sallow, or, perhaps, pale; the indications of age become much more strongly marked and manifest themselves with more rapidity; febrile attacks often present themselves; the mind becomes peevish or irritable, or the patient becomes careless and inattentive to the most important matters;

the powers of the system gradually fail, and a complete retention, a sloughing of some portion of the gland, excessive nervous exhaustion, hemorrhages, or uræmic poisoning, terminate the suffering patient's existence.

The changes which occur in the urine should, especially, be observed. This fluid at first clear and apparently healthy, gradually loses its transparency, becomes slightly cloudy, with a few small threads or flocculi floating in it; and upon standing deposits more or less mucous with phosphatic matter and crystals of triple phosphates. Not unfrequently a whitish opaque layer will cover the surface of the urine, which may or may not be iridescent. As the disease advances there is an increased deposit of mucus, which becomes thick, ropy, slimy, and very adhesive, does not mix with the urine, contains an increased quantity of triple phosphates, and adheres strongly to the sides of the vessel holding it; and the urine itself when passed, is turbid, opaque, of a pungent, ammoniacal odor, or more or less fetid, and alkaline. If blood be present in the urine, this fluid will be colored reddish-brown, or will present a dark, dirty hue. These characters of the urine are due to its decomposition in the bladder, for however much urine may be voided by the patient, the bladder is never completely emptied; from half an ounce to a pint or more, according to the degree and character of the obstruction at the neck of the bladder, is constantly present in this organ undergoing decomposition as well as abnormally influencing the walls of this reservoir.

If the urine be examined under the microscope, epithelium, blood and pus-corpuscles, large granular globules, uric acid, oxalate of lime, amorphous phosphate of lime, triple phosphates, and uriniferous tubes will be observed, the particular kinds of which and their quantity being dependent upon the peculiarities of the disease and its accompanying secondary affections, in each individual case. But, whatever, other appearances the urine may present, amorphous phosphates and more or less numerous crystals of the triple phosphate of ammonia and magnesia will always be present as essential characteristics of the disease.

It is frequently the case that blood will be observed in the urine, which may be owing to the passing a catheter over an ulcerated or tender surface; to the attempts made to introduce an instrument, when this it found to be difficult; or to an enlarged and congested condition of the capillary veins of the lining membrane of the bladder.

A correct *diagnosis* of prostatic hypertrophy can not, however, be formed from the symptoms alone, because these may be due to

some other cause; it will be necessary to institute a manual examination, which will give positive indications, and which is accomplished by means of the catheter, and the finger in the rectum.

The patient, having previously had the rectum well cleansed, is placed upon his back, on a bed or other convenient article, with his knees drawn upward and somewhat extended apart from each other. The catheter may now be gently introduced into the bladder, if required. But whether this be done or not, the physician, having the nail of the index finger of the left hand cut quite short, and having thoroughly oiled it, gently, slowly, and carefully passes it through the sphincter into the rectum, entering it as far as possible. The method of determining the healthy prostate has already been given on page 1096.

Having introduced the finger, he must, before withdrawing it, ascertain the following points, viz., whether the prostate is enlarged; the direction of the enlargement; whether one or both lobes are affected by it; the extent of the enlargement; whether the gland is uniformly enlarged in its breadth, or forms a globular projection into the rectum; or whether the enlargement is irregular, knobbed, or mammillated? Not unfrequently the enlarged gland will be felt as soon as the finger enters the rectum, and we will have to depress the tip of the finger very much in order to pass it beyond the presenting surface of the swoln prostate. When the finger has been carried up as far as possible along the median line, and meets with a fullness and hardness instead of the yielding coats of the bladder at this part, this will be due to tumor or enlargement of what has been termed the "middle lobe," or, rather, the "median portion" of Cruveilhier.

He must also ascertain the character of the enlargement as to its consistence; whether it is soft or hard; regularly so, or unequally so at various points; or, whether it contains fluid? Can fluctuation be distinctly appreciated beyond the enlargement? "In the latter case, the right hand should be applied to the hypogastric region, and firm pressure made there, with the view of ascertaining if a large body of fluid, such as a distended bladder, can be pressed down upon the apex of the finger, in the rectum below; then gentle but sudden taps should be made on the same region, for the purpose of imparting the wave-like impulse which, under such circumstances, will be communicated. This proceeding constitutes an important mode of verifying the condition of the bladder, and the proper position for the trocar, when the operation of puncture by the rectum is about to be performed, or its applicability to the case in question has to be determined. At

the same time, the situation of arterial branches is ascertained, one or two of considerable size may generally be felt lying a little to the right or left of the middle line, and sometimes crossing it, branches of the hemorrhoidal arteries. The presence of prostatic calculi may generally be thus ascertained, being usually felt with ease, when rather large or numerous, lying in one or more cavities of the prostate, with very little tissue intervening between them and the walls of the rectum." (*Thompson.*)

Any tenderness upon pressure must be ascertained, by pressing upon the gland with considerable firmness, at its center, as well as at its extreme right and left margins; the locality of the tenderness must be noted, also its degree, and the sensation caused by the pressure, as described by the patient at the time. Heat, tension, and severe pain are indications of inflammation.

If the catheter has been passed into the bladder, he may determine the thickness of the tissue which intervenes between it and the finger in the rectum, as well as the situation and direction of the prostatic part of the urethra. And should any calculi be in the prostate, by gently pressing the instrument downward upon the finger in the rectum, a grating sensation will be experienced by the examining finger.

If an ordinary full-sized catheter can not be passed into the bladder, or, if, having entered eight or nine inches within the urethra, no urine is found to flow; and especially, if, in entering it thus far, the handle had to be depressed considerably more than is usual, there will be no doubt of the presence of a hypertrophied prostrate. In such cases, in order to reach the bladder, it will become necessary to employ one of the catheters named on page 1143, Mercier's, d'Etiolles', or Thompson's; and the rules there given for their employment in prostatic tumors will be equally applicable in enlargement.

A medical writer, in reference to these examinations into the nature of the disease, its degree of development, extent, and complications, remarks:—"The patient being in the most favorable conditions, and the irritability of the urethra being diminished, the management of exploring instruments becomes more easy and more practicable. We must especially direct our explorations to the interior of the bladder; we must distend its walls by means of an injection in order to determine the condition of its internal surface, and to appreciate the morbid changes produced there. We must carry the exploring instruments over all its surface, without being rough, causing pain, or unpleasant symptoms; we must manœuver in the water, the walls of the bladder being distended as much as their elasticity will allow, without provoking painful sensations and

urgent desires to urinate. By this method, we can determine whether the tumor met with at the entrance of the bladder, and which is due to prostatic enlargement, is complicated or not with fungosities, induration, or thickening of the vesical walls. If the prostatic tumor be considerable, it will limit the exploration, so that it will be difficult, or even be impossible, for us to learn the true condition of the internal surface of the organ; we may not even be able to recognize the presence of one or several calculi contained in the bas fond of the bladder. We see then how important it is to act with skill and coolness, and to renew these explorations if the first do not sufficiently enlighten us, for we can not adopt any mode of treatment whatever, if we are not sufficiently decided as to the correct nature of the affection we are called upon to treat."

Prostatic enlargement may be *determined* from *stricture of the urethra*, by the introduction of a full-sized catheter or bougie; in stricture, an obstruction is almost always encountered before the instrument has passed six inches within the urethra; while in enlargement, the obstruction is not presented until eight or nine inches have been reached; or, if the instrument can be passed into the bladder, its handle will require to be more or less depressed than usual. Stricture is common previous to the fiftieth year; enlargement, after this age. Yet a person may possibly be affected with both at the same time.

In *calculus of the bladder*, the stream of urine may suddenly cease to flow, and at the termination of micturition there is apt to be more or less severe pain. Other symptoms are also present, which it is hardly worth while to name, as, after all, the catheter alone gives the most satisfactory indications of the presence of a calculus. A calculus may exist in connexion with an enlarged prostate; being frequently developed during the progress of the enlargement, by the deposits from the decomposed urine retained in the bladder.

Tumor of the bladder is very difficult of determination; the pain is more severe than in enlargement, and the passing of instruments is almost insupportable. The urine contains sanious matter, flocculi of the structure of villous growth, and blood.—In *chronic cystitis*, *atony of the bladder*, and *paralysis of the bladder*, a rectal examination will ascertain whether they are complicated with prostatic hypertrophy.

Post-mortem examinations have shown us that hypertrophy may involve all the prostatic tissues, either separately or collectively, and that it necessarily effects important modifications in the form, weight, volume, and structure of the gland. The volume of the prostate may be increased even to that of a turkey egg, although

it is more commonly met with about twice its original size; but, much depends upon the age of the hypertrophy, as, an enlarged gland of a few years' standing will be of less volume than one of fourteen or eighteen years'. A few rare cases have been met with in which the gland was as large as an orange, and in one case it was of the size of an average cocoa-nut. The healthy prostate varies in weight from four to nearly six drachms, or, four drachms and fifty grains on an average. The hypertrophied gland varies in weight from six and a half drachms to seventy-five drachms; the most common weight being from seven to twelve drachms, in proportion to the duration of the disease. In the extreme cases, there can be little or no difficulty in pronouncing upon the hypertrophy; but, especially when the gland is a little more or less larger than a horse-chestnut, the most experienced anatomist will be embarrassed in deciding whether there exists a real hypertrophy.

General hypertrophy is when the whole of the prostatic mass has its volume augmented, the gland preserving its natural conformation; its two lobes advancing behind the vesical neck forming a regularly-rounded relief around that region.—*Partial hypertrophy* is when only a part of the gland is affected, as, the right lobe, the left lobe, or the median lobe. As far as the structure of the prostate is concerned, sometimes it is only the gland proper which is hypertrophied, sometimes the muscular tissue, at others, the fibrous tissue, and, again, the vascular structure; or, all these tissues may be equally affected at the same time.

Hypertrophy of the glandular tissue of the prostate. This tissue is more especially hypertrophied when the median portion is affected. The tissue of the gland does not lose its consistence or softness; it is of a deeper-grayish color than in the normal state; and upon cutting into the tissue we can distinctly see the direction and the volume of the prostatic and ejaculatory canals. These canals, as well as the prostatic utricle, are more or less enlarged, and the prostatic canals usually contain an excess of fluid, less opaque, however, than in the normal state.

Hypertrophy of the muscular tissue of the prostate. The muscular fibres which pass from the neck of the bladder into the lateral parts of the prostate, being lost either in the body of the gland or at its surface, are very frequently hypertrophied. In some instances, these fibres are carried downward into the muscular portion of the urethra, and upward in the walls of the bladder itself, which walls are in their turn considerably hypertrophied. There is even a mutual association between hypertrophy of the bladder and that of

the prostate, due to this kind of muscular fibres; accordingly, whenever we discover a hypertrophy of the bladder, we may positively affirm that there is hypertrophy in the antero-lateral region of the prostate. It is in these cases, especially, that the lateral lobes of this organ, not sharing in the enlargement, being even atrophied by the compression, are carried outward and forward; and if we make a rectal examination while the catheter is in the urethra, we will feel this instrument through a thin membrane, so that at first we will believe that the urethra is carried backward. We may thus diagnose hypertrophy of the bladder, by induction.

But while the anterior fibres of the bladder are especially directed in the horizontal direction, the posterior muscular fibres have a transverse course, and may in their turn be hypertrophied; which is more frequently the case. This hypertrophy gives rise to a projection into the urethra, at the level of the vesical neck, and it is one of the most efficient causes of urethro-prostatic obstruction. We must not forget that the development of this portion of the muscular fibres of the prostatic mass is wholly independent of that of the antero-lateral muscular fibres; so that we may observe the lateral fibres very much enlarged, while the transverse are small, and vice versa.

Hypertrophy of the fibrous tissue of the prostate. The prostatic mass is traversed by fibrous septa which represent partitions, filaments, or bridles for each lobe of the gland; beside which, each prostatic duct is surrounded with cellular tissue. Morbid influence upon this part, will, therefore, rather result in fibrous tumors, than in hypertrophy.

The history of these tumors is of some interest, especially as regards their mode of formation. Velpeau has compared the prostate to the womb, and has pointed out an analogy between tumors which are developed in these two organs. Among aged women, especially, tumors are very often observed in the uterus, which are either fibrous tumors or fibrous cords. In this respect, there is a perfect analogy between the prostate and the uterus. These fibrous bodies may exist throughout the substance of the gland; in the lateral lobes, as in the "median portion."

They vary in number from one to twenty or more; generally, they are small when numerous, but, when few in number attain a considerable size. They have been known to become as large, each one, as a normal prostate. They are whitish, and slightly grayish in color, and are of very firm consistence, sometimes being quite hard. Usually, they are imbedded in the glandular paren-

chyma; occasionally they project beneath the mucous membrane of the prostate.

The relations existing between themselves and with the other tissues of the gland are very remarkable. The cellular tissue which surrounds these hard and condensed bodies decomposes very soon, so that by the employment of maceration and putrefaction we may readily detach them. We will then observe that they are round, ovoid, and sometimes irregular. If, on the contrary, a fresh piece be examined, and if we cut through the common fibrous envelop, they will pass out through the orifice as by enucleation; and if we attempt to separate them from the surrounding parts, we may readily do so, but there will always remain a kind of pedicle which is a part of the common mass. When the prostatic mass is filled with such productions, the proper glandular tissue is always atrophied. We seek in vain for traces of the gland; there are no more canals, no more fluids either in the interior of the prostate, nor at its surface. Compress it in all directions, and not a drop of fluid will be expressed; and more frequently the ejaculatory canals will have disappeared from the midst of these fibrous masses.

In stating that these bodies are produced from the fibrous tissues of the region, we must not forget the view of Velpeau, who gives another explanation for some cases. He says, "I have no doubt that these productions *sometimes* have their origin in some matter effused in the substance of the organ; a drop of blood, of plastic lymph, or of pus, may, it seems to me, frequently be the commencing nucleus. In all parenchymatous organs with compact tissue and obscure functions, as the breasts, the uterus, the prostate, there is produced, as a result of congestions, obstructions to the circulation, sanguine, lymphatic, or other exudations, which readily account for the fact in question. The knowledge of the various changes which the blood, or other effused animal fluids may undergo, when retained within living tissues, authorize, it seems to me, the hypothesis I have just advanced."

Some authors have believed that these fibrous bodies were only the natural vesicles or lobules of the prostate, enormously hypertrophied; Velpeau thinks that two things are confounded, in this view. He has also witnessed hypertrophy of vesicles or lobules of the prostate; but it never exceeded the size of a large hazel-nut, was not disseminated throughout the organ in an isolated manner, and almost always presented a pedicle or root with each enlarged lobule, a vestige of their old excretory duct. Upon cutting them, there may be readily expressed from them, a white, viscid matter,

analogous to the prostatic fluid. Fibrous tumors, on the contrary, are homogeneous, larger, more elastic, and formed rather of convoluted fibres than of vesicles; yet, when vesicles are present, they are small, like miliary pimples, instead of constituting the whole tumor. The matter expressed from these tumors differs but little from that of fibrous tumors in general.

In almost every case of hypertrophy of the prostate gland, the neighboring organs become more or less affected, and frequently to a very tormenting degree. The muscular coat of the bladder will be found thickened to a greater or less extent, from the extraordinary efforts made by this organ to expel the urine; while the mucous lining membrane, suffering constantly from chronic inflammation, will present a dark red or black appearance, be thickened and pulpy to the touch, and will have its blood-vessels in a turgid condition; sometimes, this membrane will be seen protruding through the triangular intervals between the muscular fibres, forming cysts or pouches, or it may be ulcerated.—The prostatic portion of the urethra will be found elongated, curved to one side, or, as in the case of enlargement of the "median portion," it will be drawn upward and immediately posterior to the pubic arch. The seminal vesicles rarely escape being in some manner implicated in this affection.—The ureters are generally more or less dilated, having their walls thicker or even much thinner than in the normal state; and, sometimes, this dilatation will even extend to the pelvis of the kidneys and infundibula.—Even the kidneys themselves will present evidences of inflammation, and of alterations in structure, form, and volume.—The rectum seldom escapes being involved, as indicated by the presence of hemorrhoids, prolapsus, etc. (*See Diagnosis of Urethral Stricture*, page 967.)

The *treatment* of enlarged prostate may be divided as follows:

1. Treatment of prostatic engorgements.
2. Treatment of hypertrophy of the prostate, when detected at an early period.
3. Means of obviating urinary and other difficulties attendant upon enlarged prostate.
4. Operations which have been recommended for prostatic tumors.

1. Prostatic engorgement may occur as a consequence of neglected or badly treated gonorrhea, gleet, stricture of the urethra, irritations caused by the unskillful introduction of bougies or catheters into the bladder, masturbation, excessive venery, etc. (*See Chronic Prostatis*, page 1106.) In these cases, the prostate may become enlarged to five or six times its natural size, giving rise to various symptoms, among which the most common are, frequent

desire to urinate, more or less difficulty in passing urine, scalding of urine, too rapid emission of semen during coition, and, often, considerable diminution of the sexual desires. Sometimes, there will be no difficulty in voiding urine, but there will be experienced a difficulty or obstruction in the rectum, during the evacuation of the bowels. In the young adult the lateral lobes of the prostate are more commonly found tumefied; hence, although there may be a frequent desire to urinate, there will not be that difficulty in voiding the urine to which old men laboring under hypertrophy of the gland are subject, in whom the "middle or median" lobe is so greatly hypertrophied.

These are not cases of true hypertrophy, and are met with more commonly in early adult life, frequently terminating in abscesses. When the gleet, urethral stricture, or other cause is cured, the enlargement gradually subsides spontaneously. If, however, the tumefaction continues notwithstanding the removal of the cause, therapeutical means must be adopted. The means of treatment are,—*hygienical*, or those directed to improving the health of the body; and, *therapeutical*, or those intended to more directly exert an influence upon the diseased parts. With regard to the *hygienical* measures, they may be briefly summed up as follows:

The bowels must be kept free, never allowing fecal matters to accumulate in the rectum; the skin must be regularly attended to by bathings and vapor baths; hunting, horseback riding, violent exercise, coition, and other causes of prostatic irritation must be prohibited; if there are pains in the spermatic cord or testicles, swelling of the testicles, and desire to urinate frequently, a suspensory bandage should be worn; the diet should be nutritious but moderate, avoiding all kinds of food that will occasion a sense of distress, weight, or heaviness at the pit of the stomach, that will give rise to acid stomach, flatulency, constipation, or that will render the urine of an irritating quality. All high-seasoned food, spices, every kind of liquor, much saccharine matter, and all acids must be positively prohibited. The body should be kept clad comfortably warm, and all sudden changes of temperature, cold, and dampness be avoided or guarded against as much as possible. Exercise may be taken, but not to fatigue; walking or short rides in carriages on a smooth road may be practised; but riding on horseback, or long rides whether in cars or coaches, must be positively prohibited. The patient should associate frequently with pleasing, agreeable companions, to give tone to his mind and overcome any tendency to melancholy or depression.

The *therapeutical* means are for the purpose of reducing the en-

larged prostate to its natural size, and may be considered under two heads, viz., internal and external.

Among the agents used internally, are, Hydrochlorate of Ammonia, Iodide of Potassium, Iodide of Ammonium, Bromide of Potassium, Bromide of Ammonium, and Alcoholic Extract of Conium Maculatum. In many instances, and especially when the engorgement is the result of gonorrhea, the Iodide of Potassium, or of Ammonium, may be administered with marked advantage; a persistent and long-continued use of them will, however, often be necessary,—a rapid diminution of the enlarged prostate must not be looked for under the most successful course, only a gradual approach to the normal condition will be observed. The great difficulty in the way of curing even true prostatic hypertrophy, is the erroneous view of physicians that medicines must, in chronic functional or organic disorders, effect beneficial results in a short time; if they do not, they are discarded and pronounced inefficacious. Chronic or slow, long-standing diseases require chronic, slow, or long-standing treatment, and probably no one of them yields to the influence of remedies more slowly than the enlarged prostate.

I have used the Hydrochlorate of Ammonia in only a few cases, and generally in combination with the Alcoholic Extract of Nux Vomica, and the Alcoholic Extract of Cimicifuga, thus: Take of powdered Hydrochlorate of Ammonia forty-eight grains, Alcoholic Extract of Black Cohosh forty-eight grains, Alcoholic Extract of Nux Vomica six grains, Sulphate of Quinia twelve grains; mix, and divide into forty-eight pills. The dose is one pill, to be repeated every three or four hours through the day. Some little benefit has been observed from the employment of this combination.

But the agents which have appeared, in my experience, to be of the most value, are, the Bromide of Potassium, and the Bromide of Ammonium, more especially the latter. These may be administered in pill form, or in solution, and may be combined with various agents to suit each individual case under treatment; thus, the Alcoholic Extract of Nux Vomica, or, Sulphate of Quinia, (a Bromide of Quinia would answer better) may be associated with the agent used where a tonic is indicated; Reduced Iron, Phosphate of Iron, or Bromide of Iron, etc., where Chalybeates are required; Lupulin, Extract of Belladonna, Extract of Conium, Extract of Cannabis Indica, Atropia, Morphia, Extract of Hyoscyamus, etc., where an anodyne or sedative is needed; etc. The dose of Bromide of Potassium is from three to ten grains, to be re-

peated three times a day; that of Bromide of Ammonium, in solution, two to five grains.

The external or local therapeutical means consist of direct applications to the prostate, or upon some of the neighboring parts, with a view to the reduction of the enlarged gland to its natural size. Direct applications are made either by injecting, through a tube passed into the urethra as far as the prostate, a solution of Iodide of Potassium, Iodide of Ammonium, Bromide of Potassium, or Bromide of Ammonium; or, by bringing the gland in contact with an ointment of the same salts, through the medium of an instrument devised for the purpose. The strength of the solution or ointment employed must be such as not to cause pain, give rise to unpleasant symptoms, or prevent the patient from taking a moderate degree of exercise. The following will give an idea of the proportions: Take of Chloride of Zinc from five to ten grains, Iodide of Potassium from ten to twenty grains or more, Extract of Belladonna from ten to twenty grains, Lard or Simple Cerate, one ounce; mix thoroughly together. Another: Take of Bromide of Potassium from ten to twenty grains, Lard or Simple Cerate one ounce; mix thoroughly together.

These applications are to be made according to the effect they produce; in some cases, two or three times a day, in others once a day, and again, only once every other day. It can not be expected that they will remain in contact with the gland for any great length of time; yet they will remain sufficiently long each time to exert an influence; in addition to which, after they have passed into the bladder and been taken up by the urine, they continue to act efficaciously; it being well known that the quality or character of the urine exerts its influence, for good or evil, upon the neck of the bladder and the prostate.

In addition to this, the same ointment which is applied to the urethral surfaces of the prostate, should likewise be applied over its posterior surface, or rather upon that portion of the rectal wall which covers this surface, and which should be repeated at least as often as every other night; this will greatly aid in facilitating the reduction of the tumefied gland. This operation may be effected by means of a slightly-curved tube, (about an inch in diameter, having an oval opening of the proper size, at its extremity, upon its concave side), being passed within the rectum up to the desired point; through this tube a bent piece of whalebone carrying a sponge holding the ointment is introduced, and the latter brought into contact with the part to which it is to be applied, through the oval opening on the concave side of the tube.

Or, suppositories of these agents may be employed. Of course these urethral and rectal applications are to be made only when the bladder and rectum are empty.

Galvanism, or electro-magnetism, may likewise be employed to stimulate the gland, in severe or obstinate cases, and thus favor its susceptibility to the influence of the medicines used. Although I have but very little faith in these agents as a means of lessening the enlargement, when used alone, I am thoroughly convinced from experience that they render abnormal organs, through which their currents are passed, more sensitive to the action of remedies, thereby causing such organs to return with greater facility to their normal states. One of the conductors being applied to the lower part of the spinal column, the other should be placed upon the perineum, to the groins, and even to the prostate itself. For the latter purpose, I cut off the closed end of a gum catheter or bougie, pass a copper wire through it, and firmly attach to one end of this wire a cylindrical button of silver, about an inch in length, and having the same diameter as that of the bougie; to the other extremity of the wire a ring is screwed on, so as to bring the cut end of the bougie and the upper part of the silver button in close and smooth contact. The urethral conductor or silver button, thus prepared, is passed down into the prostatic portion of the urethra, one of the conducting wires from the battery is then attached to the ring at the upper end of the instrument, and the current applied. It is important, in all cases, that only a moderate current be employed—if too powerful it may prove injurious. This should be applied daily, and for fifteen or twenty minutes each time; if it should cause too much irritation at first, the power of the current must be reduced, or it may be applied every other day.

These means, carefully and perseveringly employed, will seldom fail of proving successful, more especially when the auxiliary measures for overcoming any urinary difficulties which may be present are used in conjunction, as referred to below in section 3. The means above recommended may, probably, be found advantageous in tubercle of the prostate, and even in prostatic hypertrophy.

2. It is very doubtful whether any treatment will be successful in diminishing the hypertrophied prostate of old persons; the tendency of all the tissues of the system, even in a state of health, is, to gradually become more dense and firm as age advances, while, at the same time, the resisting power to disease gradually loses its energy and influence, and the vital stamina advances toward its

minimum. Hence, old persons are less susceptible to the influence of remedies, and less apt to have thorough and permanent cures made of chronic disease, than young ones. And, as Sir B. Brodie has correctly stated,—"The prostate of a man advanced in life can not be rendered like that of a young man, any more than his gray hairs can be converted into black; but the train of evils which the enlarged prostate produces by its influence on the urinary organs may be, in some instances, altogether prevented, and in others very much diminished, so as to remove the patient from a state of extreme, and even immediate danger, to one of comparative security."

Notwithstanding this, it is certainly the duty of the physician to attempt the reduction of an enlarged prostate, by the means recommended, especially when the patient is in the prime of life, healthy, the enlargement of the gland is regular and uniform, and there are no contra-indications to the treatment. When it is taken into consideration that the remedial agents advised have exerted beneficial influences in bronchocele, uterine enlargements, and other instances of hypertrophy, it must certainly be deemed, at least, justifiable on the part of the physician, to employ the same agents with a view to the diminution of prostatic hypertrophy, when such agents may be used without exhausting the system or disturbing the functions of digestion, and without increasing the severity of the symptoms or the irritation of the parts around the neck of the bladder. And, although we can not hope for much benefit therefrom, in the case of prostatic tumors and outgrowths, we may certainly anticipate some beneficial results in the treatment of hypertrophy of this gland, especially when we have been enabled to detect its existence at an early period. The agents and means advised for this purpose are the same as recommended for prostatic engorgement, in the preceding section, and their employment should be perseveringly persisted in for several months in order to allow them full opportunity for exerting a beneficial influence.

3. However doubtful may be the result of a treatment instituted for the cure of hypertrophy of the prostate, much may be done toward relieving the various accompanying symptoms, diminishing some, and preventing others, thereby not only affording a greater degree of enjoyment to the patient, but also prolonging his existence. And the earlier these measures are adopted, and the more perseveringly and skillfully they are pursued, the less liable will the patient be to any serious results from the disease under consideration.

One of the ordinary symptoms of prostatic hypertrophy, and which occurs even at an early period, is, the habitual *partial retention* of a part of the urine, this fluid not being completely removed

from the bladder, whatever may be the efforts of this organ to expel it. The retained urine may vary in quantity from a few fluidrachms to several fluidounces; usually, in these cases, shortly after having urinated, the patient experiences nearly, if not quite as urgent a desire to pass urine as before; and the irritation of the parts, the pain, and the constant desire to void urine, is a source of the greatest annoyance and suffering, and especially, when in addition, a few drops leak from the urethra, after a urination, and moisten the patient's linen.

When this symptom is present, and the physician has determined by the introduction of the catheter, as well as by a rectal examination, that the prostate is enlarged, it will be his duty to make use of means to ensure a complete evacuation of the urine from the bladder, which will not only lessen the tendency to irritable and other conditions of this viscus, but will also diminish the progress of the hypertrophy. To accomplish this purpose, there are two important measures to be pursued; first, regularity of the bowels, and second, the use of the catheter.

Constipation, or *an accumulation of fecal matter* in the rectum is very commonly met with among persons having enlargement of the prostate, and is often a source of annoyance to both patients and physicians. It may be due to want of tone in the lower bowels, or, more commonly, to an encroachment of the enlarged prostate upon the calibre of the rectum, thereby obstructing the free passage of the feces; and when constipation is obviated, the introduction of the catheter will be thereby facilitated. In instances of complete retention of urine, where I have met with no success in my endeavors to pass the catheter into the bladder, an injection, or a laxative medicine by mouth, has, by causing the evacuation of the bowels, enabled me to introduce the catheter with facility, and thus give relief to the patient; and, in a few instances, I have known the urine to flow without the aid of the catheter, as soon as the alvine discharges were procured. I recollect one case in which it was absolutely impossible to introduce the catheter into the bladder, and in which the patient was in great agony from complete retention of urine; he had been greatly constipated previously, and purgative medicines by mouth exerted no influence, while the impacted, hardened feces prevented the injection, attempted, from entering the rectum. In this case, a portion of the fecal matter was scooped from out of the rectum, so that an injection could be administered; and as soon as an evacuation of the bowels was effected, on attempting to introduce the catheter, it passed very readily into the bladder. The rationale of this must be obvious to every medical man.

When the bowels can be kept regular by the use of figs, prunes, cornmeal, or other articles of diet, not otherwise contradicted, it will serve a much better purpose than the employment of medicines, which must necessarily tend to weaken the tone of the alimentary canal, especially if their doses have to be augmented. But when these dietary articles fail in producing the desired end, medicines will be required, as Sulphate of Magnesia, Rhubarb, Extract of Butternut, etc. Preparations of Nux Vomica or Strychnia are peculiarly applicable in these cases; they may be added to the solvent or laxative medicines administered. The object is, not to purge, for this will weaken the patient, but to keep up as nearly as possible, a natural, healthy, daily discharge from the bowels, and for which purpose the doses of the laxative employed must be properly regulated. Fecal matter must not be allowed to accumulate in the rectum.

Injections, administered with an instrument having a rather short pipe or nozzle, will frequently be found to answer the indications much better than internal medicines,—and, where they are daily required, the addition of Iodide or Bromide of Potassium or of Ammonium, may serve a useful purpose. Very active injections are, as a general rule, to be avoided; the milder the injection, so as to effect the desired end, the better.

Partial retention of urine requires the use of the catheter, so as to procure a thorough evacuation of the bladder at least as often as once in every twenty-four hours; and, in cases, where several fluid-ounces are retained, the use of this instrument may be required two or three times during the above-named period. "This plan is to be pursued, probably, to the end of the patient's life. It may be distressing to him to be thus dependent on the use of the catheter, but it is the least of two evils. The repeated introduction of it is an inconvenience, but it prevents misery and destruction. Without it, slow inflammation of the mucous membrane of the bladder, extending along the ureters to the kidneys, will supervene; abscess will form in the prostate; and probably stone in the bladder. But where the catheter is used regularly, these evils are at any rate delayed for a considerable time, and in by far the greater number of cases are prevented altogether." (*Sir B. Brodie.*)

As to the kind of catheter to be employed, some medical men prefer the gum or flexible, and others the metallic. In these cases of partial retention, the gum catheter, with or without the iron-wire stilet, will be found to answer, in most cases; it is more easily introduced and there is less danger to be apprehended from it, than when the metallic one is used. It should be of a diameter suffi-

cient to fill the urethra without stretching it or causing pain; a smaller one will be liable to become entangled in some portion of the mucous lining membrane, or in the prostatic enlargement, and thereby not only fail in entering the bladder, but likewise cause more or less irritation, etc. If the stilet be used, it will be in those cases where the tumor forms a considerable projection into the bladder, and obstructs the entrance of the beak of the instrument into this organ. In such instances, the catheter will require a greater curve than usual, in order to enable it to pass over the obstruction, and the curvature necessary for this purpose may be given to the stilet. The degree of curvature required can only be ascertained by the physician, after a few trials. The same rules are to be followed in introducing the catheter, in difficult cases of partial retention of urine, as are hereafter named for its introduction in cases of complete retention.

In the use of gum catheters, whether introduced by the physician or patient, the latter should be provided with a number of them, and should keep them in a cool place, having each one mounted on a well-curved, stout iron stilet. When one is to be used, the curved stilet should be withdrawn, and a straight one of sufficient diameter to fill the canal of the catheter should be passed in it as far as to the commencement of the curved part, which gives greater firmness to the stem of the instrument thus filled. Then oil and introduce it, and, upon removing the straight iron stilet or support to the shaft of the instrument, the urine will flow. As the curved part tends to become straight after having been used, or when warmed, the instrument should be remounted upon the curved stilet as soon as it has been cleansed, and its internal walls have become dry. In some cases, I have found a catheter with only one orifice at its beak or extremity, to answer a much better purpose than the instrument ordinarily manufactured, with orifices upon the sides.

Some medical men prefer the silver catheter, and cases will, undoubtedly, be met with, in which it will be found necessary; but, beside being of more difficult introduction, especially when used by the patient, it is more liable to lacerate or puncture the urethra, or occasion hemorrhage, and when once introduced, it can not be so conveniently retained for any length of time, should this be necessary. The gum catheter, on the contrary, may, as in cases of complete retention, be allowed to remain for several days before withdrawing it.

In cases of partial retention of urine from enlarged prostate, the catheter will be required once or oftener, daily; but it should never

be introduced more frequently than is absolutely necessary. As long as there is pain and irritation of the bladder, or in the neighborhood of the prostate, and as long as the urine deposits a ropy, tenacious, alkaline mucus, or, hemorrhage from the urethra is observed, the patient should continue under the immediate attendance of the physician. But in the absence of these symptoms, or of any other requiring personal medical assistance, the patient should be taught to introduce the catheter for himself, as soon as the physician has ascertained the degree of curvature necessary to give to the instrument, as well as the peculiar dexterity and management of it, suitable to each individual case; in all of which, the patient should be thoroughly instructed.

As a general rule, patients who are carefully instructed in this operation, pass the instrument with much greater facility than any second person could; as they soon learn the sensations produced by it in every part of the urethra, as well as the points where obstructions are encountered, and the peculiar tact and manœuvering required to pass the instrument by them. "Now, it is this continued use of the catheter, in those cases in which the patient is unable completely to empty the bladder by his own efforts, which constitutes the principal part of the treatment to be employed in ordinary cases of disease of the prostate gland. In some cases nothing more is required; and the patient who is dexterous in the use of the catheter, and who is careful never to neglect the regular introduction of it, passes through the remainder of his life, an invalid indeed, but with little or no actual suffering; and dies at last of some other disease, entirely independent of that which exists at the neck of the bladder." (*Sir B. Brodie.*)

Complete retention of urine also demands the employment of the catheter; and the elastic or gum instrument should, in my opinion, always have the preference over the silver one, wherever it can be successfully used; because, should it be desired to retain it for any length of time in the urethra, after having introduced it, a second operation is thus rendered unnecessary. But whichever instrument is employed, the physician should have on hand, a number of each kind, having different curvatures, in order to be prepared to meet the different cases which may be presented for treatment. These curvatures will vary from that given to the ordinary silver catheter to one at right angles, depending upon the degree of the enlargement and of the deviation of the urethral canal from its normal direction, and which can be determined only after one or more trials. Great care should be had that the last inch or two of the beak of the instrument be sufficiently curved; for, however well

the rest may be curved, if the end is straight, or even nearly so, it will be very difficult, if not absolutely impossible, to pass it into the bladder. In some cases, it may be required to employ a catheter twelve or fourteen inches long; as, for instance, when that portion of the urethra behind the triangular ligament is lengthened, as well as altered in its direction. All these catheters should be quite round at the point or beak.

Every physician knows that even when the urethral canal is free, difficulties are frequently encountered in attempting to pass the catheter into the bladder, and which must be greatly augmented when this canal is obstructed by tumors or enlargements; it is proper therefore, to know beforehand, whenever this can be done, the cause of these difficulties, in order that we may be prepared to overcome them by the correct means.

In the introduction of the catheter, no rudeness, no force, no violence must be attempted. If the urethra be irritable, spasm of its membranous portion will follow such a course; or, as frequently occurs with rough and inexperienced operators, the instrument may be made to pierce the wall of the urethra at some point, forming a false passage, and thus adding to the difficulties already existing to the passage of the catheter into the bladder, as well as originating a liability to the formation of abscess.

Dexterous and gentle manipulation is alone required; the catheter should be held rather loosely between the thumb and first two fingers of the right hand, at its upper or open end close to the ring; while the penis should be held between the fingers of the left hand,—the patient having previously placed himself in a recumbent posture, lying upon his back with his legs drawn up. Holding the straight part of the instrument in a horizontal position, and parallel with the line of the left groin, introduce the point or beak into the meatus urinarius, and carry it into the urethra as far as it will enter in this position; then, gently raise the handle a little, at the same time moving it to the median line of the body, which manœuver causes the point of the instrument to enter the subpubic curve. Next, gradually elevate the handle nearly at a right angle to the pubes, and, keeping the beak of the instrument closely along the upper part of the urethra so that it will slide closely under the pubic arch, slowly and gently depress the handle, (which may be done by placing a single finger on it) moving it downward toward the space between the patient's thighs. If this manipulation be dexterously performed, without force, the point of the instrument, if this be of the proper curve, will ride over the enlarged portion of the prostate and slide into the bladder.

Various other manœuvers may be required in difficult cases before the catheter can be made to enter the bladder. In some cases, where the gum catheter is employed, after advancing its point, as above stated, as far as the obstacle, it will pass into the bladder only upon withdrawing the stilet. Again, as the beak encounters the prostate, it may be made to slide into the bladder, by raising it or pushing it forward, either by pressure made on the perineum, or by means of a finger introduced into the rectum. Or, the operation may prove successful, if the concave surface of the instrument be kept closely but gently pressed against the pubic arch, while the handle is being depressed downward. Sometimes, it may be necessary to employ a longer catheter and one having a greater curve, in order that the beak may ride over the prostatic enlargement. And, if the tumor be so large as to completely block up the median portion of the passage, a small opening only being present at one side of the projection, it will be necessary, after having carried the beak as far as the obstacle will permit, to incline it to the right or left, that it may be enabled to enter such opening, and thereby reach the bladder. Other artifices may be required, but they can only be determined by practice, experience, good judgment, and a knowledge of the anatomy of the parts in health and in disease.

It may be proper to state here, that congestion of the prostate and engorgement of its vessels, which add to the volume of the already enlarged gland, is frequently the result of exposure to cold or dampness, as well as of various other causes. But whatever may be the cause, the congestion may be removed, at least sufficiently so to facilitate the introduction of the catheter, by immersing the whole body in a hot bath, or, (and which I prefer when it can be procured), by pounding fresh Stramonium Leaves to a pulp, adding hot water to the pulp; and applying it to the perineum, allowing it to remain on for twenty or thirty minutes, or even longer if necessary; this likewise relieves the distressing and uncontrollable paroxysms of straining to pass urine, from which patients frequently suffer. A fomentation of dried leaves of Stramonium and Lobelia in hot water, forms an inferior substitute for the preceding one.

If the attempt to pass the catheter into the bladder has proven successful, the next thing is to determine whether this viscus should be completely emptied or not. Instances have occurred in which an immediate and thorough evacuation of the contents of the bladder has been followed by depression, syncope, and death; and this result is more apt to occur in cases where the bladder has

been kept in a greatly distended condition for some time, from the retention, even when there has been a constant leakage or dribbling of urine. The rule to be governed by is, that in cases where retention of urine has remained for some time, or where there has been a constant dribbling of urine, the bladder being distended all the time, the withdrawal of the urine should be gradually accomplished, so that the bladder may be able to accommodate itself, by degrees, to the healthy condition of contraction. Therefore, in such cases, after some twenty or thirty ounces of urine have been removed, the catheter should be allowed to remain, placing a plug in its open end to prevent any further flow; in the course of half an hour, or an hour, some more may be allowed to flow out, and so on,—care being subsequently taken, in these instances, that the bladder be thoroughly emptied of its contents once or twice every day.

Another point to consider is, whether, in any case, the catheter should be removed after the bladder has been evacuated, or should be allowed to remain. In cases of urinary retention it is a very general circumstance, that after the withdrawal of the urine, the bladder soon becomes filled again, requiring the use of the catheter anew, within from three to six hours from its first introduction. Its re-introduction will increase any irritation already existing in the parts, and may also be found a much more difficult task than before. It is, therefore, a much better plan to allow the instrument to remain, plugging its open end so as to prevent the urine from trickling away, at the same time applying one of the above-named fomentations to the perineum to subdue any irritation which may be present. The instrument should be fixed, by tying or otherwise, so that its beak will not project into the bladder to create irritation, and the plug should be removed every few hours, as may be required, to admit the urine to flow out. This course will be still more strongly indicated if great difficulty was experienced in introducing the catheter at first. There may be cases met with, in which the physician would be justified in removing the instrument soon after the urinary evacuation, and which must, of course, be left to his judgment to decide; but, in the majority of cases, the rule above given will prove the safest and surest mode of procedure. As to the time during which the catheter may remain, it will differ according to circumstances, from twenty-four hours to three or four days, depending much upon the degree of contractile power resumed by the bladder. And, in all cases, this viscus will require to be artificially evacuated once or twice every day, until it has fully regained its power to normally effect this

evacuation. As with partial retention, after a suitable time, the patient may be instructed, so as to introduce the catheter himself.

If the mucus is very viscid and offensive, tepid water may be injected into the bladder by means of a catheter with double canals, washing it out, in this manner, as often as may become necessary. In such cases, it is better always to employ the double-channeled catheter instead of an ordinary one, after the first catheterism.

Where it has been necessary to allow a catheter to remain for some time in the urethra, I have met with very satisfactory results from the employment of an instrument made as follows: An ordinary silver catheter, but without any small holes or eyelets, has its closed end cut off so as to open this extremity; a round silver ball is carefully and accurately fitted to this open end, so that it may be withdrawn through the canal of the instrument by means of a stout flexible wire, which holds the ball in place (projecting out a short distance from the cut end of the catheter), by means of a cap and screw at the other end of the instrument. Having introduced this into the bladder, unscrew the cap, withdraw the ball, and pass in a gum catheter, which may, if necessary, be held in its place by means of a long wire stilet, while the silver catheter is being removed. The gum catheter may now be permitted to remain as long as may be desirable, but never to exceed two or three days.

Mr. H. Thompson has devised an instrument, as follows: "A full-sized catheter, of the No. 1 prostatic curve, but completely open at its extremity, as if the point were cut off; a flexible gum catheter of a size adapted to fill pretty accurately the channel of the silver catheter, is to be passed through this, just so far that the point of the flexible instrument protrudes, forming an obturator and point; this apparatus being passed down to the obstruction, and the silver catheter being held by the left hand, the flexible one may be gently pushed onward through the former, and may find its way into the bladder, when neither the silver nor the flexible instrument would pass alone."

Other forms of catheter have been devised by M. Mercier, one to be used as a last resort, when other catheters have failed to pass the obstruction, and another for the purpose of avoiding false passages. The reader will find an account of them in H. Thompson's monograph upon Diseases of the Prostate; it is unnecessary to describe them here, as they will seldom be required except in cases which have previously received unskillful treatment.

But, if no instrument can be passed into the bladder in the ordi-

nary way, and it is absolutely demanded that speedy relief to the patient suffering from urinary retention be afforded, what course is there to pursue? Such instances may occasionally be met with. The means which have been recommended are, forcible catheterism and puncture of the bladder. Of these, the first is considered hosafer operation, although either of them are liable to be followed by fatal results. A silver catheter of proper strength, having a conical form at its beak, is introduced as far as the enlarged prostate; the operator will then ascertain that the instrument is fairly within the urethra, by a finger passed into the rectum, also that it is in the median line of the body, at a proper distance from the pubic arch as well as from the rectum, and that its beak is against the prostate. Satisfied on these points, he will carefully, steadily, and firmly press the beak onward in the direction of the cavity of the bladder, gradually depressing the handle as the instrument advances, and ceasing all efforts as soon as no further obstacle is felt, and urine passes. It has also been recommended to perform this operation by means of a silver canula, having a curvature like that of a catheter, through which a trocar or cutting stilet is passed for the purpose of perforating the obstruction.

Whichever is used, (the catheter or canula), after it has entered the cavity of the bladder, it should be allowed to remain for about forty-eight hours, when a catheter should be introduced to preserve the opening thus made, and to favor the formation of a mucous membrane upon its walls. After which the aperture may be prevented from closing by occasional introductions of the catheter.

It usually happens that after having evacuated the bladder, in these cases of urinary retention, this organ does not readily recover its contractile power, and the use of the catheter will be required once or twice daily for several weeks, aided by such internal agents as will restore tone to the enfeebled or paralyzed organ, as Quinia, Strychnia, Ergot, Electro-magnetism, etc.

The operation for puncture of the bladder may be performed through the rectum, through the symphysis pubis, and above the pubes. These operations are very rarely demanded, though cases have occurred in which the patients' lives were thereby prolonged for several years. It is unnecessary to describe them here, as detailed accounts of them are given in the best surgical works.*

* Mr. H. Thompson describes these operations, in his work on Diseases of the Prostate, as follows:

"The supra-pubic, at one time regarded as the only possible mode of reaching the bladder from the surface in cases of enlarged prostate, is performed as follows: The patient being placed in a half-sitting, half-reclining position, and the

When the bladder becomes engorged with urine, the neck is dilated, and the surplus urine overflows and passes off involuntarily;

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pubes shaved, a vertical incision of the integument is made directly above the symphysis pubis, about an inch and a half or two inches in length at the surface; this is to be carried downward through the linea alba, so as just to admit the tip of the finger to recognize the distended bladder. Meantime, an assistant standing behind the patient, should press one of his hands firmly on either side, against the abdominal walls, in such a position as to steady the bladder. A straight, or a slightly-curved trocar (if the latter, the convexity of the curve should be upward), is then to be carried, with a very little inclination downward, into the bladder. The puncture should be made, not quite close to the pubes, or as the bladder contracts the opening will tend to recede downward behind the symphysis; nor should the distance from it at all exceed an inch, else the peritoneum will be endangered. When the distension is considerable, this membrane is carried two inches or more above the margin of the symphysis. In this case also it is better not to empty the viscus immediately when very large, in order to avoid the evils resulting from the sudden removal of pressure from the abdomen. After the operation the canula should be exchanged for a silver tube specially adapted to slide through it, secured by tapes and a T bandage, which may remain a variable length of time, at all events until lymph has been effused upon the edges of the wound, when it may be withdrawn, and an elastic gum catheter worn in its place, an instrument which is generally better tolerated by the bladder than one made of metal. * * *

"The puncture by rectum, commonly adopted in stricture, but which has also been resorted to in a few cases of retention with enlarged prostate, may be performed in the following manner: The rectum having been emptied, if necessary, by means of an enema, the patient is to be placed upon his back, in the position for lithotomy, and firmly held by two assistants, not tied. The surgeon is then to introduce the forefinger of his left hand into the bowel, and ascertain the limits of the prostate, defining its boundaries, if possible, particularly the posterior one. *Fluctuation should be felt there*, communicated through the contents of the bladder, from a tap, or from momentary pressure made on the hypogastric region; and the point at which it is most distinctly perceived in the median line selected. Any spot within fair reach of the finger, under the circumstances of retention and consequent distension of the parts, may be considered safe as regards the peritoneum. Having directed an assistant to support firmly the lower part of the abdomen with both hands, so as to press down and steady the bladder toward the rectum, a well-curved trocar, seven or eight inches long, should be carried along the finger, and carefully directed to the part indicated; the handle is then to be depressed, and the point carried upward through the coats of the rectum and bladder, until it is felt free in the cavity of the latter. The canula is to be carefully kept in its place while the trocar is withdrawn, and afterward retained there by means of a bandage and tapes" (He prefers Mr. Cock's instrument, the canula of which can have its extremity somewhat expanded after its introduction into the bladder, so as to lessen the danger of its slipping from this organ.)

The puncture through the pubic symphisis, he thus describes: "The patient should recline, and the trocar (a cylindrical one—an ordinary hydrocele trocar of middle size), should be introduced, whether after a small preliminary division of the integuments or without it, appears to be immaterial, about the center of the

this has been erroneously termed *Incontinence of Urine*, but it is simply *retention of urine with engorgement and overflow*, and requires the same treatment as recommended for retention, viz., the catheter.

Atony of the muscular coat of the bladder, in which this organ loses its muscular contractility to a greater or less degree, so that it becomes incapable of expelling the urine, even after this fluid has been withdrawn by catheterism, is frequently observed in cases of enlarged prostate. In most instances the regular evacuation of the bladder by catheterism, continued for ten or fifteen days, will be followed by a return of its contractile power; sometimes, however, the atonic condition will remain, and urine passes through the catheter, either by pressing upon the region of the bladder, through the abdominal walls, or, by the pressure exerted upon the bladder by the intestines while the patient is in an upright position. Remedial measures will then be required, although they will not invariably prove successful in removing this condition.

Cold water suddenly applied to the thighs, the abdomen, or the back, will aid very much in facilitating the contractile efforts of the bladder; or, cold water may be injected into the bladder every day or two. A solution of Strychnia injected into the bladder, has also proved efficacious, after having been repeated several times; it must, however, be employed with judgment and carefulness. Internally, the remedies which have been found the most effectual, are, Strychnia, in doses of from one-tenth to one-fiftieth of a grain, repeated two or three times a day, carefully watching its effects, and ceasing its use when any untoward symptoms appear. Ergot of Rye, is another efficacious agent; it may be given in doses of from five to ten grains of the powder, repeated three times a day;

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symphysis, reckoning from above downward, and in a direction at about right angles to the vertical axis of the body, (somewhat obliquely downward and backward toward the sacrum, varying the direction according to circumstances). A piece of flexible catheter is then to be introduced through the canula, and retained by a tape."

The puncture by rectum is the simplest and safest of these operations, when temporary relief only is intended. But it can not always be performed, as the enlargement of the prostate may be so great as to prevent the finger from reaching the tumid bladder behind it. The puncture above the pubes is more dangerous than the preceding one, especially among corpulent persons, although often successful, and affording a relief which has continued for several years; and it is to be preferred in those cases, where the catheter can not be introduced through the urethra, and where a new opening must be the patient's only resource for a considerable period of time. The puncture through the symphysis pubis, has not yet been sufficiently practised to develop its advantages or disadvantages.

or the tincture may be administered in doses of from half a fluidrachm to a fluidrachm; the use of this agent should not be too long continued, on account of its pernicious effects when taken uninterruptedly for a length of time. Cantharides, Extract of Arnica, and Tincture of Iron, have likewise proved efficacious.

The following preparation has been found to exert a most potent influence: Take of Strychnia one grain, of powdered Cantharides two grains, Extract of Arnica from forty-eight to eighty grains. Mix well and intimately together, and divide into twenty or twenty-four pills. The dose is one pill, repeated every eight hours; and their use should cease as soon as twitchings are observed, or when strangury occurs, or the stomach becomes irritable; commencing their employment again, in smaller doses, as soon as these effects have passed off. When indicated, a grain of Steel dust, or Oxide of Iron may be added to each pill.

Another excellent preparation is composed of Citrate of Iron and Strychnia three grains, Sulphate of Quinia one grain, Cantharides one-fourth of a grain, Extract of Arnica nine grains; mix, and divide into three pills, of which one pill is to be given every six or eight hours, as above.

Counter-irritation to the sacrum, as well as to the pubes, may frequently be beneficially associated with the above-named remedies; as, by sinapisms, Croton Oil Liniment, Firing, or Compound Tar Plaster, etc. I have found the addition of finely-powdered Arnica to the Compound Tar Plaster, very useful in obstinate cases. It has also been recommended to vesicate over various sites of the lumbar portion of the spinal column from time to time, each blister occupying a space of about one or two inches in diameter, over the vesicated surface of which, about one-eighth, one-sixth, or one-fourth of a grain of finely-powdered Strychnia should be sprinkled; one blister only should be formed at a time, for this purpose.

Electricity, or electro-galvanism is said to have answered an admirable purpose in several instances. The current may be passed from the lumbo-sacral region of the spinal column to the pubes and adjacent parts, and to the perineum. A gentle current may likewise be passed from the lumbo-sacral region of the spinal column, to the neck of the bladder, or as near to it as can be reached by the urethral conductor.

In the treatment of the difficulty under consideration, the digestive organs and bowels must be carefully attended to; employing a nourishing but easily digestible diet, and promoting regular daily alvine evacuations by articles of diet, injections, etc.; avoiding active catharsis or drastic purgation as much as possible.

Inflammation of the Bladder, *Irritability of the Bladder*, and *Incontinence of Urine*, which frequently attend enlarged prostate, must, when present, be treated as already laid down under their respective heads.

Hemorrhage from the prostate may occur spontaneously, or may be due to the introduction of an instrument into the urethra, or to its retention for some time. Unless profuse, little else will be required than rest in the recumbent position; otherwise, it must be treated upon the principles laid down under the head of *Hemorrhage from the Bladder*. Also see *Phosphatic Deposits*, page 945.

4. The operations which have been recommended for prostatic enlargement and tumors are as follows:

a. Compression has been employed by many surgeons; its mechanism is two-fold, to render the urethral canal rectilinear, its deviation being one of the frequent results of prostatic enlargements, and to change the vitality of the organ by modifying its circulation, and thus promoting discussion or absorption. For this purpose large elastic and metallic catheters have been employed; instruments having several branches are to be introduced with the branches closed or lying together, and as soon as these reach the neck of the bladder, they are to be separated, and compress the abnormal projections; also elastic tubes, which, when introduced as far as the vesical neck, are to be distended by forcing water into them.

Compression is a painful method, is very difficult to support by the patient, is apt to give rise to great irritation of the parts, and is generally attended with no desirable results.

b. Incision has also been employed, but it seems to be more applicable to those muscular bar-like obstructions which are sometimes met with at the neck of the bladder; and, in which cases, when properly performed, it appears to have afforded much relief to the patient from the distressing symptoms which had not yielded to the several means previously pursued.

M. Mercier, a French surgeon, dwells especially upon these obstructions, and advises to incise at one, two, or three places, for which purpose he has devised several instruments, which may be reduced to a bent sound, in the interior of which is a cutting-blade, which incises the bar, either from behind forward, from in front backward, or by a to and fro motion. Various other instruments somewhat similar in construction have been employed by French surgeons. Incisions seem to have another object, that of deeply *scarifying* the prostatic tissue. This method is based upon the fact

that after the operation of lithotomy, the prostate has rather a tendency to atrophy than to hypertrophy.

Incisions of the prostate constitute a very uncertain method; when of limited extent, their effect is rendered null by their rapid cicatrization; and when deep, they are liable to cause hemorrhage, inflammation, or other serious symptoms. Their employment should be confined only to well-ascertained cases of bar at the neck of the bladder.

Excisions, which are only a variety of incision, has for its object the removal of a portion of the bar, especially when this is wide and rounded, or, of one of the abnormal projections of the prostatic lobes. Several instruments have been invented for this purpose. M. Mercier employs a kind of lithotrite with two branches; the bar is seized between the branches, they being separated, then by closing them the excision is accomplished.

Cauterization, which has also been advised in the treatment of prostatic enlargement, is of very little efficacy, besides being of very difficult application.

Crushing is another operation which has been attempted; the projecting tumor is embraced between the blades of a lithotomy forceps, and is crushed or torn, so as to develop sphacelus in the part.

Ligation, is another difficult and very limited operation, though if it can be accomplished, it is the least dangerous of any of the mechanical means above referred to, and may prove successful in removing polypoid tumors coming from the median portion of the prostate.

All these mechanical means which have been proposed for the treatment of prostatic tumors are very difficult, and very limited in their application, because of the depth of the gland, and the shallowness of the surrounding urethral space, and their results are, as yet, very problematical.

CHRONIC DISEASES OF THE EAR.

ANATOMY OF THE EAR.*

USES OF THE DIFFERENT PARTS OF THE ORGAN OF HEARING.

1. The *auricle* has two uses, viz.: to receive and reflect sonorous undulations, and, up to a certain point, direct them into the auditory canal; thus, the undulations which strike upon the concha, are re-

* Before entering into a description of Chronic Diseases of the Ear, it may be of some utility to briefly refer to the anatomy of this organ. The auditory apparatus, consisting of many parts, has been, for the sake of description divided into three parts, viz., the external ear, the middle ear, and the internal ear.

I. The EXTERNAL EAR consists of the following parts, viz.:

1. The *auricle*, or expanded portion, also called *pinna*, and *pavilion*, is a thin, transversely flattened, semi-oval, fibro-cartilaginous appendage, wider above than below, continuous with the neighboring parts, free above, below, and behind, situated on each side of the lateral region of the head, below the temple, behind the cheek, and in front of the mastoid process. Its external face is inclined forward, and is concave throughout most of its extent. The inequalities caused by the eminences and depressions of the outer surface of the auricle, also exist in its fibro-cartilage. This fibro-cartilage is fixed around the auditory canal by three ligaments.

2. The *helix* is a fold, or half-circular prominence, found on the outer, posterior, and superior edge or boundary of the auricle. It commences at the center of the concha, above and somewhat behind the boundary of the external meatus, passes along the outer margin of the auricle, and gradually becomes thin, narrow and fleshy, losing itself in the lobule.

3. The *antihelix* is another prominent ridge, arising in front by two ridges from behind the anterior curvature of the helix; it proceeds at first longitudinal, parallel to the helix, then obliquely from behind forward, describing a circuit around the concha, and terminating in the antitragus. Of the two ridges at its commencement, the inferior one is narrow, more acutely prominent, partly concealed under the helix, and proceeding horizontally forward, while the superior one is larger, obtuse, and directed obliquely forward in such a manner as to form, with the inferior one, a small triangular cavity, called the *fossa of the antihelix*, or the *fossa navicularis*.

flected upon the tragus, which in turn reflects them into the auditory canal. And, notwithstanding we may occasionally encounter

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4. The *fossa of the helix*, (*fossa innominata*), is the narrow, curved groove situated between the helix and antihelix.

5. The *concha* is the deep, capacious cavity, looking obliquely outward and forward, transversely elongated, somewhat divided into two parts by the commencement of the helix, narrower above, and triangular or funnel-shaped from without inward, where it is continuous with the meatus auditorius or external auditory canal. The cartilage of the concha is enveloped by a fine skin; the subjacent cellular tissue contains little or no adipose matter; and this part readily becomes deeply and extensively ecchymosed by severe frictions and bruises.

6. The *tragus* is a small, flattened, irregularly triangular eminence, adherent at its base to the skin of the face, with its apex or free edge looking obliquely inward and backward; it is situated above and in advance of the lobule in front of the concha, as well as of the meatus auditorius, and below the anterior part of the helix, from which it is separated by a small notch. Its under surface, especially at the apex, is usually covered with a tuft of hairs, more particularly in advanced life.

7. The *antitragus* is another eminence of somewhat similar form to that of the tragus, and which is situated directly opposite the tragus, from which it is separated by a deep notch (*incisura intertragica*), and at the superior and anterior portion of the lobule.

8. The *lobule* is the inferior, dependent part of the ear, situated immediately below the antitragus, it consists of tough cellular tissue, with a small quantity of adipose substance, and is softer and less elastic than the rest of the auricle. Females wear rings in this part of the ear.

9. Under the skin and on the outer surface of the cartilage, are four small muscles, called the *intrinsic muscles*, but their presence is not constant with man; they are the helix minor, the helix major, the tragicus, and the antitragicus; also, the transversus auriculæ, on the cranial surface of the auricle. There is also another set of muscles, called the *extrinsic*, which are attached to the head, and move the whole of the auricle; they are generally rudimentary, being mere analogues of larger muscles in some of the mammalia. They are, the Attolens aurem, or superior auriculæ, inserted into the upper and anterior part of the concha; the Attrahens aurem, or anterior auriculæ, inserted in front of the helix; and the Retrahens aurem, or posterior auriculæ, inserted into the back part of the concha.

10. The *auditory canal or meatus auditorius externus*, is a canal about an inch and a quarter, or an inch and a half in length, which extends transversely from the concha to the membrana tympani. Its direction from the concha inwardly is, at first, a little forward and upward, then backward and inward, and again downward, forward, and inward. Externally, the meatus is of an oval shape, but it becomes circular toward its inner extremity. About one-third of the external part of the auditory canal consists partly of cartilage and partly of fibro-cellular tissue, which renders it moveable to a certain extent, and very slightly dilatable; the rest of the canal has bony walls. The superior and posterior walls of the meatus, are somewhat concave; and the superior wall is somewhat shorter than the inferior. There is only a thin lamina of bone between the posterior wall, and the mastoid cells. In front, the meatus is protected from the introduction of foreign bodies, by the tragus. The diameter of the external

persons who, having lost their auricles, are still able to hear, yet there is no doubt that delicacy of hearing greatly depends upon the

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auditory canal, varies in different persons, from half an inch to one-fourth of an inch, being, however, narrower near its middle portion than at its extremities. Its tympanal extremity presents a well-marked obliquity passing from above, forward and downward.

At the entrance of the external auditory canal and on the margin of the meatus are numerous glands furnishing fine hairs, called *vibrissæ*, which point toward the center of the canal, and which serve to prevent the introduction of foreign bodies into the ear. These hairs become very abundant as the person advances in years. These hairs, when falling loose, and becoming intermingled with the wax or cerumen, frequently give rise to ceruminous concretions which obstruct the passage of the auditory canal, giving rise to deafness in a greater or less degree, and chronic inflammation of the neighboring tissues, as well as perforation of the tympanal membrane.

The tissues which line the walls of the external meatus auditorius, are 1st. The epidermis which forms the outermost layer of the walls of the canal, as well as of the tympanal membrane. 2d. The dermis, which underlies the epidermis throughout its whole extent, and which gives insertion at certain parts, above referred to, to fine, short hairs, and which likewise gives passage to the ducts of the ceruminous glands. As the dermis advances inwardly, it becomes extremely sensible. 3d. The periosteum covering the bone, and the perichondrium.

11. In the cellular tissue situated beneath the dermis, and chiefly in the outer half of the membranous portion of the meatus, are numerous glands, over two thousand, which secrete the cerumen or wax of the ear. These *ceruminous glands* are more abundant posteriorly, and the cerumen secreted by them forms a ring or band passing around the external part of the tube of the canal, about six lines in width and one line in thickness. This wax is of a brownish-yellow color, or nearly black when old, and its bitter taste and adhesiveness is well calculated to arrest particles of dust which may enter the canal, as well as to prevent insects from crawling therein. The ceruminous secretion may be increased in quantity, by certain inflammations of the parts; it may likewise be diminished under the influence of certain pathological conditions.

THE MIDDLE EAR or TYMPANUM is an irregular, narrow cavity, situated within the petrous bone, between the external auditory canal and the outer wall of the labyrinth, having an oblique direction inward and forward; it is somewhat wedge-shaped, being narrow below and in front, and broad above and behind, its longest diameter from before backward being from six to nine lines, its diameter vertically about three lines, and its transverse diameter about two or three lines.

The cavity of the tympanum presents six faces or sides: 1. The superior wall, which is formed by a layer of bone, separating this cavity from that of the cerebrum, and through which bone diseases of the tympanum advance, when they affect the brain. 2. The inferior wall, which presents a fissure or slit, about a line in length, called the *Glasserian fissure*, traversed by a fibrous band called the tendon of the anterior muscle of the malleus, and a small canal giving passage to the chorda tympani nerve. 3. The external wall, formed principally by the membrana tympani. 4. The internal wall, which has a vertical direction, and looks outwardly; it presents a reniform opening which leads from the tympanum into the vestibule, having its convex border upward, and its long diameter directed horizontally, and which is called *Fenestra ovalis;* it receives the base of the stapes.

presence of these appendages and their stretching or degree of projection outwardly.

The fenestra ovalis is not completely closed by the base of the stapes, which is inserted by a kind of synovial articular capsule, a kind of circular narrow strip which is probably subject to all the diseases of the larger articulations.

Above this fenestra is the *Aqueduct of Fallopius*, which gives passage to the facial portion of the seventh pair of nerves; below this is the *Promontory*, formed by the first external turn of the cochlea, and a part of the vestibule; below the promontory is an oval aperture placed at the bottom of a funel-shaped depression leading into the cochlea, and called the *Fenestra Rotunda*, which is separated from the fenestra ovalis by the rounded eminence of the promontory; the fenestra rotunda is closed by a membrane which is concave toward the tympanum, and convex toward the cochlea, and which has been termed *membrana tympani secundaria*. Behind the fenestra ovalis, and in front of the vertical portion of the Aqueduct of Fallopius, may be observed a small conical eminence, called the *Pyramid;* in its apex there is a depression which leads into an opening giving insertion to the *Stapedius Muscle*. 5. The anterior wall, is wider above than below, and presents the internal tympanic orifice of the *Eustachian tube*. 6. The posterior wall is also wider above than below, and presents an opening of communication with the *mastoid cells*.

We will now examine more particularly some of the parts of the middle ear referred to in the preceding section, and with which it is important that the practitioner should be acquainted, as the Mastoid Cells, the Membrana Tympani, the Ossicles, and the Eustachian Tube.

THE MASTOID CELLS. At the upper part of the posterior wall of the cavity of the tympanum, is a large, irregular sinus, and sometimes several smaller apertures, which lead into canals which communicate with the interior of the mastoid process. This process contains in its interior an infinite number of compartments, formed of bony lamellæ, recalling to mind the spongy tissue of bones, and which are termed the mastoid cells. All these bony lamellæ are covered by a very delicate mucous membrane (resembling a true periosteum) which is continuous with that lining the cavity of the tympanum. As these cells communicate freely with the tympanic cavity, inflammation attacking this cavity may extend to, or exert an unfavorable influence upon, them.

The MEMBRANA TYMPANI, or DRUM MEMBRANE. This membrane separates the inner extremity of the external auditory canal from the cavity of the tympanum; it is a very dry, thin, semi-transparent or translucent membrane, irregularly oval in shape, rather broader above than below, and directed from above very obliquely downward and inward, forming an acute angle with the inferior wall of the external auditory canal, and an obtuse angle of 130° to 140° with its superior wall in the adult; with the new-born child it is slightly oblique. The shape of the membrane varies from nearly circular to elliptical, according to the age of the person, as well as its degree of obliquity, which assumes a more horizontal direction with very young persons. Its long or obliquely-vertical diameter is about two-fifths of an inch; its circumference is thick, firm, somewhat denser and whiter than the rest of the membrane, and is inserted in a well-marked groove upon an elevated ridge at the tympanal margin of the bony meatus, in a manner somewhat resembling the setting of a crystal in the besil of a watch. This circular groove occupies about five-sixths of the circumference of the inner or tympanal extremity of the external auditory canal, the remaining upper sixth, where

The second and most important use of the auricle is to receive and transmit sounds. Savart has shown that when waves of sound

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the malleus joins the membrana tympani, being smooth instead of grooved. Internally, where it corresponds to the handle of the malleus, the membrana tympani is convex; externally, where it terminates the external meatus, it is concave.

According to Toynbee, the membrana tympani is composed of four extremely thin layers, viz.: 1, the *epidermis* or *external layer*, which is a continuation of the epidermis of the external meatus; it is very thin, and so transparent that the layer beneath it can be seen distinctly through its substance; on its outer side it presents a very smooth, reflecting surface, and at its anterior and inferior part, there may generally be seen a triangular shining spot.

2. The *dermis* or *dermoid layer* is a continuation of the dermis of the external auditory canal; it is situated immediately underneath the epidermis, which, indeed, it secretes, is very thin and transparent, and is well supplied with blood-vessels, which can not be seen with the naked eye, except when they are enlarged, giving a red appearance to the surface of the membrane; it is also furnished with nerves which render it exquisitely sensible.

3. The *fibrous layer* is composed of two laminæ, which may be readily separated from each other. The external lamina is situated directly beneath the dermoid layer, and has been named the *radiate fibrous lamina*, because its fibres radiate from the malleus to be attached to the white, dense, cartilaginous or ligamentous ring, forming the thick and firm circumference of the membrana tympani. These fibres proceed from the sides and the extremity of the malleus to the cartilaginous ring, for about the inferior half of the membrane; in the superior half, these fibres pass across the external portion of the malleus, taking their course in front of the processus brevis, and are inserted into the periosteum of the upper part of the external meatus, of which they are a continuation.

The internal lamina, called the *circular fibrous lamina*, passes, for the most part, behind the handle of the malleus, and is united by fine cellular tissue to the radiating layer in front of it. This lamina consists of circular fibres, which are firm and strong at the circumference, but so attenuated toward the center, as to be detected only by careful observation; it has no connection with the cartilaginous ring, but is continuous with the periosteal lining of the tympanic cavity.

4. The *mucous layer*, or *membrane* forming the inner covering of the membrana tympani, is very thin, and is a continuation of the mucous lining of the tympanic cavity; it can be discerned with difficulty.

The membrana tympani is highly sensitive, the slightest touch producing most acute pain; its thinnest parts, where it is more generally ruptured by accident or disease, are, about midway between the points of the malleus downward and forward in the anterior portion, and downward and backward in the posterior portion. The office of the membrana tympani appears to be to receive and convey sounds to the ossicles, and thence to the labyrinth; to modify the influence of loud sounds, and to render the ear more susceptible to the influence of delicate ones.

OSSICLES OF THE TYMPANUM. The tympanic cavity of the ear, from the membrana tympani to the fenestra ovalis, is traversed by a chain of movable ossicles (minute bones), which articulate with each other by means of a little synovial and ligamentous apparatus. These bones, are three in number, some writers say four, and are as follows:

come in contact with membranes of the nature and density of this appendage, they resound and transmit the sound. Now the promi-

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1. The *malleus* or hammer, named from its fancied resemblance to a hammer, is the largest of these bones and is situated more anteriorly than the incus; it consists of a head, neck, handle or manubrium, and two processes. The *head* is the large upper extremity of the bone, located in the upper and anterior part of the cavity of the tympanum, which extends above the membrana tympani, it is irregularly oval, and articulates posteriorly with the incus, being free in the rest of its extent. The *neck* is the narrow contracted part just beneath the head, and immediately below this is a bulb or prominence to which the various processes are attached. The *manubrium* or *handle* is a long, tapering process, flattened from within outward, and slightly curving forward at its extremity. It passes downward and backward between the two fibrous layers of the membrana tympani, and is the chief object on which the eye first rests in examining the ear. The *processus gracilis*, or *long process*, is a long, slender process, which proceeds at a right angle from the prominence below the neck, in a direction forward and outward to the Glasserian fissure, where it is attached near the edge of the tympanic ring. It affords attachment to the anterior mallei muscle, or Laxator tympani. The *processus brevis* or *short process* is a slight conical projection arising from the upper end of the handle, and lies in contact with the membrana tympani. It affords attachment to the internal mallei muscle, or Tensor tympani.

2. The *incus* or anvil, which is of an irregular shape, somewhat resembling a bicuspid tooth, with two roots, widely separated from each other; it consists of a body and two processes. The *body* is rather quadrilateral, and compressed laterally; its crown or summit is concave, and articulates with a corresponding convex surface upon the head of the malleus. The *short process*, is of a conical shape, is directed horizontally backward, and is attached by ligamentous fibres to the roof of the tympanum, near the orifice leading into the mastoid cells. The *long process* passes nearly at right angles from the short process, and in a direction with that of the handle of the malleus, behind which it is situated, bending inward and terminating in the *os orbiculare*, which articulates, toward the inner wall of the tympanum, with the head of the stapes.

3. The *os orbiculare* or *lenticular process*, is a small lenticular bone, situated between the long process of the incus and the superior and external extremity of the stapes; it is united to the process of the incus in the adult, but forms a separate bone in the fœtus. In size it is equal to a small grain of sand.

4. The *stapes* or *stirrup*, so called from its resemblance to this article, consists of a head, neck, two branches, and a base. The *head* presents a depression which articulates with the os orbiculare. The *neck* is the constricted part of the bone below the head, and receives the insertion of the Stapedius muscle. The *two branches*, one of which is longer than the other, diverge from the neck, and connect at their extremities with the base. The *base* is a flattened oval-shaped plate, which forms the foot of the stirrup, and is fixed into the opening of the vestibule.

All these small bones are connected with each other, and with the tympanum by ligaments, their articular surfaces being furnished with cartilage and synovial membranes. The muscles which move them are the stapedius and the tensor tympani; the stapedius pulls the head of the stapes upward and backward; the tensor tympani draws the malleus and the membrana tympani inward and forward.

nences and ridges of the auricle are so numerous and diversified, that at whatever part the sonorous waves strike them, they will

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The EUSTACHIAN TUBE is a somewhat trumpet-shaped canal from an inch and a half to two inches in length, through which a communication is kept up between the tympanum and the cavity of the fauces; its small extremity, or intra-tympanic orifice opens into the cavity of the tympanum, from which it proceeds, gradually increasing in diameter, obliquely downward, inward and forward to the superior and lateral part of the pharynx behind the posterior orifice of the inferior meatus of the nasal fossa, behind and on a line with the inferior turbinated bone. Its faucial or guttural orifice, called pavilion, is fibro-cartilaginous, larger than at any other part of the canal, bell or funnel-shaped, and will admit the introduction of a writing quill, while a very fine bristle can hardly pass through its bony portion, which is about a quarter of a line in diameter. The Eustachian tube consists of an osseous, and a fibro-cartilaginous portion.

The *osseous portion* (excavated in the thickness of the temporal bone, between the petrous and squamous portions, above the carotid canal from which it is separated by a very thin plate of bone, and below the canal which receives the muscle of the malleus), opens into the tympanic cavity by an orifice which is situated blow the processus cochleariformis. This orifice is about two-fifths of a line in its transverse diameter, and about one-fifth in its vertical.

This portion is slightly compressed from without inward, is from six to eight lines in length, conical; the wide extremity of the cone corresponding to the tympanum, the narrow extremity opening into the fibro-cartilaginous portion, at its origin, and which orifice is quite round, having a diameter of about a quarter of a line. The internal walls of the osseous portion are lined by an extremely thin fibro-mucous membrane, very similar to that lining the tympanic cavity.

The *fibro-cartilaginous portion* commences at its attachment to the jagged margin at the extremity of the osseous portion, which is usually the narrowest part of the tube, barely large enough to admit a good sized bristle. From this point it proceeds downward and inward, gradually dilating as it advances, forming a second elliptical cone, resembling a straight trumpet, the large bell or funnel-shaped extremity of which opens behind the posterior nares, as stated above, where it presents a thick, round, projecting lip or margin. The fibro-cartilaginous portion of the tube is from an inch to an inch and a quarter in length; the trumpet or funnel-shaped faucial orifice of the Eustachian tube is nearly half an inch long, and its lower margin is slightly below the floor of the posterior nares; this orifice is always closed in a state of rest, and is opened by the Tensor and Levator palati during the act of swallowing.

This portion of the tube is formed by the union of two triangular cartilages, of unequal size; the smallest, situated inwardly, is united to the osseous portion by its summit, to the internal wing of the pterygoid process by its base, and gives attachment to the Tensor palati muscle; the other cartilage, much larger and thicker, is likewise attached to the osseous portion of the tube by its summit, and forms at its base a kind of horn, to which is attached the Levator palati. These two muscles form, as it were, a kind of sphincter around the faucial orifice of the Eustachian tube, and this disposition of them will enable us to explain the cause of certain difficulties or symptoms which may follow the operation of catheterism. Thus,

a. With certain persons, as soon as the catheter touches the pituitary mem-

always or nearly always be perpendicular to the tangent of one of these prominences or depressions. Thus then the auricle receives

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brane, spasmodic contractions occur in the upper portion of the velum palati; now, during these violent contractions, the muscles of the palate having their fulcrum at the faucial orifice of the tube, completely close it, so that the catheter can not enter.

b. If this spasmodic contraction occurs at the instant the catheter passes into this orifice, the instrument will be suddenly expelled therefrom, and its beak will fall in the pharynx; thereby rendering it necessary to repeat the manœuver.

c. If, in order to enter the catheter, notwithstanding these contractions, the medical man makes a little resistance, the beak of the instrument will lacerate the mucous membrane, and an emphysema will be spontaneously produced during the movements of deglutition, or even with the first insufflation.

A mucous membrane lines the interior of the whole Eustachian tube, which is a continuation of that of the nasal fossa, and of the cavity of the pharynx, and before penetrating therein it forms a thick and soft cushion around the faucial orifice, which contains small glands secreting a mucus analogous to that from the nostrils; hardly has it advanced within the tube, than it becomes much thinner, acquires greater consistence, and gradually assumes that peculiar epithelial-like appearance, which characterizes the internal membrane of the tympanum. Throughout its whole tract, from its faucial orifice to its tympanic extremity, the mucous membrane is very vascular, and is provided with vibratile cilia; it also contains in its substance muciparous follicles, and it is to inflammation of them with hypertrophy, in obstinate catarrhs, that thickenings, strictures, and other morbid changes of this membrane are due.

III. The INTERNAL EAR or LABYRINTH is situated in the petrous portion of the temporal bone, between the tympanic cavity and the internal auditory canal; it is very complicated in its form; and its position is such that the Vestibule, and the Cochlea are opposite to the membrana tympani, and the Semi-circular canals are posterior to it; it commences at the fenestra ovalis, and consists of the three following parts:

1. The *vestibule* is a small, irregular cavity, ovoid from before backward, flattened from side to side, or from without inward, and situated centrally and slightly outwardly in the labyrinth, immediately behind the fenestra ovalis; its greatest or transverse diameter averaging about one-sixth of an inch. It has three dilatations, called ventricles or horns, one anterior and superior, and two posterior and inferior. On its outer or tympanic wall is the fenestra ovalis, closed by the base of the stapes; its inner wall is perforated at its anterior and inferior part by several minute holes for the passage of filaments of the portio mollis or auditory nerve; at the back part of the inner wall is the orifice of the Aquæductus vestibuli or canal of Cotunnius; on the superior and posterior side of the vestibule are the five orifices of the semi-circular canals; in front is the oval orifice of the external scala of the cochlea, etc.

2. The *Semi-circular canals*, which form the posterior part of the labyrinth, are three osseous tubes, situated in the temporal bone, above and behind the vestibule, into which they open by both extremities; there are, however, but five orifices to be observed in this cavity, and which is owing to the fact that two of these canals have but one common orifice. Two of these canals have their arches vertical or turned upward, one being superior, the other posterior; the third or shortest, is external and horizontal, its arch being directed outward and back-

the undulations, reflects some of them, and transmits the most of them through the air in the external auditory canal to the membrana tympanum, and thence to the aural bones.

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ward. These canals describe the greater part of an irregular circle, are compressed from side to side, are about one-twentieth of an inch in diameter, and present each, (with the exception of the posterior extremity of the external or horizontal canal), a dilatation of the end of the tubes to more than twice their diameter, and which dilated extremities are termed *ampulla.*

3. The *Cochlea*, so named from its bearing some resemblance to a snail shell, forms the anterior part of the labyrinth, and commences at the anterior part of the vestibule. It is a conical tube, placed almost horizontally in front of the vestibule, and having the length of about one inch and a half, measured along its outer wall; the canal winds spirally round a central pillar of bone, called the axis or modiolus, around which it describes two turns and a half, gradually diminishing in size from the base to the summit, where it is closed forming a cul-de-sac. The first turn of the tube of the cochlea produces that convexity upon the inner wall of the tympanum, which is called the *promontory.*

The interior of the spiral canal is divided into two scalæ or passages by a thin osseous and membranous lamina, the lamina spiralis, which winds spirally round the modiolus in the direction of the canal; and upon this lamina the nerve tubules are distributed. The two scalæ are thus completely separated from each other, communicating superiorly by means of an opening common to both, the *helicotrema.* Of the two scalæ, one, which is internal or posterior, is situated at the base of the cochlea, is larger, shorter, and at first a little straight, and commences at the fenestra rotunda; at its inferior part is the orifice of the aqueduct of the cochlea. The other scalæ, external or anterior, is narrower and longer and commences in the vestibule by an oval orifice. It is through this that the vestibular liquid penetrates into the scalæ of the cochlea,—a very fine fibro-serous membrane, and which is intimately adherent to the bones, lines all the cavities of the labyrinth, the internal surface of which secretes the liquor Cotunni, and which liquor exactly fills all the labyrinthian cavities, in which we find neither air nor emptiness.

The *membranous labyrinth* is a closed membranous sac, smaller than the osseous labyrinth, having the same general form as the vestibule and semilunar canals, in which it is enclosed, and separated from their lining membrane by liquor of Cotunni. The *vestibular portion* of this labyrinth consists of two sacs called the Utricle and the Sacculus. The *utricle* is the larger of the two, it is elongated, compressed laterally, is situated in the superior and posterior part of the vestibule, being in contact with the superior cresta vestibuli, and its cavity communicates, posteriorly, with the membranous semilunar canals by five apertures. The walls of this sac have numerous filaments of the auditory nerve distributed upon them. The smaller vestibular sac is the *sacculus*, which is round, situated in the hemispherical cavity of the vestibule, and has apparently no direct communication with any other part; it receives numerous nervous filaments which enter from the bottom of the depression in which it is contained. It contains a limpid fluid, and is said to have so much firmness, that when opened with the point of a lancet, it will retain its form.

The *Membranous Semicircular Canals* are smaller in diameter than the osseous canals, but resemble them in number, shape and general form; they are hollow,

2. *The external Auditory Canal* directly continues the ærial waves through the air it encloses; its walls conduct the sonorous waves, transmitted by the auricle, to the membrana tympani; and the column of air contained in it, re-echoes and augments the intensity of the sound.—To properly fulfill its functions, certain conditions of this canal are required; its curvature is of service, and exists in all animals furnished with such a canal; if it be too large, or too narrow, it gives rise to a deficiency in the delicacy of hearing. A certain amount of cerumen is required to keep the canal properly moistened, but, too great an abundance, or an entire absence of it, interferes with the transmission of the sound-waves,—the latter condition may, however, be frequently remedied by dropping into it

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open by five orifices into the utricle, and have ampullæ at their extremities the same as the osseous canals.

The membranous labyrinth is retained in its position by means of the numerous nervous filaments which pass through the minute openings on the inner wall to be distributed to the utricle, the sacculus, and to the ampulla of each canal. Its walls are transparent, and consist of three layers, within which is contained a limpid serous fluid, liquor of Scarpa or endo-lymph, which fills the membranous labyrinth, and two minute, granular, calcareous bodies suspended in this liquor, and called *otoconites* or *otoliths*, one being in the utricle, and the other in the sacculus. They appear to be almost universally present in the ear of the mammalia, and are probably in some way connected with the function of hearing.

IV. NERVES OF THE AUDITORY APPARATUS. The Auditory Nerve is the portio mollis of the seventh pair of nerves, emanating from them after they have reached the meatus auditorius internus; it is the special nerve of the sense of hearing, and divides, at the lower part of the internal auditory meatus, into two branches, the cochlear, and the vestibular. The *vestibular nerve* is situated more posteriorly than the cochlear, and is subdivided into a superior, middle, and inferior branch. The *superior branch* is the largest, and divides into numerous minute filaments, which after entering the vestibule are distributed to the utricle and to the ampulla of the external and superior semicircular canals. The *middle branch* sends off numerous filaments which enter the vestibule below the superior branch and are distributed to the sacculus. The *inferior branch* is the smallest of the three, it passes backward to the posterior wall of the vestibule, and gives off filaments which are distributed to the ampulla of the posterior semicircular canal. After these nervous filaments have entered the ampullæ and the sacculi, they radiate in all directions, forming loops and a kind of network, and finally terminate upon the inner surface of these membranes in minute papillæ, somewhat like those of the retina.

The large, anterior, cochlear nerve, divides into numerous filaments at the base of the modiolus, ascend along its canals, and form a plexus containing ganglion cells between the osseous plates of the spiral lamina, at the edge of which they terminate, by a very free anastomosis, in minute fibrillæ, and finally end in delicate papillæ in the membranous part of the spiral laminæ.

The *Arteries* of the labyrinth are derived principally from the auditory branch of the superior cerebellar artery.—The most important vein of the ear is the deep-seated auricular, located in front of the tragus.

a few drops of some fatty substance. Deafness is the result of the obliteration of this canal.

3. The *solid walls of the Cranium* aid in the transmission of sound, as may be proven by holding a watch between the teeth. When we close the ears, we, nevertheless, hear the voice of a person near by; and if we place a watch against or near the head, first, in front, and then behind, we will ascertain that the posterior part transmits the sound-waves much better than the anterior.

4. The *Membrana Tympani*, or *Drum Membrane*, is present in all animals with ærial audition. In animals who lead a subterranean life it is very oblique, and nearly horizontal with the mole. Its inclination not only increases its extent, but also changes the direction and measure of the sonorous waves. It receives these waves, either through the air in the external meatus, or directly along the walls of this canal, and by the shock communicated to it, vibrates, the same as the head of a drum when it is made to receive a blow.

It is likewise susceptible of another very different movement, which is impressed upon it by the movements of the chain of ossicles under the influence of muscular contractions. This second movement, known as tension and relaxation of the membrana tympani, is somewhat passive in man, as it results only from the action of the ossicles. With some animals it will be active, as their drum membrane is of a muscular character; while with others the tension and relaxation are due to the variable pressure of the air in the interior as well as in the exterior parts of the ear.

In man, the tension may occur by the tensor tympani, or by the stapedius muscle, when this is present, that is to say by a power which acts at one or the other extremity of the chain, and relaxation is then simply an effect of elasticity, and is not active. Arnold states that the otic ganglion presides over the movements of these two muscles, the same as the ophthalmic ganglion presides over the movements of the iris; so that there is an analogy between the iris and the drum membrane.

The membrana tympani, according to Bichat, is made tense for weak sounds, and is relaxed for strong sounds. On the contrary, however, Savart states that the membrane is relaxed for the perception of weak sounds, and becomes tense for loud sounds; also that when the membrane becomes accidentally and forcibly stretched by rarification of the air of the tympanum, or by condensation of the external air, the faculty of hearing feeble sounds is lost, loud ones only being heard; in other words the hearing is diminished. We can satisfy ourselves of this, by closing the mouth and nose, and then making a strong expiration, which condenses

the air in the tympanic cavity—or, by a strong and continued inspiration, which rarifies the air in this cavity. In these two easily repeated experiments, we hear badly, the hearing is obtuse, because the membrane is made tense outwardly during the expiration, and inwardly during the inspiration.

Muller thinks that certain cases of partial deafness are due to too great a tension of the drum membrane; this circumstance may be of value to bear in mind in the diagnosis of diseases of the ear, which are sometimes so obscure. This excessive tension of the membrane may be occasioned by obstruction of the Eustachian tube, in which the air dilates under the heat of the body, or else becomes partially resorbed, the membrane being strongly stretched either outwardly or inwardly. It may also be occasioned by contraction of the tensor tympani. Perforation of the membrana tympani, or of the mastoid process would be useful in the first case (that is, if the tube be obliterated) but of no service in the last, and this will, probably, explain the opposite results following this operation.

It is probable that during a very loud sound, the tensor muscle is put in action by a reflex movement, similar to that which happens to the iris and to the orbicular muscles of the eyelids under the influence of a very strong and bright light. In this case, the irritation is transmitted to the sensorial nerves of the brain, and from the brain to the motor nerves. Consequently, it is a probable hypothesis, that when a very intense noise strikes the ear, the muscle of the tympanum may control the amount of sound-waves that pass to the labyrinth, and thus moderate the hearing, by its reflex movement. Mr. Toynbee observes, "I think it may be fairly inferred, that the function of the tensor tympani muscles is to protect the membrana tympani and the labyrinth from injury during loud sounds; while the stapedius muscle places these structures in a position to be impressed by the most delicate vibrations; and it would appear to be brought into action during the process of listening."

The integrity of the drum membrane is not absolutely essential to the mechanism of hearing; many individuals in whom it has been accidentally ruptured, are able to pass cigar smoke through the ears, without being deprived of the faculty of hearing. If, with a perforation, there also exists a thickness or other abnormal condition of the membrane, then deafness will almost invariably be present.

5. The *Tympanum* or *Drum*. We have seen that variability of tension of the membrana tympani is necessary for the adaptation of hearing to the variable intensity of sounds. Now, to effect this

variability of tension, it is required that the partition or drum membrane be placed between two columns of air, and consequently that this fluid be contained in the tympanic cavity.—Sound, having reached the membrana tympani, is transmitted to the internal wall of the tympanum, by the air contained in this cavity, and by the ossicles.

All possible conditions are combined in order that the vibrations communicated by the drum membrane be transmitted, without any loss, to the fenestra ovalis along the chain of ossicles. These are solid, unattached to the bones of the cranium, and are enveloped on all sides with air; and, it is known, that a solid body transmits sound more readily when it is not communicated to the surrounding atmosphere. The membrana tympani, then, transmits the sound-wave to the handle of the malleus, from this to the stapes and to the membrane of the fenestra ovalis.

6. The *Eustachian Tube* has had many uses attributed to it; thus, Muncke maintained that it was necessary to keep up an equal density between the external and internal air, in order that the latter transmit the vibrations; Muller has objected to this opinion, because unequal density of layers of air only occasions a slight loss of the force of sound. Henle states that the faucial aperture is analogous to holes pierced in the sound-board of a violin, and which are necessary for the formation of a full sound, and there is resonance at the same time of the board, of the instrument, and of the air contained in its interior. Muller admits this fact.

The mucus secreted in the tympanic cavity is evacuated through the Eustachian tube, and when this is retained or accumulates, it forms an obstruction to the free passage of air through the tube, and deafness is the result. But the principal use of this tube is to give a free passage to part of the air of the tympanic cavity, consequently, favoring tension of the drum membrane, and maintaining it in equilibrium with the air exterior to it.

The Eustachian tube is generally closed at its faucial orifice, except during deglutition, when it is opened by the tensor, and levator palati muscles. Toynbee remarks: "As during the act of deglutition the tensor and levator palati muscles contract, it is evident that whenever that act is performed, the Eustachian tube must be opened; and inasmuch as there is no apparatus by which the faucial orifice of the tube can be kept open, its lips must fall together, and the orifice close as soon as the muscles cease their action. During the few moments that the faucial muscles are brought into play in the process of deglutition, air can either enter or recede from the tympanic cavity, and thus be always of the same density as the outer

air. The reasons why the Eustachian tube is closed, save during the momentary act of deglutition, are, first, that the tympanum may be generally a closed cavity, so that the sonorous vibrations reaching it may be concentrated upon the membrane of the fenestra rotunda; and second, that, as especially pointed out by Dr. Jago, sounds may be prevented entering the tympanum from the fauces." He further states, that whenever the Eustachian tube becomes impervious, the air in the tympanic cavity becomes partially exhausted or absorbed. "The effect is to produce an increased concavity in the external surface of the membrana tympani; a forcing inward of the chain of ossicles; pressure on the contents of the labyrinth; and a very serious diminution of the hearing power."

7. The *Mastoid Cells* appear to be merely an appendage to the tympanic cavity, being for the organ of hearing what the sinuses are for the olfactory organ. Their development in feline animals and night-birds, in which they extend into the occipital bone and the temporal, indicates that they contribute to increase the intensity of sound.

8. *Fenestra Ovalis* and *Fenestra Rotunda*. The sonorous vibrations having reached the internal wall of the tympanum, may be transmitted to the labyrinth by two routes: as by

a. The fenestra ovalis which, by means of the chain of ossicles, makes the lining membrane closing it vibrate, and, consequently the vestibular liquid.

b. The membrane which closes the fenestra rotunda, or membrana tympani secundaria.

There has been a diversity of opinions as to whether sound is transmitted by both, or only one of these passages. Pathology has shown that destruction of the ossicles will sometimes result in the abolishment of hearing, and at other times will only feebly diminish it; it is probable therefore that both of these fenestræ have the power of propagating sonorous vibrations. As to which of them transmits sound the best, Muncke decides in favor of the fenestra ovalis to which an osseous chain conveys sounds; Muller also adopted this opinion.—What is remarkable in this matter, is, that both fenestræ are not indispensable to ærial audition; frogs have the f. ovalis but not the f. rotunda, a manifest proof of the superiority of the former.

M. Auzoux gives an explanation of the use of the fenestra rotunda, of the following purport: At the instant when the plate or base of the stapes, put in motion by the sonorous vibrations, dips or sinks down in the fenestra ovalis, the labyrinthian liquid yields to the pressure thus made upon it; but this liquid exactly fills the canals

and the scalæ of the labyrinth, so that there is no vacuum; and the osseous walls resist this pressure. The membrane of the fenestra rotunda, pressed from within outward by the reflux of the liquid (through the orifice of communication of the two scalæ), yields, becomes tense within the limits of its elasticity, making, so to speak, a hernia on the side of the tympanum; consequently, the capacity of the inferior scala is momentarily enlarged, to the extent to which the small portion of liquid displaced has yielded when put in motion by the shock or pressure of the stapes. As soon as this pressure ceases, the membrane of the fenestra rotunda, from its own elasticity, returns to its original condition, and the labyrinthian liquid displaced an instant for the accomplishment of the function (that is, concussion of the nervous extremities), also resumes its primitive situation.

9. The *Liquid of the Vestibule*, and the *Semicircular Canals*. The greater part of the sonorous undulations pass, then, by the fenestra ovalis; there, they impress the liquid, which communicates its vibrations to the vestibular and cochlear nerves.

The complication of this passage through a layer of liquid before encountering the nerve, is a fact worthy the attention of physiologists. Let us observe, at first, that this disposition being common to all atmospheric and aquatic animals, is, for that reason, fundamental, and of the highest importance for the function.—The presence of an intermediary liquid being, if not indispensable, at least very useful; the concussion communicated by a liquid to the nerve being more favorable for its delicate pulp. Beside, according to Breschet, the membranous sacs or tubes of the vestibule may vibrate; this vibration is rendered more easy for them by their position between two liquids which sustain them.—If the vibration of sound passed directly from the air to the nerve, the sudden impression would be painful for this soft and delicate pulp.

Muller states that the intensity of sound is slightly augmented by the direction of the curvature of the canals, and, according to him, the osseous portion of the canals appears to be accessory, for with the noisy lamprey we find only membranous tubes or canals.

10. The *Cochlea*. M. Flouren's researches have shown that the cochlea has not so great an importance as the vestibule, since it is absent in entire classes of animals; it is, however, a very useful means of improvement. To understand the manner in which the sonorous vibrations are conveyed to the cochlea, we must bear in mind that they may reach it by two passages, viz.: *a*. By the water of the labyrinth, (perilymph), which moves freely in the communicating vessel, represented by the vestibule, and the cochlear scalæ.

b. By the solid walls of the cranium. All these vibrations are transmitted through the modiolus, the spiral lamina, and the osseous plate which envelops the scalæ.

It may naturally be asked if the concussion follows a successive and progressive course along the liquid of the scalæ, or along the modiolus and the spiral lamina, from the vestibule, to the apex of the cochlea? This can not be; the concussion is communicated so readily from the liquids to the solids that the shock is communicated at once in every direction, without going through the entire length of the canals.

We are aware, with Muller, that the convolutions of the cochlea have for their object, by confining the canal in a small space, the inducing a simultaneous vibration or concussion upon the whole nervous surface.

The lamina spiralis is also, probably, designed to present a large surface upon which the numerous filaments of the cochlear nerve are expanded, like the cords on a key-board.

Muller has offered the following considerations: The cochlea is adapted to receive at the same time, the sonorous vibrations coming from the labyrinth and from the walls of the cranium, for its spiral lamina, supports the auditory nerve, communicates with the labyrinthine perilymph and with the bony parts of the cochlea and of the cranium, and, on the contrary, the membranous labyrinth, which is free and floating in fluid, is only adapted to transmit to the vestibular nerve the vibrations communicated through the medium of the liquid. And since the cochlea possesses the two means of receiving the vibrations through the solids and the liquids, it is a more perfect organ of reinforcement than the vestibule.

As to the aqueducts, they have no part in hearing; they do not serve to evacuate the fullness or overflow of the liquid, during the vibratory concussion, as Cotunni and Meckel believe. Breschet has demonstrated that these fissures are associated simply with the evolution of the auditory organ.

No satisfactory solution of the perception of different sounds and their degrees of intensity have yet been given, though many hypotheses have been advanced by physiologists.*

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* In the selection and preparation of matter furnishing the history, description, causes, and symptoms of aural maladies, as well as the remarks introductory thereto, I am greatly indebted to Triquet more especially, to Toynbee, Wilde, and Von Trœltsch, also to Itard, Kramer, Bonnafont, Muller, Meniere, Valleroux, etc.

GENERAL CAUSES OF DISEASES OF THE EAR.

Acquired deafness is due to two causes, viz.: predisposing, and efficient.

Among the *predisposing causes* it will be found that males are more subject to those diseases of the ear occasioning deafness, than females, and which is undoubtedly owing to their being more exposed to the action of cold, moisture, atmospheric influences, etc., which give rise to catarrhs and inflammations of the air passages, Eustachian tube, tympanic cavity, and other parts of the ear. The action of cold is very prostrating; it interferes with the free circulation of the blood in the capillary vessels, so that the parts affected by it contract and present an appearance characterizing either an absence of blood in the tissues, or a stasis, being pale in the first instance, and purplish in the latter; it likewise lessens the sensibility of the parts, as well as retards or arrests their secretions. If the cold be severe, the consequent degree of depression will be in accordance therewith, and, if not carried to too great an extreme, will be followed by a corresponding powerful reaction, resulting in pain, redness, increased heat, and other symptoms indicating inflammatory action.

The resisting power of organs to the influence of cold, is, to a certain extent, due to their being well enveloped in adipose and cellular tissue, and in being furnished with an abundance of blood; the ear, however, has only a minimum amount of such protection, its more important parts being encased in osseous structure, and hence it is more disposed to inflammation when improperly exposed to a cold atmosphere, cold draughts of air, or draughts of air when the system is warmed by exercise, etc., as well as to the influence of cold water or other fluids entering the ear, and imprudent applications of cold water to the head.

Deafness may be acquired at any period of life from infancy to old age, depending upon the abnormal lesions producing it; thus, young children often labor under external or internal otitis, with denudation of the bones, caries, necrosis, perforation of the membrana tympani, abscess of the mastoid process, and caries of the mastoid process, which lesions are generally the sequelæ of certain fevers, especially eruptive fevers. Two additional causes may be met with among very young infants, viz., exposures to cold, and convulsions. Among youth and adults, frequent catarrhal attacks, extending into the Eustachian tube, the tympanic cavity, or into

the external auditory canal, as well as otitis developed during, or following a severe febrile attack, as, for instance, typhoid fever, may ultimately occasion deafness. Old persons are more disposed to deafness originating from morbid changes in the internal ear, as, absence of the liquor of Cotunnius, congestions of the neurilemma of the auditory nerve, as well as abnormal changes in the sensibility of this nerve.

Deafness may also be hereditary or transmitted from parent to child; thus, we sometimes meet with parents becoming deaf at a certain age, whose offspring also become deaf at about the same age, and under similar circumstances. In these cases, the prognosis is almost invariably unfavorable.

Deafness is much more common in the North, or, in cold and moist climates; for these agents acting either singly or together, produce unfavorable influences upon the tissues of the external auditory canal, and upon the membrana tympani, rendering this membrane less apt to transmit the sonorous vibrations; beside which, they occasion inflammations which may attack this membrane and the tissues of the external auditory canal, or which may extend into the Eustachian tube, and to the tympanic cavity, as may frequently be observed in inflammation of the naso-pharyngeal mucous membrane. On this account it is better to undertake the treatment of deafness from these causes, in warm and dry seasons, instead of during the winters. Deafness in warm climates, and especially in places along the sea-coast is more commonly due to rheumatic affections of the fibrous tissue which enter into the composition of the auditory apparatus.

Persons of sedentary professions, and those much occupied in long-continued mental exercises, are liable to become deaf, especially about the middle period of life, from hyperæmia of the auditory apparatus, which may be cœtaneous with cerebral congestion; those, likewise, whose avocations require them to be exposed to cold, moisture, atmospheric changes, etc., are equally liable to diseases of the ear, as draymen, coachmen, carpenters, house-painters, masons, bleachers, day-laborers, boatmen, farm-laborers, etc.

Again, those who dwell or work in the midst of noise, especially if this be constantly monotonous, are very subject to deafness occasioned by a diminution of the sensibility of the auditory nerve, from the constant and repeated concussions, and incessant irritations upon this delicate organ. Those who work near steam-engines, are very apt to be hard of hearing, if not quite deaf; and artillery-men are always more or less deaf, which is often due to rupture of the membrana tympani from the severe sonorous concussions occasioned

by the firing of cannon. These constant noises act both by the shock they impart to the whole organism, especially when they are powerful, and by the impressions they produce on the organ of hearing.

In adult and old age, those of a sanguine temperament are more subject to deafness. Persons of this temperament who constantly present red cheeks, injected eyes, short necks, large chest, full and strong pulse, are more especially liable to what is called "nervous deafness," and which may be due to a congestion of the labyrinth, of the neurilemma of the auditory nerve, or, of that part of the encephalon from which this nerve arises.—Next to the sanguine, the lymphatic temperament is liable to deafness. Among children, especially, of a lymphatic and scrofulous temperament, who are pale, with soft flesh, white, slightly œdematous skin, thick lips, broad, flat nose, blue eyes, and congestion of the glands of the neck, deafness is to be feared, as they are very subject to discharges from the ear, and which, if neglected, will certainly occasion a more or less complete loss of hearing. With this class of children there is a tendency to suppuration, which becomes developed under the influence of the slightest cause and continues inexhaustible. The deafness observed among them is often due to internal or external otitis, which ultimately extends into the tympanum; sometimes, however, it is owing to catarrhal inflammation of the Eustachian tube.

The nervous temperament comes next in order, as regards liability to deafness, and which deafness is ordinarily due to vital lesions of the auditory nerve.—Lastly, the nervo-bilious, or melancholic temperament is subject to tinnitus aurium, and a more or less complete loss of hearing. But, whatever may be the predisposing cause to diseases of the ear, the liability to them will depend upon the character, duration and intensity of the efficient causes, and the degree of resisting power of the system.

The *efficient causes* are both local, and general. The principal ones among the local efficient causes, are, cold and moisture, heretofore refered to; these are not only predisposing causes, favoring the development of diseases of the ear, and rendering them more difficult of cure, but they frequently are, of themselves, sufficient to produce deafness very rapidly, as may often be witnessed among persons living in places where they are exposed to sudden changes of temperature, or of the wind, etc. Diseases of the throat, the result of cold, and especially that which occurs during the presence of scarlatina, catarrh, influenza, measles, diphtheria, laryngitis, etc., are very fruitful sources of aural affections; as, the

diseased condition of the mucous membrane of the throat, lips, nostrils, or eyes, may be propagated through the Eustachian tube to the mucous membrane of the tympanum. The mucous membrane lining all these organs is but a continuation of one membrane, which even extends into the lungs and stomach, and which will account for the readiness with which disease at one portion of it may be transmitted to some other, even to that lining the middle ear.

The next in order among the local efficient causes are blows or falls upon the head, and all circumstances which may produce concussion of the brain; in which cases, the deafness may be symptomatic of a cerebral lesion, its prognosis resting upon that of the brain affection, or, it may be the consequence of a concussion of the auditory nerve, somewhat analagous to amaurosis caused by blows upon the eye, and, like the amaurosis, it may resist all methods of treatment. The common practice of boxing or pulling the ears, or of introducing pins, ear-spoons, or other foreign bodies within the external meatus is very improper, as inflammation, terminating in deafness may thereby be produced; I have known the drum membrane to become ruptured, in several instances, where the children had been severely boxed on the ears.

Among the general efficient causes, is, the scorbutic diathesis, in which there is a tendency to a morbid change in all the plastic functions of the system, and especially in the fluids, and which condition is not only favorable to, but may actually determine effusions in the ear,—deafness frequently being due to an effusion of blood in the internal and middle ear.

Cancer may develop itself either in the neighborhood of, or directly in, the auditory apparatus, and interfere with, or completely abolish the hearing, but there is no special action of cancer in the development of aural diseases.—Deafness may occasionally be due to gout influencing some part of the auditory organs, or, it may with still greater probability be occasioned by syphilis, which locates itself wherever there is any fibrous tissue, as, in the derma, periosteum, articulations, cellular tissues, parenchymatous tissues, as the liver, testes, etc., and also in the neurilemma, and which may, in like manner, locate itself in the bones of the ear, in the periosteum lining the osseous cavities of this organ, and in the auditory nerve, or some of its ramifications, producing lesions incompatible with hearing. But cases of deafness due to these causes are extremely rare. Still more seldom is deafness due to the presence of tubercles in any part of the ear.

Acute diseases, as, typhoid fever, small-pox, scarlatina, measles, etc., are apt to terminate in a purulent diathesis of the economy,

frequently giving rise to suppurative discharges from the ear, (as well as suppurative inflammation of the parotid glands, of the bronchia, pleura, etc.), and which aural discharges may ultimately occasion deafness.

Among persons of advanced years, deafness generally comes on gradually; at first, conversation at the usual distance can not be heard, the distance of hearing lessens by degrees, slight noises are not heard, and finally, the person, in order to hear, requires those with whom he converses to repeat their sentences, and to elevate their voices, and so on, until ultimately the deafness becomes complete. But, the deafness may develop itself more rapidly, under the influence of a severe acute attack, external or internal otitis, acute catarrh, etc. The duration of the deafness is generally quite lengthy, perhaps several years. Deafness in old age has been shown by Mr. Toynbee, not to depend upon a gradual and natural decay of the power of the organs of hearing, but upon "the influences to which aged persons are frequently subjected, namely, the prolonged stay in warm rooms, the avoidance of the open air, the cessation from bodily exercise, the want of attention to diet and to the healthy performance of the functions of the skin." The internal auditory apparatus being almost entirely concealed in a bony receptacle, and having but little connection with the rest of the economy, as a general thing, we can treat its diseases only by feeble and indirect means of action.

GENERAL SYMPTOMS OF DISEASES OF THE EAR.

The symptoms of aural affections are divided into Subjective, or certain sensations experienced by the patient, and Objective, or certain morbid changes observed by the physician, in the form, color, texture, consistence, vascularity, and the more or less ready penetration of air and fluids in the different parts composing the organ of hearing. Both orders of symptoms should be very attentively investigated, in order to aid us in forming a correct diagnosis, prognosis, and course of treatment.

If it be desirable to treat diseases of the ear with skill and efficiency, it is highly important that a correct diagnosis be arrived at by the practitioner; and this can only be attained by instituting as thorough an examination as possible of the several parts of the ear, and of the symptoms present, and by ascertaining all the important circumstances associated with the case before us.

We will, therefore, first ascertain the name of the patient, age, occupation, temperament, usual state of health, present state of

health, condition of tongue, stomach, liver, kidneys, bowels, pulse, etc.; whether subject to cutaneous diseases, syphilis, rheumatism, scrofula, etc.; whether any relatives have been subject to deafness or diseases of the ear, and which of them; when the present affection was first observed, and to what cause it was attributed; what symptoms have from time to time been observed; whether the disease has progressed gradually or rapidly; whether the symptoms were constant, or appeared at regular or irregular intervals; whether they came on gradually or suddenly; whether they (deafness in particular) have been or are aggravated by cold, cold and damp weather, mental excitement, physical fatigue, mastication, etc.; what conditions of air, weather, position, and the system, effects an apparent improvement in them; and whether during an exposure to loud noises, noise of machinery or mills in motion, traveling in coaches or railroad cars, walking through a crowded street, etc., or, whether after a full meal, the hearing is increased or diminished.

Having procured satisfactory replies, we then commence a further investigation of the

I. SUBJECTIVE SYMPTOMS.

1. *Deafness* presents itself in various degrees, from cophosis or complete absence of hearing to dysecœa or dullness of hearing. In dysecœa the patient still hears, but less distinctly and readily than in the normal state; as commonly termed, he is said to be "hard of hearing." In a more advanced degree, the most elevated tones of the voice can hardly excite a confused sensation. Having reached this degree, the deafness approximates cophosis.

For a long time, aurists have endeavored to ascertain the best method of determining the degree of hearing with the different persons falling under their observation. Generally, a patient believes his hearing to be still good, as long as he can continue his social relations in a convenient manner and sustain a conversation. The human voice is thus taken as a standard of comparison; but this could only be admitted if either every person, or any particular individual, always spoke in the same tone, with the same force, the same thrill, and accurately in the same direction toward the ear of the patient; and these conditions do not admit of being fulfilled. Patients who hear very badly with one ear, often think that they still hear perfectly well with the other, and therefore consider any further proof of this quite superfluous.

Again, a person may hear the human voice tolerably well, and yet be wholly unable to hear another noise, as, for instance, the

ticking of a watch; and, on the contrary, certain persons who can still hear the watch, are entirely insensible to the human voice. The facility with which the voice, articulated in a more or less distinct manner, and at a greater or less distance, may be heard, is, then, not a certain measure for the various changes which the function of hearing may undergo; for the ear is not sensible to all sounds, though of the same force, so that we can not with absolute certainty conclude, from an increased susceptibility for a definite sound, as that of a watch, that a precisely proportionate increase of capability of hearing the human voice exists. Various instruments have been formed for the purpose of determining the degree of hearing, but, as "the works of the watch always give a *uniform sound*, the *distance* of which from the ear to be investigated always admits of being *accurately defined*, and which may always be presented to the ear in the *same direction*," these several instruments have been set aside, and the watch substituted in their stead.

As watches vary in their sounds, some ticking louder than others, it is very difficult to form a correct idea of the degree of hearing, or hearing distance of deaf patients, reported by writers, unless there be universally recognized by the whole profession, a *standard normal distance of hearing distinctly*, and counting the ticking of a watch. In order to obtain this desideratum, I had (including myself) ten apparently healthy persons, who had not complained of any difficulty of hearing, to test, each, the hearing distance of his own watch, as well as of the watches of the others, and the result is given below. Although the measurements are not given exact up to the very inch or its parts, (in some cases, an inch or so being dropped, and in others added), yet the figures and allowances made are considered sufficiently correct for all practical purposes.

Each watch was held, in the hand of a person, on a level with the ear of the listener, the latter of whom gradually increased the distance between his ear and the watch, until he reached his limit of distinct hearing,—then, by means of a graduated tape, the measurement was taken from the watch to the prominence of the malar bone of the right side; the right ear being, in each instance, the one directed toward the watch.

From the following, the average or *standard normal distance* at which the ticking of a watch may be heard, may be assumed as 12.5 feet, or 150 inches, or 381 centimetres.

Therefore, taking 12.5 feet as the *standard normal distance of hearing* the ticking of a watch, we can readily determine the *standard limit of hearing* (distinctly) with any watch whatever, provided, the normal distance at which the watch used can be heard, has

first been ascertained; and which may be effected by a trial with ten or twelve healthy persons who have not complained of, nor detected any difficulty of hearing, and accepting, as the normal distance at which said watch can be heard, the greatest distance at which the majority of the listeners can distinctly hear and count its ticking.

NUMBER OF PERSON.	Number of each Watch, and the Hearing Distance.									
	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.
	feet.	feet.	feet.	feet.	feet.	feet.	feet.	feet.	feet.	feet.
1	16.5	22	10	14.5	10	8.5	16.5	6	10	15
2	16.5	22	10	14.5	10	8.5	16.5	6	10	15
3	16	21.5	9.7	14	9.7	7.5	16	5.5	9.7	14.7
4	20	25.5	12	19	12	11	20	8.5	12	19
5	16	21.5	9.7	14	9.7	7.7	16	5.5	9.7	14.7
6	15.5	20.5	9	13	9	7	15.5	5	9	14
7	14	19.5	8	12	8	6.5	14	4.5	8	13.5
8	16	21.5	9.5	14	9.5	7.7	16	5.5	9.5	14.7
9	13.5	19	6.5	10.5	6.5	5.5	13.5	4	6.5	12.7
10	16.5	21.5	10	14.5	10	8.5	16.5	6	10	15
	160.5	214.5	94.5	140.0	94.5	78.5	160.5	56.5	94.5	149.0
Average distance of hearing with each watch.	16.05	21.45	9.45	14.0	9.45	7.85	16.05	5.65	9.45	14.9

I. The rule by which to make the calculation is as follows: *As the normal distance at which the watch employed can be heard, is to the standard normal distance of hearing, so is the distance at which the patient can hear the watch employed, to his standard limit of distinct hearing*, or *standard hearing distance.**

1. If the normal distance of hearing a watch is 3 feet, and a patient can only hear it at 3 inches, what is his standard limit of hearing?

First, in this case, reduce the feet to inches, then,

inches. inches. inches. inches.
36 : 150 : : 3 : $12\frac{1}{2}$

2. If the normal distance of hearing a watch is 7 feet, and a patient can only hear it at 2 feet, what is his standard limit of hearing?

feet. feet. inches. feet. feet.
7 : 12 . 6 : : 2 : $3\frac{4}{7}$

* *Standard limit of hearing* is the distance at which the patient would hear a watch, the standard normal distance of hearing of which is 12.5 feet.

3. If a watch can be normally heard at 20 feet, and a patient can only hear it at 6 inches, what is his standard limit of hearing?

inches.		inches.		inches.		inches.
240	:	150	: :	6	:	$3\frac{3}{4}$

II. The rule by which to determine the distance at which a particular watch may be heard by a patient, his standard limit of hearing being given, is as follows: *As the standard normal distance of hearing is to the normal distance at which a particular watch can be heard, so is the standard limit of hearing in a patient* (as given by a writer) *to the distance at which said patient can hear the particular watch.*

3. The normal distance of hearing my watch is 20 feet, at what distance can it be heard by a patient whose standard limit of hearing is given as $3\frac{3}{4}$ inches?

inches.		inches.		inches.		inches.
150	:	240	: :	$3\frac{3}{4}$	:	6

4. The normal distance of hearing a physician's watch is 7 feet, at what distance can it be heard by a patient whose standard limit of hearing is given as $3\frac{4}{7}$ feet?

feet.		feet.		feet.		feet.
$12\frac{1}{2}$	:	7	: :	$3\frac{4}{7}$	:	2

A writer may, therefore, give, when describing the degree of his patient's hearing, either the standard limit of hearing, or the actual distance at which his own watch can be heard by the patient. In the latter case always naming the normal distance at which his watch can be heard.

By the above means a degree of uniformity is attained, and the degree of deafness of all reported patients, as well as their subsequent improvement in hearing, can be approximatively ascertained, sufficiently exact for all practical purposes.*

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* Instead of the above, we may, as is done with vision, determine the Acuteness of Hearing, instead of the hearing distances, thus: Let the normal Acuteness of Hearing, 12.5 feet, as ascertained by the means named above, be represented by 1; then in the first example given above the Acuteness of Hearing will be twelve and one-half one hundred and fifty inches, equal to one-twelfth; and in the second example, it will be five one-seventeenth and one-half or about plus one-third.

Ex. The normal distance of hearing my watch is 20 feet, at what distance can it be heard by a patient whose Acuteness of Hearing is given as one-sixth?

One-sixth of 12.5 feet is 25 inches, which is the standard limit of hearing of the patient, then by Rule II above given,

inches.		inches.		inches.		inches.
150	:	240	: :	25	:	40

When it is desired to estimate a very advanced degree of dullness of hearing, a watch should be employed that can be heard at a considerable distance by a sound ear. The watch should be approached gradually to the ear, instead of being withdrawn from it, until it gets within the hearing point at which the tickings can be accurately counted, and the intervals between these sounds be perceived. The hearing should be tested with the mouth open as well as closed; also before and after the inflation of the tympanum; and the experiment should be conducted in a room as still as possible. The watch should be held directly opposite the ear and on a level with it. Persons who can still hear the elevated tones of the voice at a short distance from the ear, say about eighteen inches, may hear the ticking of a watch in contact with the ear; but those who can hear the watch at a distance of one-third of an inch, one-half of an inch, or one and a half inches may be able to follow a conversation at some distance, and without any effort.

In repeating the trial of the hearing distance of a patient, in order to determine the progress of his case, it "must always be made under the same circumstances, internal as well as external; always in the same room, and during the same degree of surrounding stillness, as well as of the mental and bodily repose of the patient; either always before or after a syringing, or sitting before the vapor or air apparatus; and with the watch in the same direction toward the ear, etc." (*Kramer.*)

According to the degree of deafness, etc., the watch should be applied as named above, or, both before and behind the auricle, or to the forehead, or, against the auricle, or be held gently between the teeth of the patient, etc.

2. *Pain*, (with the exception of otalgia or neuralgia of the ear, in which the pain comes on by paroxysms, without any trace of inflammation of the membranes, and rapidly attains its height, as well as vanishes suddenly), is almost invariably indicative of an inflammatory condition of the organ. Otalgia may be due to the presence of a carious tooth, and will disappear with the removal of the tooth.

Pain, is a symptom observed in all inflammations of the external, middle, and internal ear. In each of these cases, its seat and its nature are invariable, and demand an attentive examination.

In inflammation of the external auditory canal, whether this inflammation be due to the presence of a foreign body, or originates from cold, the seat of the pain is the tragus and the small region contiguous to it.

In inflammation of the tympanum, and of the cells, the seat of the pain is at the base of the mastoid process, and at the root of the neck.

In inflammation of the membrana tympani, the patient complains of pain in the superior part of the helix, and deeply within the external canal.

In inflammations of the internal ear, the corresponding region of the cranium is more particularly the seat of the pain, as, the forehead, the temples, or the occiput. In otalgia the pain is violent and by paroxysms; in all inflammations it is continuous with a paroxysm in the after part of the day, and especially during the night; sharp and severe, diffusive-like, in inflammation of the auditory canal, it is pungent in inflammation of the drum membrane, pulsating or throbbing when the tympanum is inflamed, and lancinating, or as if some foreign body were attempting to pass through, when the mastoid cells are attacked.

In inflammation of the labyrinth the pain somewhat resembles that of encephalitis. The patient utters sharp screams, and becomes delirious in the first stage, which is soon followed by coma, if the treatment employed does not speedily afford relief.

In the chronic state, similar pains are experienced, but much less severe than in the acute. In chronic catarrhal inflammation of the external auditory canal, and which terminates by suppuration, there remains a feeling of uneasiness or painfulness, and we may frequently excite pain, by even lightly pressing upon the conglobate gland (sub-lobular) which is almost always increased in size.

In chronic inflammation of the tympanum, there is more a sense of fullness than of real pain; and in old inflammations of the labyrinth, there is cephalalgia, which persists for a long time; and when, exhausted by the time, it finally disappears, the morbid changes which follow, and which will be hereafter referred to, under "Nervous Deafness," are of such a nature that we should be very cautious in our prognosis. Thus, in certain amauroses, we observe the pain, acute at the commencement, soon yield to a deceitful calm, to a feeling of well-being which induces the patient to hope for an immediate amelioration; but the duration of this hope will not be very long, for at this period of the disease, the sight is lost, more generally, permanently. So it is with the ear, certain forms of nervous deafness, are, in reality, what might be termed incurable amaurosis of the ear.

3. *Erethism*, or *augmentation of hearing*. *Paracusis Acris*, is a morbid phenomenon met with principally during acute inflammatory

attacks of the membrana tympani, of the labyrinth, and at the commencement of nervous deafness, at least in many instances.

In acute inflammation of the drum membrane, this augmentation of the sensibility of the ear is sometimes such, that the least noise gives rise to most violent pains, so that the patients are frequently obliged to tightly close their ears to prevent the painful vibrations of the suffering organ.

By the side of this erethism of the hearing, we may bring in contrast with it an opposite phenomenon; *torpor* of the ear, *Paracusis Perversa*, or its insensibility to its natural excitants, the voice, moderate sounds, etc. In this state, loud noises only, such as thunder, artillery-firing, noise of large clocks, of trumpets, drums, rolling of coaches, etc., may arouse a transient sensibility of the auditory apparatus, so that the patient can hear ordinary sounds and hold conversation only during the presence of these loud sounds.

Paracusis, or *depravation of hearing*. *Paracusis Duplicata*, is a singular phenomenon rarely met with in certain forms of deafness, particularly in the nervous; the patient hearing at the same instant two or several discordant sounds.

4. *Tinnitus Aurium* is the name given to certain peculiar sounds which many patients laboring under aural affections, complain of hearing, or of being annoyed with; these sounds are variously described as a ringing or tinkling in the ears, a singing in the ears, or noises like whistling, hissing, rushing of water, buzzing of bees, the singing of a tea-kettle, rustling of trees, a blowing sound, a fluttering sound, etc. These sounds exist alone, or they may be combined with others heard by the patient, or which he imagines he hears. All these internal noises are sometimes so annoying that the patient, deprived of his sleep by them, regards them as the cause of his deafness, and imagines that he would be well if all this internal uproar could be stopped. Unfortunately this is not the case, for certain remedies which lessen or momentarily remove the tinnitus, have no effect whatever in improving the hearing; and, after all, there is nothing surprising in this, since this symptom is due to the acute or chronic morbid changes of the tympanum, or of the labyrinth.

All these noises accompany a depravation, or a partial loss of hearing, and are termed tinnitus aurium; their tone may be grave, or more or less acute, in which latter case a patient may believe he hears, and actually may hear continued whistlings, hissings, or some analogous sound. In describing these abnormal noises, patients generally compare them to other sounds with which they are more familiar; thus, domestics imagine they hear the ringing of bells, ticking of clocks, singing of tea-kettles, etc.; workmen in

large factories the noise of steam machinery; artillery-men, the noise of cannon; sailors, the whistling of the wind, or the roaring of the waves, etc.

In our inquiries concerning this symptom, we should ascertain the peculiar character of it; whether only one or several kinds of noise are experienced; whether they are heard at stated times, or all the time; under what circumstances or conditions they diminish or pass away; whether the tinnitus exists in both ears, or only in one; and whether they are referred by the patient merely to the affected ear or ears, or appear to exist in the interior of the head.

Tinnitus aurium may accompany disease of the auditory apparatus, or it may be present with diseases of other parts than the ear. We will examine each of these conditions, in order to have a proper understanding of them.

A. TINNITUS ACCOMPANYING DISEASE OF THE AUDITORY APPARATUS.

a. Tinnitus accompanying a lesion of the external auditory canal. In this rank may be placed, an agglutination of the hairs, *vibrissæ*, which are within the external orifice of the canal. With some persons, these hairs may be very numerous, and then a small quantity of cerumen will suffice to agglutinate them and form a small barrier closing the entrance of the meatus, leaving, however, minute openings or fissures among the hairs composing it, through which the air may pass in and out of the canal. Now, the little column of air which has penetrated within the auditory canal, will, from the warmth of the parts, soon have its temperature above that of the external temperature, and, as in all places where there is a circulation established between unequal temperatures of air, the warm air will be replaced by a column of cold. Thus there is established through the minute openings among the agglutinated hairs, a series of small currents of air; and these currents taking opposite directions, and the ærial molecules coming into collision with each other, give rise to a noise or tinnitus very annoying to the patient. This tinnitus may be cured with wonderful facility, if we are fully aware of its cause.

Another cause of tinnitus aurium is, the accumulation of a greater or less quantity of cerumen, in the deeper parts of the external auditory canal, near the drum membrane; the tinnitus being produced by a mechanism analogous to the one preceding. The capacity of the canal being diminished, from the accumulation of wax, a free circulation of air therein becomes more difficult, and a series of small currents is formed betwen the warm air passing out, and the cold air which enters at each instant with the sonorous vi-

brations. Itard regarded this tinnitus as being produced by the breaking or division of the column of air (occurring at the moment when this column, having passed within the canal, reaches the constricted or obstructed part), in order that it may pass through an orifice of much less diameter than its own. The causes of the preceding sounds may be readily detected by an attentive examination of the auditory canal made with the assistance of an ear speculum.

Indeed, any mechanical obstacle to the free circulation of air in the ear may cause tinnitus, upon the same principle that a murmuring or whistling is heard in a well-heated room, into which the external air passes only through a small opening. So, if we place the extremity of a finger in the meatus, or apply the hollow of the hand over the concha, an unpleasant murmuring or tinnitus will be produced.—Foreign bodies in the canal, as peas, beans, glass, marbles, beads, etc., or bodies spontaneously developed in this canal, may give rise to these various noises, and in a similar manner.

b. Tinnitus accompanying inflammation of the membrana tympani. Here the tinnitus does not present exactly the same characters as those of the preceding; it is more acute and at the same time more painful; sometimes it is likened to the falling of water, or to the loud pumping of a steam-engine, or to the roaring of waves; frequently, especially in the milder acute forms, or in the chronic stage, it is somewhat like a metallic tinkling. Its cause is not known, unless, indeed, it be due to the increased flow of blood in this highly delicate and sensitive membrane; and which is heard in a similar manner to the placental, chlorotic, or aneurismal souffle, though from the situation and condition of the parts, with much greater intensity. However, inflammation of the drum membrane is very seldom met with separately; it is frequently, if not always, accompanied with a catarrhal inflammation of the tympanum, and which will be considered hereafter. A remarkable and interesting point connected with inflammation of the drum membrane, is, that upon perforation of the membrane the noises cease at once.

c. Tinnitus accompanying catarrhal inflammation of the Eustachian tube and of the tympanum. In these affections we know that there is always a more or less profuse secretion of mucus. Now, this excess of mucus, secreted within the tympanic cavity will flow with more or less difficulty through the tube, and, during inspiration, mastication, or deglutition, the air in its effort to penetrate into the tympanic cavity through the tube, will cause noises analogous to those made during its passage through the bronchial tubes when these are obstructed with similar matters. The same effect is con-

stantly occurring in catarrhal discharges from the pharynx or nasal fossæ, either during the whole course of the inflammation, or only at certain periods, when, the obstruction being considerable, some of the mucus is forced into the Eustachian tube by the excreative efforts. But if, instead of simply obstructing the guttural canal of the ear, these mucus discharges completely fill it up, then deafness succeeds the tinnitus, and does not readily disappear. We may obtain an analogous effect in the auditory canal, by firmly and deeply inserting the end of a finger therein, so as to completely close this canal, then the tinnitus, caused by the presence of mucus, will cease or diminish, and the hearing will become more obtuse.

d. Tinnitus accompanying nervous deafness, is one of its most frequent symptoms, and for which many hypotheses have been presented. If, by an attentive examination we ascertain that the external auditory canal is not closed by cerumenous masses; that the Eustachian tube is not obstructed by mucus matters; that the middle ear does not contain a collection of mucus, sanguine, or purulent matters, we usually conclude that the tinnitus resides in the brain or in the auditory nerve. The antecedents of the patient, other concomitant or general symptoms, such as a severe fever at a recent or late period, the age especially, will be valuable information to resolve the difficulties of differential diagnosis, and we may thus be enabled to determine that the cause of the tinnitus resides in the auditory nerve itself, which may receive the morbid concussion from congestion or inflammation of its own tissue, or this pathological concussion may be communicated to it by the inflamed neighboring tissues.

Duverney believes that these sounds are due to a greater determination of blood in the arterial capillaries of the cochlea and of the semi-circular canals, and this afflux causes a vibration of the last divisions of the auditory nerve. Now, vibrations of the ramifications of the auditory nerve, whatever may be their cause, determines the production of sound, and whoever is the subject of it will hear noises of divers kinds and intensity. In the normal state, the nervous pulp or the auditory retina is gently agitated by oscillation of the liquor of Cotunnius produced by the base of the stapes, itself obedient to the vibrations of the membrana tympani.

But if, under the influence of inflammation of the labyrinthine cavities, the sanguineous circulation determines to the capillaries, which irrigate the frail and soft ramifications of the auditory nerve, increasing their activity, we can conceive that the result will be a vibration in the nervous filaments, and that this pathological vibration must give rise to abnormal sounds, the same as the physiological undulations of the liquor Cotunnius will produce in the normal

state, sound, properly so called. From this ingenious idea, the formation of abnormal sounds or acoustic anomalies, which are but tinnitus in its various forms, is made known to us in its fullest details by the key-board hypothesis of Leclat, which rests wholly upon the anatomical disposition of the nervous filaments which are distributed to the spiral lamina of the cochlea.

This spiral lamina having a triangular form, and diminishing in width from the base to the apex, the nervous filaments exposed at its surface must, consequently, be smaller in length as they occupy a more elevated position. Leclat compares this arrangement to that observed in the strings of a harpsichord, and, according to this truly seductive hypothesis, sounds should be more or less grave or acute according to the part of the spiral lamina set in vibration by the undulations of the liquor Cotunnius. So, according to this writer, grave sounds result from vibration of the inferior cords of the spiral lamina, acute ones from vibration of the more elevated nervous filaments.

This theory has been rejected by all physiologists, who have regarded it as a fancy of the mind; but as the auditory apparatus has been compared to that of certain stringed instruments, the explanation of Leclat merits a serious examination. Let us suppose that a simple sanguineous congestion, or else an inflammation, affects the largest portion or the base of the key-board represented by the spiral lamina, the nervous strings will be vibrated by the acceleration of the movement of the blood in the capillaries, and the tinnitus caused by this inflammation will have a grave pitch; if, on the contrary, the inflammation affects the more elevated strings, instead of the tinnitus being grave, the patient will hear sharp sounds, whistlings, etc., and these sounds will be more acute as they are nearer the summit of the key-board.

Labyrinthine and cochlear inflammations, as well as inflammation of the auditory nerve itself, from its origin at the fourth ventricle to its termination, have been demonstrated by numerous dissections; and it is sufficient that there exist a congestion, inflammation, or even excitation of the auditory nerve, in the cranium or in the labyrinth, in order that tinnitus may be produced. So that we may accept Leclat's theory of tinnitus in nervous deafness, based as it is on the most rigorous proof,—normal and pathological anatomy.

Saissy has met with a curious variety of tinnitus, which he calls "whirling sound," and considers to be owing to the entrance of air into the cochlea, and to its passage through the spirals of this part. This phenomenon could not be produced, unless one of the

fenestræ being destroyed, the liquor of Cotunnius flowed out, and its absence was replaced by the air of the tympanum. Now, the pathological anatomy of nervous deafness has shown a destruction of the membranes of the fenestræ, or else, luxation of the stapes, either of which conditions may give rise to this curious phenomenon.

Thus then, congestions, inflammations, etc., of the deeply-seated parts of the acoustic organ, as well as anything that will cause abnormal vibrations of the auditory retina, will give a satisfactory explanation of the tinnitus, and abnormal noises which are heard under these pathological conditions.

Triquet also describes a species of tinnitus which is insupportable from its persistency, and which destroys the charms of society, renders life joyless and full of bitterness, causing men to renounce their business, to become melancholy, and even to commit suicide. It has, very probably, been heretofore associated with nervous deafness. He says, for a long time I have remarked that, in certain cases of tinnitus in which the Eustachian tube, the tympanum, and the auditory canal were healthy, a very strong lens of three to four inches focus, aided by the speculum and a reflector, has, when examining that point of the membrana tympani which gives attachment to the handle of the malleus, revealed considerable vascular redness of this handle and of that portion of the membrane surrounding it, as well as minute intermittent oscillations of the drum membrane at this same point, beating synchronously with the pulse.

Having had an opportunity of examining the ear of a patient affected with, well-marked deafness, a discharge, insupportable tinnitus, and destruction of the membrana tympani as well as of the ossicles, Triquet observed a reddish projection on the sides of the promontory, and which appeared to be the stapes remaining in place, pressing in its fenestra; the mucous membrane was red and fungous. At the inferior and anterior part of the internal wall of the tympanum, he noticed particularly a nipple-like projection about the size of a pin's head, a true hypertrophy of the mucous membrane; it was red and shining, and had pulsatory movements which were synchronous with the patient's pulse, and, on compressing the corresponding carotid, its pulsatory movements as well as the tinnitus ceased, and the hearing became better. This projection was touched with a solution of perchloride of iron, 25° B., and disappeared in the course of eight days, together with the tinnitus. Other similar cases were cured after a period of three or four weeks, applying the solution every two or three days. Here then is a fine

capillary plexus, which, from inflammation in different parts of the acoustic apparatus, becomes abnormally developed, elevating the mucous membrane in which it is diffused, in the same manner as the small vessels which nourish arterial and cutaneous erectile tumors.

When the drum membrane is destroyed we may readily observe the condition referred to, but when this membrane is entire we can only establish the diagnosis by induction. There is one sign, however, which Triquet considers pathognomonic, and that is the redness and vascularity of the handle of the malleus, heretofore described. Whenever this symptom exists, we may affirm that the patient is tormented by tinnitus, and that this tinnitus is due to an abnormal development of the capillary plexus, a consequence of chronic inflammation. It may also be observed that tinnitus, due to the cause under consideration, is tumultuously augmented on the least exercise, or under the influence of the slightest emotions. In these cases, when the drum membrane is entire, he applies, by means of a capillary tube properly placed, a few drops of the solution of perchloride of iron on this membrane along the course of the handle of the malleus. He also proposes compression, and even ligation of the small arterial vessels which penetrate into the tympanum and labyrinth.

He further says,—"If all the other means fail, such as catheterism of the tubes, local and general venesections, drastic purgatives, and especially aloetics, cold affusions on the head and neck, cauterization over the mastoid process, seton to the nape of the neck, and Faradization; if my patient was especially a victim to these insupportable aural noises which produce a deep melancholy, despair, and suicide, I would, at first, attempt compression of the anterior and posterior auricular arteries, and even the ligation of this last, which is undoubtedly the most important, as it furnishes the stylo-mastoid branch, which is the true artery of the internal ear.

"I would act thus with the firm conviction of curing the patient, or at least of affording him great relief, without exposing him to any serious danger, experience having shown that compression and even ligature of the auricular arteries presents no inconvenience."

B. Tinnitus accompanying other Diseases than those of the Ear.

The diseases in which tinnitus may exist, without any aural affection being present, are, anemia, chlorosis, excessive uterine hemorrhages, hysteria, hypochondria, eruptive fevers, at their commencement and sometimes during their whole course, cerebral congestion, apoplexy, and other diseases of the brain in which

there is no symptom present of diseases of the ear, etc. There are also other abnormal sounds, a kind of roaring or blowing noise due to the pulsations of dilated or aneurismal arteries situated within the neighborhood of the auditory apparatus, for instance, in the vessels of the neck, and of which several instances have been recorded. In these cases, if we can compress the affected artery, the sounds will cease while the compression lasts.

Sometimes, these noises in the ear, may be due to strong mental impression, a great fright, intense excitement, excessive fatigue, etc.

As to the *diagnosis* of these varieties of tinnitus, it will be the same as that of the diseases of which the tinnitus is only a symptom, and which will be noticed hereafter.—As to *treatment*, a few words may be said here by way of anticipation. Generally, patients who are subject to tinnitus, become so tormented by it, that they are willing to pursue any treatment, however severe, as the moxa, seton, or cauterization, if the slightest hopes of relief thereby be held out to them; and in these cases, it may often be required to use some means for its diminution or removal, more especially when it is not connected with any disease of the ear.

When the tinnitus is due to ceruminous obstructions in the external auditory canal, these should be removed by injections of warm water, as described hereafter.—When it is owing to an obstruction of the median ear, catheterism of the Eustachian tubes, followed by injections of medicated vapor or fluids, is the only mode of treatment.—If it be caused by inflammation of the tympanum and its membrane, antiphlogistic medication will be required, as, leeches to the ear, and the internal use of Tinctures of Aconite, Black Cohosh, Gelseminum, Veratrum, St. John's Wort, Arnica, etc. Wilde speaks of the Tincture of Arnica as being the only medicine which, as far as he knew, exerted any beneficial influence in tinnitus; he recommends fifteen drops of the tincture in a tablespoonful of the Infusion of Arnica, and some cordial tincture, or aromatic wine, three times a day, gradually increasing the dose a drop or two daily, until it produces headache or giddiness, when the dose should at once be lessened, or the medicine be omitted for a short time. I have found very excellent results from the Tincture of Black Cohosh used in a similar manner.—Tinnitus accompanying nervous deafness, must be treated by means indicated by the general symptoms present, and which will be considered hereafter.

If, after a general survey of the disease, and of the patient, we have reason to believe that the tinnitus is due to a too considerable determination of blood to the head, purgatives, irritating pediluvia, spirit vapor bath, frictions upon the surface of the body, and tepid water upon the head and neck, once or twice a day, will be found very serviceable; should these fail, the practitioner may add to them, cupping behind the ears, and scarifications of the small veins of the auricle. Sometimes, when not contra-indicated, douches of cold water to the head, instead of tepid, will be found more efficient.

In the tinnitus accompanying nervous deafness, douches of the Vapor of Ether, or of Chloroform, have often given a transitory relief for a longer or shorter period; but it must be remembered that serious lesions of the internal auditory apparatus may be present in the disease termed "Nervous Deafness;" and as these lesions are more commonly the result of an old chronic inflammation, neither an antispasmodic like ether, nor an excitant like chloroform, can afford any temporary cure or permanent relief.

When the tinnitus is associated with cerebral congestions, of which it is the precursory symptom, as, apoplexy, softening of the brain, paralysis, etc., these diseases only are to be treated; the tinnitus will disappear with them. The same may be said when it is present in anemia, chlorosis, uterine hemorrhage, etc.—Tinnitus due to strong mental excitements, or to mental alienation, must be treated both mentally and therapeutically according to the circumstances and conditions attending each particular case, and which will frequently require great tact and judgment on the part of the practitioner.

Sometimes, tinnitus, even when it is not of long standing, and is not complicated with deafness, resists the best directed treatment, and the patient will have to submit to it, unless he is willing to follow the advice of Itard, which is to cover or disguise the internal, real, or imaginary sound by an analogous external one and equally continual. And it is worthy of remark that the external noise thus made, which ought necessarily to be more intense than the morbid tinnitus, in the place of preventing sleep, will induce it and render it profound.

When deafness has continued for a long time, or is very considerable, a change in the *character of the voice* will be observed; and this will occur without any disease of the internal parts of the mouth and throat, or of the organs concerned in the mechanism of speech. The voice becomes harsh, discordant, monotonous, with a peculiar twang resembling that which has been termed, though im-

properly, "speaking through the nose." Sometimes the tone of the voice is quite loud, the patient speaks as though he was out of breath, and with a blowing or whistling sound; the sounds gradually acquire a more guttural tone, and utterance becomes indistinct. The prognosis in cases of this kind is by no means favorable, especially when the mouth and parts around the naso-pharyngeal cavity, and in the nares present a normal appearance.

II. OBJECTIVE, OR ANATOMICAL SYMPTOMS.

After having finished an investigation of the Subjective symptoms, it is of the highest importance that the practitioner carefully and thoroughly examines the morbid changes undergone by the different parts of the ear, for it is only by this course that he can obtain any information calculated to give as much precision as possible to his diagnosis. Without this precision, the treatment will be empirical and hazardous. We will, therefore, point out what parts are to be examined, and how their examination must be made.

1. *Examination of the Auricle, and adjacent external parts.* The patient is to be seated in a chair with a high back to it, against which he may rest his head, or, if the back be not sufficiently elevated for this purpose, he may rest his head against a wall, or have it supported by an assistant. If the day be a fine one, and the sunlight good, he should be seated near a window so that the rays of the sun may fall directly upon the parts of the ear under examination. These preparations being made, we request the patient to incline his head, to the extent required, toward the shoulder opposite the ear to be examined; which inclination exposes the ear more directly to the physician's sight, and to the luminous rays. He should also be requested to keep as still as possible while the examination is going on. The physician now carefully observes the condition of the auricle, the concha, the external meatus, the cerumen, and the vibrissæ; also, of the mastoid process, and the subparotid region corresponding to the fissures of Santorini, through which pus, enclosed in the external auditory canal, may filter.

In examining the auricle we must observe its color; it may be very pale, or white, as with chlorotic or anemic persons, those of strumous constitution, or those who are fatigued or exhausted. It may, on the contrary, be reddish, or purplish, as with plethoric individuals; with these, the veins of the auricle are generally apparent, delineated in bluish or purplish relief, and these particulars

have their importance. Indeed, congestion of the auricle of the ear is almost always an indication of congestion of parts deeper situated, and it is often the case, that deafness is owing to no other cause than hyperæmia of the internal ear, and which has been cured by plunging the ear in water as hot as could be borne, and then scarifying the veins of the auricle or over the mastoid process, and thus procuring a sufficient flow of blood.

The form of the auricle is next to be noticed; in the normal state it should have the form of an ear-trumpet; its prominences should be well marked; it ought to be wide at its mouth, somewhat bell-shaped, and the concha should be large and funnel-shaped; the external meatus should be readily brought to view, not being obstructed by the tragus. It is of considerable importance in the mechanism of hearing, that the auricle presents all its normal anatomical forms and conditions.

The auricle should be moderately thick, but thin enough to possess complete translucency, and with sufficient resistance to preserve its form; these points demand a close attention, for the auricle is not only designed to collect sonorous undulations, but likewise to increase their intensity by its vibrations. Any cause that will alter its consistence, its thickness, its flexibility, and consequently its elasticity, will thereby interfere with one of the acts of the function of hearing, and produce a hardness or dullness of hearing.—If the prominences and depressions of the auricle are absent, or abnormal in their character, sound-waves are imperfectly or not at all collected; if the auricle be too thick, or soft, its vibration will be more or less deficient in proportion to the degree of these changes.

The consistence of the auricle should not be too hard nor too soft; as either will interfere with its elasticity and vibrating power, as well as its function of conveying sounds to the outer meatus.—Its temperature should be especially remarked; in certain forms of nervous deafness when the auricle is congested, and when it is the seat of some local inflammation, as erysipelas, eczema, impetigo, etc., its temperature will be found considerably elevated.—The angle of insertion which the auricle forms posteriorly with the cranium, should be noticed. It should not lie close toward the head, as that would interfere with its facility for catching sound; it ought to stand out a little forming an angle with the posterior part of the cranium of about forty, forty-five, or fifty degrees.

As we proceed in our examination, all the different morbid symptoms and conditions should be written down, so that nothing may be forgotten in forming a diagnosis, prognosis, and treatment; and

also that as the treatment progresses, we may refer to our notes to learn the degree of improvement, from time to time.—The upper extremity of the helix should be taken between the thumb and index finger of one hand, and be drawn upward, backward, and outward, while the thumb or fingers of the opposite hand, placed in front of the tragus, should draw it sufficiently forward and slightly downward, to expose a considerable portion of the outer third of the external meatus auditorius. And while holding it in this position, the patient should be requested to open and shut his mouth, and to perform the act of swallowing; if any pain is caused by these movements, it should be carefully noted. Wilde also recommends firm and deep pressure with a finger "upon the movable root of the *tragus*, and backward into the depression between it and the articulation of the jaw. While the finger is retained in this position the patient should be desired to open and shut the mouth, and the amount of pain or inconvenience experienced by pressure in those two different positions of the jaw accurately noted. The middle and forefingers should likewise be inserted deeply behind the ramus of the jaw toward the styloid process, and notice taken of the sensations there experienced."

The ear-gorget, or semi-speculum auris of Wilde, will be found very useful in the examination of the outer part of the external canal. The entrance to this canal is protected by two opercular projections, the tragus and the antitragus. These projections serve to indicate the orifice of the auditory canal, which they protect, and, in the normal state and with young persons, without interfering with the functions of this apparatus. But with old persons, these membranous parts becoming flaccid and participating in the general relaxation of all the tissues, it sometimes happens that they fall down upon the auditory meatus and completely cover it, somewhat like a snuff-box is covered by its lid. This point should be recollected in the examination of old persons, with whom dullness of hearing or even deafness, may be due to this cause alone.

The disposition and condition of the hairs just within the entrance of the meatus should be noticed. In crossing one another, and in becoming agglutinated to each other by means of the cerumen, they may form at the entrance of the canal, a net-work, and a kind of barrier to the introduction of foreign bodies; this agglutination may become so extensive as to present an impediment to the entrance of air and sound. Some writers have attributed another use to them, that of finely dividing or sifting the air which enters the auditory canal, and modifying its cold and moist qualities. This is a view which is not without some foundation. All animal tissues

possess some caloric, and the air which passes through the barrier formed by these hairs at the entrance of the external meatus, must experience an elevation of temperature, and thus produce a less painful impression upon the membrana tympani. If the hairs are few, or absent, the cold and moist air coming in contact with the drum membrane, would become a cause of deafness.

If we are led to believe that inflammation is present, we should especially examine the *mastoid process*, as to its color, form, size, temperature, etc. A couple of fingers should explore its entire surface, making very firm and strong pressure upon all parts of it, to ascertain if the cells composing it contain any abnormal collection of fluid, whether serous, sanguine, or purulent. The depth and duration of any pitting made by this pressure, as well as the degree of œdema or swelling of the soft parts and integuments, will aid considerably in forming a diagnosis. Sometimes, percussion of the mastoid process, will afford some valuable information. A similar examination should also be made of the sterno-mastoid muscle from its insertion to one-third its distance downward, as well as at its origin at the clavicle; for, collections of pus may be frequently found at these different places, which, having their commencing point in an abscess of the tympanic cavity, have penetrated, under the deep surface of the sterno-mastoid muscle through a perforation, or kind of fissure of the process of the same name.—Immediately behind the auricle, and over the center of the mastoid process, is a small gland, about as large as a horse-bean, and of similar shape; this gland is sometimes the seat of severe neuralgic pain, and also swells, and becomes painful upon pressure, during inflammatory attacks.

2. *Examination of the External Auditory Canal.* In examining the auditory canal, and previous to employing the speculum auris, we should observe any abnormal changes, either in quantity or quality, which the wax or cerumen may have undergone. Thus, the cerumen may be absent, which is one cause or rather a complication of certain kinds of deafness; in this case, the meatus will be dry, and the little layer of cerumen, which, in the normal state lines its inferior two-thirds, can not be seen. This state of dryness of the meatus is one of the worst signs that we can ascertain by a simple exterior examination with the eye alone.

When the auditory canal is the seat of a catarrhal otitis, with inflammation of the ceruminous glands, the wax assumes characters different from those which it presents in the normal state; it will be serous, fluid, less yellowish, of a dark-brown or blackish color, and fetid. All these morbid changes may be verified without the

aid of the speculum. At the same time, under the influence of the irritation, we may observe that these glands become more prominent or hypertrophied, giving to the walls of the canal a characteristic dull aspect.

We now proceed to the examination of the deeper parts of the external auditory canal. This canal is from an inch and a quarter to an inch and a half in length, and consists of an osseous, and a cartilaginous portion, the entire length of which must be examined, as well as the outer surface of the membrana tympani. When the canal is of large diameter, by straitening it in the manner presently to be described, its whole extent may, under a good light, be explored without the aid of a speculum; but as it is generally rather narrow, an ear speculum will be required, of which instrument, among the several models that have been presented to the profession, I prefer Wilde's, though Toynbee's, and Holcomb's porcelain ones will be found useful in many cases. An aurist should have a full set of each. The ordinary two-valved, hinge-moving speculum is used by many, and is highly recommended by Triquet; that it may prove serviceable is undoubtedly true, but I seldom make use of it.

As the external auditory canal is not a strait but curvilinear tube, it must be rendered as strait as possible in using the speculum, and which may be accomplished in the following manner: With the fingers of one hand seize the auricle at its superior posterior part, and gently draw it upward, backward and slightly outward, and with the other hand introduce the speculum, taking care to have the sett ready so that the most suitable size may be selected. (If the examination is made without a speculum, a finger of the hand not employed in drawing upon the auricle, may draw the tragus outward and to one side, so as to expose the canal to illumination and inspection.)

In conducting the examination of the auditory canal, whether with or without the aid of a speculum, we should select a place, as for instance near a window, where a full stream of strong light can fall upon the membrana tympani; the best light is that in which the sun's rays fall obliquely into the speculum. The patient's head, in this examination, will have to be strongly inclined toward the opposite shoulder, the physician placing it in such a position as will enable him the more readily to obtain a clear and distinct view of the membrana tympani, and other parts brought into view, being very careful to keep his own head out of the light. The speculum must be passed in the canal as far as it will go without producing pain, and without force, for no dilata-

tion of any account can be produced, and this only at the outer cartilaginous portion of the meatus. Then by moving the patient's head slightly in the required direction, and rotating or moving the end of the speculum gently about, every part of the membrana tympani, and of the auditory canal may be distinctly seen. During the examination the head of the physician should be somewhat higher than that of the patient.

Sunlight is decidedly superior to any other in making this examination, and should always be had recourse to in operations in the vicinity of the tympanal membrane. But, in *the examination*, it can not always be made available, and artificial light will then have to be employed. Various lamps, etc., have been contrived for this purpose, which it is unnecessary to enumerate here; I have found the best artificial light to be that from a coal-oil lamp, having a slightly concave silver reflector on one side of it, and a plate of glass tinted with neutral blue, four or six inches square, on the opposite side. (This lamp should be made so as to be readily held in the hand, or be placed upon a table, as may be desired, and it may likewise be used for examinations with the ophthalmoscope and the laryngoscope.) However, the practitioner can not make as accurate and satisfactory an examination by artificial as by sunlight, for the different shades of vascularity, polish, transparency, etc., of parts, can not be thereby detected.

Again, an examination of the membrana tympani is not always so easy as one might believe, and especially in those cases where the obliquity of its direction is such as to be nearly horizontal; and, in other instances, it will be necessary to completely remove all obstructions in the canal, by means of an injection of warm water, in order to see the whole extent of the drum membrane, its color, normal transparency, morbid lesions, etc. Sometimes, the wax, muco-purulent matter, or other impediment that might obstruct our view, "may be gently removed with a small spatula, or a probe rolled round with cotton, as syringing is apt to increase the vascularity, and so mask the natural appearances." (*Wilde.*)

Another method of illuminating the ear for purposes of examination and applying medicines, is to have a plain or slightly concave mirror attached to an upright rod by means of a sliding rod, in such a manner that the mirror may be movable in every direction. This rod may be attached to some portion of the window-frame, or be placed upon a table near the window. Seating the patient about ten or twelve feet from the mirror, this is moved about until the rays of the sun received upon it are reflected immediately upon the ear, and through the ear speculum upon the

membrana tympani. This method is preferable to direct sun light or to artificial light. By means of a magnifying lens, of two and a half inches focus, held between the thumb and index finger, the meatus will be seen considerably enlarged, and a thorough examination may be made of the membrana tympani.—A new aural speculum named "Hutchinson's,' Clark's Illuminator," will prove a very useful instrument in nearly all examinations of the drum-membrane.—Von Troltsch suggests the use of a concave mirror of about six inches focus, with a central orifice, similar to the ophthalmoscope, for throwing light through the speculum upon the tympanum; I have used one with great advantage.

In the *healthy state* the appearance of the membrana tympani has been variously described by authors. Triquet states that it presents the appearance of a small thin web, transparent, of a pearly color, and slightly bluish with brilliant irisated reflections; in its center is a kind of penumbra, an obscure point, which corresponds to the insertion of the malleus. The circumference of the membrane is a little more obscure than the other parts. Toynbee states that the outermost layer of the membrane is very smooth, and capable of reflecting light, and there is usually seen at its anterior and inferior part a triangular shining spot.

The following general description of its appearance may be of some value to the reader. The drum membrane is polished, shining, diaphanous or semi-transparent, clear, and brilliant, or occasionally of a yellow-gray tint, somewhat the color of gold-beater's skin, or thin-sheet gutta percha, except toward its superior attachment, and along the line of insertion of the handle of the malleus; it presents an irregularly curved surface; is divided by a white streak thickened above and narrow below, except at its extremity, which is slightly enlarged and indented into a navel-like depression, or umbilicated. This white line is the manubrium of the malleus proceeding from the upper attachment of the membrane downward, somewhat backward, and a little inward, to a point slightly below the center of the membrane, which is thus divided into an anterior, posterior, and an inferior portion. The anterior part of the membrane is thin, almost transparent, or as clear as fine gold beater's skin, highly polished, and generally convex, a speck of bright light being reflected from its most convex and prominent part; this is not always in the center of the anterior part, but is often seen beneath it, (a triangular shining spot at its anterior inferior part),—this may be called the anterior vibrating portion. Sometimes the short process of the malleus may be seen as a small

round dot above the manubrium, where the membrane curves off into the roof of the meatus.

Below and behind the malleus, the membrane is also thin, clear, and glistening, but not quite so diaphanous. Beneath the point of the malleus it is flat, and behind it rather concave, but not always so; spots of reflected light are not usually present in these parts when normal. Superiorly, from about the upper half of the malleus, the membrane becomes gradually denser until it is quite white; it also forms concave curves from the upper part of the malleus, the posterior one being deepest and whitest. Above, the membrane forms a gradually-vaulted curve into the roof of the external meatus, with the lining of which it is imperceptibly blended; while, in front, below, and partly behind, there is a sharp, well-defined line of demarcation between it and the meatus, and sometimes a slight, whitish, thickening.

In examining the membrana tympani, we must observe "its superficial color, its degree of opacity or transparency, its tenuity or thickening, its vascularity, and the arrangement and position of its vessels in every part,—its tension, flexibility, polish, curvature, and its position as regards the interior of the cavity of which it forms the outward boundary,—and also the direction and projection of the handle of the malleus; and the characters of the membrane, both above and below the attachment of this bone, should be carefully observed. While the membrane is thus within the field of the speculum, the patient should be desired to try and press air into the drum by holding the nose, shutting the mouth, and making a forced expiration. This manœuver should be resorted to several times, if the first be ineffectual, as some degree of tact on the part of the patient is necessary to test the experiment. The sound thus produced is a sort of a *thug*, and very much resembles that of a dried bladder suddenly inflated with air.—When the tympanum is inflated, the whole of the anterior and lower portion of the membrana tympani is bulged outward, and the speck of light appears as if spread over a large surface, or is entirely lost for the moment.—While the air is thus pressed into the drum we should note accurately whether the membrane vibrates, or its tensity is altered, and if so, whether it regains its original position suddenly or gradually. The patient's own sensations should likewise be taken into account in this matter. It is also necessary carefully to observe the degree of vascularity produced by this inflation, as well as the course and position of the vessels which cause such vascularity, for even in several healthy ears, if this experiment is made two or three times, we seldom fail to recognize one or two vessels becoming filled

with red blood along the course of the malleus; and if a small aperture exists in the membrane which may have previously escaped the eye, we may then readily detect it both by sight and hearing. By this means we often discover a perforation, which, from its minuteness, or owing to the part being thickened or coated with discharge, had not been noticed during the ocular inspection. If such exist, we shall then see its open, everted lips, sometimes pressing out mucous discharge, and also hear a peculiar whistling sound which the air makes in passing through this narrow aperture. There are, however, some cases of perforate membrana tympani, where, from obstruction in the upper part of the Eustachian tube, or granulations in the middle ear, this can not be effected. If the patient be able to thus inflate the tympanum, we may then remove the speculum, and, by means of an ear-stethoscope (otoscope), ascertain the peculiarity of sound which is thus produced in the middle ear, (the same method of inflation being again had recourse to), whether the ordinary rush of normal air, or a prolonged squealing or gurgling sound,—such as might be caused by any contraction in, or thickening of, the walls of the Eustachian tube, or by dryness, or by accumulation of mucus either in it or in the cavity of the tympanum,—is heard. The stethoscope should also be applied over the mastoid process, and the same series of observations made upon the sounds, if any, produced there; but these latter can seldom be heard distinctly." (*Wilde.*) If the patient can not thus inflate the tympanic cavity, there may be some obstruction in the Eustachian tube, in which case, if there be no acute inflammation of the tube or tympanum, we may inflate it artificially by injecting air, as hereafter described.

Under the influence of disease, the membrana tympani may present various appearances; it may become white and thick, from disease or decomposition, and sometimes the outermost layers can be removed in an unbroken scale. It may be collapsed, (indicative that the Eustachian tubes are obstructed so that air can not reach the tympanic cavity), entire, or ruptured; granular and vascular; mottled red and white; opaque and vascular; pinkish, thickened; pearl-colored, unpolished, thickened; whitish, thick, succulent and vascular; white and opaque in nervous deafness; sometimes the shining surface will be hazy and opaque, or as white as parchment, the handle of the malleus being discerned with varying degrees of distinctness, or ceasing to be visible at all; an opaque crescent may be observed on its lower edge; or, it may be covered by yellow lymph, wax, pus, or blood, etc. Occasionally, a ray of sunlight striking upon some of the irregularities of the curved surface of the

membrane, gives the appearance of a perforation when none exists,—hence care must be exercised not to take the reflection of a ray of light for a hole or perforation.

When the mucous layer is diseased, it becomes thickened, vascular, villous, and even pulpy; in cases when this layer is intensely vascular, the other layers may remain as transparent as natural, (the epidermis being polished), while the inflamed mucous lining may be seen through these layers of a pinkish color.—When the proper fibrous membrane is inflamed, it will sometimes present one uniform sheet of bright red, and often, several small vessels, superficial to the general redness, and radiating from the center to the circumference, may be seen.—The cartilaginous or ligamentous ring can frequently be distinguished from the rest of the membrane, but, in disease, it becomes very manifest, frequently presenting a bright vascular zone when the rest of the membrane is not affected; it is also the seat of an isolated dense opacity at the inferior attachment of the membrane, resembling a crescentic white band, about a line in breadth, somewhat like the arcus senilis.

In the examination of the tympanal membrane the introduction of a probe to press against it, is very rarely required, as any perforation of the membrane can almost invariably be ascertained without the use of this instrument; but in the few cases in which its use might possibly be justified, it should be introduced very lightly and carefully, avoiding much pressure, and never without having the membrane fairly within view, as, otherwise, it will not only cause or increase pain, but may produce a perforation where none existed before.

Having carefully surveyed the membrana tympani, we withdraw the speculum slowly, at the same time examining the auditory canal, its form, curvature, color, polish, vascularity, and its secretion.

"Redness of the lining membrane of the external auditory canal is present both in acute and chronic inflammation; the vessels are abnormally developed, their calibre being increased by a foreign stimulus,—in the natural state, hardly perceptible with the aid of magnifiers, they become visible to the naked eye from inflammatory influences. The walls of the meatus are naturally of a pale rose color, but become more or less deep red from inflammation. With this vascularity, more or less tumefaction appears, the lining membrane seeming to be converted into a net-work of anastomosing vessels, and the walls almost come in contact with each other. In this case, the patient experiences a sensation as if a foreign body was in the ear, similar to that experienced in conjunctivitis. In the

chronic state the redness is not so deep, or is of a whitish rose color, with less vascularity and less tumefaction.

"If the vascular redness and the tumefaction continue and resolution is not effected, ecchymoses will be observed both on the walls of the meatus and on the tympanic membrane; they may be small, resembling flea-bites, or may attain a still larger size. In certain cases, where the mucous membrane appears raised, by pricking it with a fine needle, a small drop of blood will flow out, showing a subepidermic effusion.—If the disease be not checked in its progress, the reddish tint of the ecchymosis will become obscure red, brownish-red, grayish-red, and we will then have a purulent spot; suppuration or an abscess is developed under the epithelium. If the inflammation still continues the abscess will discharge itself into the auditory canal. If this abscess is developed in the thickness of the membranous layers composing the membrana tympani, the case will be still more serious, as a perforation is inevitable.

"When the walls of the auditory canal have suppurated for a long time, adhesions may be established between the drum membrane and the ossicles, and between these organs and the promontory; when the ossicles have become displaced, various adhesions may occur,—the luxated ossicles adhere to each other and fall into the tympanic cavity, and the drum membrane becomes shrunken. The case is then incurable.—Ulcerations may exist in the auditory canal from the preceding morbid changes; if they are simple and not extensive they are soon cured; if they are connected with a scrofulous or other diathesis, the appropriate constitutional remedies must be given. A slight ulceration of the drum membrane, following a simple catarrhal inflammation, generally heals readily. If it results from a scrofulous inflammation, it will be more serious and less amenable to treatment. If the ulcer be large, it will be impossible to heal it, and the perforation resulting from it will render the tympanum liable to disease.

"In certain subacute affections, a gangrenous layer forms and more or less of the membrane sloughs off; this occurs more particularly in small-pox, scarlatina, typhoid fever, and measles. From this results a loss of substance in the auditory canal and in the tympanic membrane. In the auditory canal this loss is not so serious, as reparation usually takes place. But if a portion of the drum membrane is destroyed, and the progress of the ulceration was from within outward, it becomes a more serious matter, and the ulceration increases daily; and, if to any extent, reparation becomes impossible. These ulcers usually occupy the center of this membrane at a point corresponding to the handle of the malleus. Sometimes,

the ossicles are removed by the suppuration, the stapes alone remaining in place; the liquids escape; the contact of air dries the parts; the auditory nerve loses its properties, and an incurable and complete deafness occurs. These are, however, not common, a reddish fungosity is usually developed, while the stapes alone remains in its place, so that the deafness is only partial.—When these ulcerations and gangrenous conditions have a tendency to heal, fleshy granulations will be seen on the surface of the membranes affected by them. Sometimes, and more especially when the ulceration is very small, and is seated at the circumference of the drum membrane, cicatrization unexpectedly occurs; when it is seated at the center, it becomes more serious.

"Opacities are a necessary consequence of the morbid changes just noticed; the inflammation has left between the layers a plasma, which is sometimes absorbed, and often remains indefinitely. More or less insensibility of the part is another consequence of these morbid changes; the walls of the auditory canal and drum membrane generally so extremely sensible, even when touched with a blunt probe covered with a little cotton, no longer experience any tickling sensation or pain.—Changes of form are likewise frequently undergone; the drum membrane loses its normal external concavity, and becomes flat; sometimes, it presents two lateral oblique surfaces, and on the sharp edge which separates them is inserted the handle of the malleus,—in this case, we may rest assured that the ossicles are anchylosed to a greater or less extent.

"The preceding conditions can not exist without more or less considerable hypertrophy or thickening of the affected tissues. The drum membrane, so thin and delicate, in the normal state, becomes vascular and thickens; at the point which corresponds to the handle of the malleus we observe an umbilication.—Inflammation gives rise to thickening, this causes the walls of the meatus to approach each other and lessen its calibre so that we can hardly perceive the drum membrane through it. The shrunken or atrophied membrana tympani somewhat resembles the eye of an ant. When the thickening amounts to induration of the tissues, the progress of the waves of sound, as well as the secretion of cerumen, are interfered with, and the parts become more disposed to renewed inflammatory attacks. If the drum membrane is indurated, we will have reason to believe that the induration extends more deeply and that the ossicles are likewise anchylosed. Softening sometimes follows induration, especially in strumous constitutions." (*Triquet.*)

It must be remembered, in all instances, that an inflammatory or other disease developed in one of the tissues of the ear may invade

several others at the same time. The disease may commence in one of the tissues, and sooner or later involve the neighboring parts. It is by no means uncommon for a simple catarrhal or rheumatic external otitis to extend even into the internal ear.

3. *Examination of the Middle Ear.* In this examination the organs to be examined are inaccessible to the sight, and we can only form a more or less complete idea of their conditions by certain manœuvers or operations, as, by inflating the tympanum, catheterism of the Eustachian tube, douches of air vapor, or fluids into the tympanic cavity, and auscultation and percussion of the mastoid process.

However, before proceeding with any of these operations, the physician should examine the throat and fauces, to ascertain the condition of the parts there, and by means of a rhinoscope, he may likewise discover the condition of the parts situated behind and above the uvula and around the posterior nares. We should introduce the index finger into the mouth, and press firmly upon the palatine arch opposite the orifices of the Eustachian tubes, in an upward and outward direction, and observe whether it gives rise to pain or inconvenience at that part, or in the tympanum, and the character as well as the degree of the pain. The mucous membrane of the nose should likewise be thoroughly examined, using Wilde's ear gorget to aid in the examination. Disease of any of these parts, it must be recollected, may extend into the Eustachian tube and tympanic cavity, as the membrane lining them is one and continuous. Should there be enlarged tonsils, granular or simple erythematous inflammation, etc., of the naso-pharyngeal cavity, and deafness be present, it will be proper to suspect that this inflammation, etc., has extended even into the tympanum; and, before undertaking any treatment for the affection of the ear, we should first treat the pharyngeal disease.

It occasionally happens that the tympanic cavity may be explored directly with the aid of a speculum, but this is only when the membrana tympani has been destroyed. And even then the examination is nearly always incomplete, from the presence of fungous growths in the tympanum, filling its cavity so that we merely see a reddish mass in the midst of which we can distinguish nothing. Generally, in these cases, the ossicles have become displaced or removed. Fortunately, destruction of the tympanal membrane is not a very common thing, and the greater part of patients affected with deafness have the membrane intact.

We now proceed to ascertain whether the Eustachian tube is free, so as to allow the passage of air into the tympanic cavity,

and also permit the discharges from this cavity to be conveyed to the pharynx. This may be effected in two ways, as follows:

a. Exploration with the Otoscope. Having placed one extremity of a Toynbee's Otoscope into the patient's ear, and the other into the ear of the examiner, being careful that no portion of the tube touches any neighboring body, request the patient to close his lips and hold his nostrils, and then make a forced expiration; the air, finding no other outlet, will be compelled to pass into the Eustachian tube, and as it enters the tympanic cavity and strikes against the inner surface of the drum membrane, the examiner will hear a *thug* like sound, or a faint blowing sound, depending upon the free condition of the tube and cavity from mucous matters. Or, instead of the forced expiration, the patient, having the nostrils and mouth closed, as above-named, may be requested to swallow a little saliva—he will then hear a *thug* like sound, and experience a sensation of fullness in the ear, while, at the same time, the examiner will distinctly hear a faint, liquid-like, crackling sound; or, if the mucous membrane of the tympanum be thick, the sound will resemble a gentle flapping.

If no sound be heard by either the patient or the physician, if no sensation of fullness in the ear be experienced by the former, and if the membrana tympani is not seen (through the speculum) to move, when these endeavors to inflate the cavity are attempted, then the second method of examination may be undertaken.

b. Exploration with the Eustachian catheter. Having selected the silver catheter to be used (Toynbee's or Wilde's are generally preferred, and if used in cold weather should be warmed), and seated the patient in a high back chair, or in some position where the head can rest and be properly supported, and where he can face the light, the operator, holding the catheter between the thumb, index and middle fingers of the right hand, somewhat in the manner of holding a bistoury or a pen, and standing in front of the patient, whose head he steadies with the left hand, will introduce the beak or point of the instrument, looking downward, into the nostril, and glide it quickly, but without employing any force, backward and by the side of the *septum nasi*, carrying it onward until the curved end reaches the faucial cavity, when it is to be pressed backward against the mucous membrane of the posterior part of the fauces; then draw it slightly forward, and rotate it outwardly, so that the extremity may turn upward and catch the orifice of the Eustachian tube, which can be distinctly felt, and will prevent the further rotation of the instrument. Now press the instrument backward and slightly outward, when it will be felt to engage in the mouth

of the tube. If the aperture be missed, the end of the catheter may again be carried against the back of the pharynx, and manœuvered as before; or, by feeling for the opening by slightly pushing it in and out. With a little careful and dexterous manipulation, the catheter will almost find its own way into the tube, in most instances; sometimes, however, its introduction will be found quite difficult. During the operation the patient must not move nor speak; and the few tears which may frequently be seen, are the result of irritation and not of pain. The operation produces rather an unpleasant sensation; and should any irritation be caused at the tip or anterior extremity of the nose, this may be pressed upward with the left hand, so as to remove it from contact with the catheter.*

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*Notwithstanding, as a general rule, that catheterism of the Eustachian tube may be readily accomplished, yet, difficulties as well as accidents will sometimes attend the operation. Thus, extreme timidity of the patient, or obstinacy in children, may require the use of chloroform. The nasal fossæ may be exceedingly narrow, so that a catheter of very small diameter and slight curve can alone be used, and which must be gently introduced under the lower turbinated bone, with its apex directed toward the external wall of the fossa. Sometimes, the narrowness may be so great that the catheter becomes arrested, on reaching the middle of the nasal fossa, between the septum and the turbinated bone, or between this bone and the upper jaw. Should this occur, the extremity of the instrument being properly directed, it will be necessary to withdraw it, and, after the patient has had a few minutes' rest, again attempt its introduction. Difficulties may also arise from excessive narrowness of the inferior nasal fossa, the result of chronic inflammatory thickening of the mucous membrane; from polypi or fleshy vegetations; from hypertrophy, or a greater or less unnatural elongation of the lower turbinate bone, with a faulty direction of the curve; from deviation of the septum of the nasal fossæ; from exostosis from the lower turbinated bone, or from the ascending process of the superior maxillary bone. An extreme sensibility of the pituitary membrane, and the pain produced by the least touch, also constitute a serious difficulty. Again, if the catheter be too large, have too great a curve, be improperly introduced, or have a wrong direction given to it, either of these will create a difficulty.

The local accidents arising from the operation, are,—1. Laceration of the inferior part of the nasal canal, causing slight pain, and a drop or two of blood; this is of little importance, unless the hemorrhage be profuse. 2. The pituitary membrane may be so excessively sensible as to cause great pain, constant sneezing, or excessive lachrymation; this last symptom causes no pain, although quite unpleasant, and soon passes off,—still some caution should be used in performing the operation in persons subject to diseases of the eye. 3. In subjects, in whom, as the result of repeated attacks of coryza, the mucous membrane will be red and inflated, and as it were, studded with papillæ full of blood, so that mere contact of the instrument will occasion epistaxis, which, however, may always be arrested by the inspiration of a little cold water, or astringent solution. 4. The operation may be disturbed by a nervous cough, but this is of no importance. 5. Spasmodic contraction of the orifice of the Eustachian tube at the moment the catheter is about to enter it, is not uncommon where patients have had re-

The rule just given for the introduction of the Eustachian tube is the general one. There may, however, be exceptions, as for

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peated attacks of quinsy, where there is a simple or chronic granular pharyngitis, and where there is hypertrophy of the tonsils. Sometimes, especially with nervous subjects, as soon as the catheter touches the pituitary membrane, the velum palati is convulsively drawn upward. During these violent contractions, whatever be their cause, the peristaphyline muscles, inserted near the mouth of the Eustachian tube, completely effuse the opening, so that an instrument can not pass it without effort. If this spasmodic contraction occurs only at the moment when the catheter enters the tube, the point is expelled and falls into the pharynx, and the operation must be repeated. 6. If the operator employs too much force to overcome the contraction of the muscles, the mucous membrane may be torn, so as to give rise to the production of emphysema at the first attempt at deglutition or at inspiration. If the patient make a sudden movement of deglutition, or if the aurist wish to blow in a little air for the purpose of exploring the tube, the patient falls as if struck by lightning; he raises his hand to his neck; the eye is haggard, the face congested, the mouth open, and the voice lost. The symptoms resemble those of œdema of the glottis in its last stage. On forcibly drawing down the tongue with the finger, there is perceived to be considerable emphysema, raising the whole of the mucous membrane of the pharynx and even invading the larynx, especially the arytæno-epiglottic folds. It is requisite only to tear with the nail of the finger which holds down the tongue, one of the emphysematous projections of the mucous membrane; the air escapes, and the patient recovers. Death has occurred from this cause. 7. Simple insufflation with an India-rubber bag, or the pumping of air into the Eustachian tube, may rupture the membrana tympani, more especially when there is chronic inflammation of this membrane. 8. When too frequently repeated, catheterism of the Eustachian tube, irritates the mucous membrane, and may give rise to traumatic inflammation, diminishing its density. And, sometimes, even the introduction of a small catheter may give rise to a painful inflammation, which may extend to the cavity of the tympanum.

The general accidents following catheterism of the Eustachian tube are: rigors and fever; facial neuralgia; obstinate headache; and an increase of the deafness, or of the noises in the ears, for the relief of which the operation has been undertaken. Suspension of the treatment is generally sufficient to arrest these accidents. (*Triquet.*)

Toynbee also observes, that in making a few puffs into the catheter, it will sometimes be the case that no air will be heard to enter, "the mucous membrane (at the faucial extremity of the Eustachian tube), being too thick to allow it to pass; and, under such circumstances, it is unwise to attempt to *force the air* into the tympanum. Great mischief has frequently resulted from such a proceeding; the mucous membrane having been lacerated, and the air been driven into the submucous tissue, causing extensive emphysema. Nay, still more serious results have occurred, the patient having been killed instantaneously, perhaps through the effusion of air through the fenestra rotunda (the membrane having been lacerated) into the labyrinth, and the shock upon the nervous system causing instant death. Nor need it be a source of surprise that the effusion of air into the labyrinth should prove fatal, since even the forcible distension of the tympanum, while blowing the nose, frequently produces giddiness by pressure upon the labyrinth."

instance, it may be required to pass the catheter through the nostril with the beak directed upward, both in introducing and withdrawing it; or the instrument may require to be gently rotated between the fingers, so as to find the way for itself, without any force being employed. Sometimes, if the patient makes a movement of swallowing, at the time the beak is being turned outward and upward, it will be involuntarily thrown into the orifice of the Eustachian tube. Again, it will sometimes be almost if not quite impossible to introduce the catheter into the mouth of the tube, unless we place it there with the aid of a pharyngoscope to guide us.

Wilde recommends to have the beak turned downward and rather outward into the angle between the floor and external wall of the nares, as it is passed rapidly over the nasal floor.

Triquet introduces the catheter directly into the inferior meatus, with its concavity looking upward and outward, the beak resting slightly against the external wall, (engaging, as it advances, deeply beneath the inferior turbinated bone), and its back or concavity in contact with the septum or partition; if it be slowly and gently carried on in this position, without using any force or violence, the posterior extremity of the inferior meatus is reached, and the point of the instrument, finding a natural groove along this inferior meatus, must, he says, infallibly and readily engage in the faucial orifice of the Eustachian tube which lies immediately behind this extremity of the inferior meatus. Sometimes, a slight turn of the instrument may be necessary to engage it. If an obstacle is encountered during the passage of the catheter through the nostril, it must be passed or overcome by slight lateral movements, without any rudeness or force. He prefers this method, which avoids giving rise to efforts at swallowing, or vomiting, as well as to spasmodic action of the pendulous veil of the palate, because, he says, the instrument reaches the orifice of the tube without having been able to touch this veil, or the pharynx.

Too slender a catheter is useless, as its calibre is too small to be of any service, either in removing mucus collections by insufflation, or in injecting medicated fluids; beside, it is more apt to injure the mucous membrane. Too large a catheter either can not be passed, with most patients, or else it may luxate or break the lower inferior turbinated bone, and terribly lacerate the mucous membrane. A catheter which has its beak too much curved is liable to the same objections. A medium-sized catheter, with a large orifice, a slightly curved beak, and a kind of olivary enlargement to round off this extremity, so as to avoid bruising or wounding the mucous membrane and to enable it to glide easily under the

small circular projection formed by the inferior turbinated bone, is the best. A practitioner, should, however, have several of different sizes.

The best time for the operation is before breakfast, or three or four hours after eating; or, the patient may be requested to omit the meal previous to the operation. The instrument should always be warmed, and anointed with glycerin, or white of egg. Sometimes it will be necessary to overcome excessive tenderness or sensibility of the mucous membrane, by several preparatory sittings, accustoming it gradually to contact with these instruments. Among refractory children, where catheterism of the tube is positively necessary, chloroform may be given to procure the required immobility, but it will not be necessary to produce complete anesthæsia.

The instrument being properly introduced into the mouth of the Eustachian tube, we are now prepared to explore this canal, or to treat it therapeutically with medicated vapors, fluids, etc.; if the latter, it will be proper, in most instances, to firmly secure the catheter by means of a frontlet bandage with a pair of forceps attached, which should be placed upon the forehead previous to the introduction of the catheter. If the former, this bandage may be dispensed with, at least when Toynbee's otoscope and explorer are used. The aurist will merely have to transfer the catheter to his left hand, and while holding it lightly, so as not to cause pain to the patient (as the use of the frontlet invariably does), insert into the dilated end of that instrument the small end of the explorer, (or, of the syringe, etc.).

The physician will place the other end of the explorer in his mouth, holding the catheter in place with the other hand constantly applied to it; then, adjusting the otoscope with the other hand (that is, having one extremity in his patient's ear, and the other in his own), he will gently blow through the explorer, and at the same time listen through the otoscope, to ascertain whether the air enters the ear, and if it does, what is the peculiar sound it produces. If the tympanum be unobstructed by mucus, the air is heard to pass in a stream against the inner surface of the membrana tympani, but when mucus is present, a peculiar gurgling is heard; and if the mucous membrane itself is thickened, a peculiar squeak or bubbling is also perceptible. It is better to make only a few successive puffs, attentively listening during each; but it is not advisable to blow forcibly into the ear. (*Toynbee.*) Wilde states, that in a healthy ear, with a free tube, when a stream of air is passed into the tympanum, it impinges upon the inner wall of the membrana tympani

with a peculiar *thug*, followed by a continuous rustling sound, which is very remarkable, is the normal or natural sound, and is not very easily forgotten when once heard.

When a puff or douche of air is passed into the tympanic cavity with a certain degree of impulse, through a catheter introduced into the Eustachian tube, a crepitation will be heard through the otoscope, which is either strong or feeble, with or without much bubbling or rattling, dry or moist, cavernous or veiled. If the tube be large, the sound will be strong, and resemble that of a heavy rain falling through dry leaves.—If there be an accumulation of mucus in the tube or in the tympanum, or, if the tube be strictured, the sound will be feeble and intermittent; the current of air will pass through these mucous secretions with more or less difficulty, and the bubbles of air will rupture, one after the other, and at long intervals.—The crepitation will be dry, when the mucous membrane lining the tube is dry, like parchment, and which condition is a cause of deafness.—It will be sonorous or cavernous when the membranes which separate the cells of the mastoid process have been destroyed by an internal otitis with suppuration, thus converting this process into a large cavity communicating with the tympanum, and swelling the sounds which are produced there, somewhat like cavities in the lung.—When the tympanic cavity is filled, either by an effusion of blood, by mucous secretions, or by pus, the crepitation will be veiled or muffled.—When the tube is wholly obstructed, or obliterated, the air not being able to penetrate into the drum, this cavity gives no sound during the operation of insufflation; and when this is the case, it is unwise and even dangerous to attempt to force air into the tympanum, as the result may be laceration of the mucous membrane with extensive emphysema, laceration of the membrane of the fenestra rotunda, consequent effusion of air into the labyrinth, and death.

"If when a jet of air is made to enter the tympanic cavity, we succeed in getting a clear view of the drum membrane through a speculum, it will be observed to press outward the anterior and lower portion of this membrane,—that which is most vibratory and placed opposite the stream of air,—and also that it at the same time renders the upper and posterior part of the membrane slightly vascular." (*Wilde.*)

With regard to the introduction of medicated vapors, etc., after the Eustachian tube has been introduced, I will refer to it hereafter, when treating of the diseases in which such vapors, etc., are reccommended.

It may be proper to state here, that *in removing the catheter* from

the Eustachian tube and nostril, we must be as careful and as delicate as when introducing it; we first, gently remove it from the blades of the forceps of the frontlet bandage, if one be used; and then slightly drawing the tube forward a short distance, to free it from the Eustachian orifice, we rotate it so that the beak or extremity will be downward, which we can determine by the position of the ring at the other (outer) end, and then rapidly withdraw it from the nostril, without using the slightest degree of force in so doing.

4. *Examination of the Internal Ear.* Here we have no direct nor indirect method of ascertaining the morbid changes to which deafness may be due; as this portion of the ear is deeply situated in a bony receptacle, concealed from sight and from the various means of exploration. It it only by exclusion, and by the impossibility of connecting the morbid symptoms of the disease with a lesion either of the external or internal ear, that we may be able to decide whether there is a lesion of these deeper parts of the ear, the existence of which we can not directly verify. Diagnosis by exclusion does not belong only to the ears, we find it made use of in the investigation of a large number of diseases.

Diagnosis by exclusion is not, then, a mark of inferiority peculiar only to the examination of diseases of the ear; it is the consequence of one of the difficulties of our art,—a difficulty which is met with in other diseases than those of the ear, but more especially here on account of the situation of this apparatus in the thickness of the petrous portion of the temporal bone.

However, there is a method of ascertaining if the internal ear is capable of fulfilling its functions, or in other words, if the vitality of the auditory nerve is not abolished, and that is catheterism of the tympanum. Between the tympanal membrane and the labyrinthine cavities are a non-interrupted chain of ossicles, serving to transmit, in part, the impression of the sonorous vibrations of the membrana tympani to the liquid contained in the vestibule, the semicircular canals, and the cochlea. From this disposition, it will be seen that if we concuss the drum membrane at the point of insertion of the malleus, by means of a blunt probe, the whole chain of ossicles is thereby put in motion; and through the stapes to the fenestra ovalis and the liquor Cotunnius; so that, if the auditory nerve has not lost the faculty of being impressed by sonorous vibrations, the patient may experience a sense of confused hearing. We term this operation, "catheterism of the drum membrane," and it should be performed with a very delicate blunt probe, having its concussing extremity covered with cotton. From this examination we can

determine whether there is any encouragement to undertake treatment of the case so examined.*

* M. Gendrin recommends auscultation as a means of facilitating the diagnosis of the deep-seated portions of the ear; the auscultation may be either mediate or immediate, and the patient's nares should be closed.—In the physiological condition every *expiration* produces in the tympanum a deep, gentle, distant *bruit de souffle*, which passes away before the end of the expiratory movement. If the *membrana tympani* is perforated, this sound becomes acute, dry, sometimes even sibilant, and is more prolonged. When the *Eustachian tube* is narrowed, it becomes intermittent, consisting of several successive *souffles* which are usually accompanied with bullar crepitation due to mucosities. Crepitation may be heard when there is caries of the internal ear, or when there is a collection of matter in the middle ear, or in the mastoid cells, in communication with the tympanum and the open tube; but here the crepitations are deep and moist. Coughing renders these abnormal sounds shorter and more clear, so that they are more easily recognized.

Inspiration, in a sound ear, does not give rise to any perceptible sonorous vibrations; but if the membrane is pierced, the Eustachian tube remaining pervious, a very sharp sibilant *souffle*, mingled with moist crepitation, is heard, the patient himself often being conscious of the sound.

The *voice*, heard in the ear, appears deeper and slightly vibrating, and is interrupted by frequent and sudden intermissions. When the Eustachian tube is narrowed, or the tympanum is filled with mucosities, by pus or by a central exostosis of the petrous bone, the sound of the voice degenerates into a confused and inarticulate murmur. It is not heard when the tube is obstructed; and it becomes whistling, and accompanied by crepitating bullæ, when the membrane is ruptured. In the normal state, the *labial hissing* is transmitted by the ear like a distant acute *sibilant souffle*. It is much weakened or almost silent when the Eustachian tube is narrowed, and is not heard at all when this is obstructed. When the membrane is destroyed, the tube remaining free, the hissing becomes very acute, and is so near that the patient seems to be whistling in one's ear In most cases the abnormal sounds may be verified by a comparative auscultation of both ears, as it is rare to find the same degree of the lesion in the two. (*Brit. and For. Med. Chir. Rev.*, *Jan.* 1857, p. 272.)

"A watch placed between the teeth, so as touch them, is *not* heard by the person whose deafness is caused by lesion of the auditory nerve or brain. The sound is conveyed by the bones of the head to the sentient portions of the ear, and is distinctly audible when the nervous apparatus is in order. This test will serve to separate a small class of cases of deafness, in which *no benefit can be derived from Eustachian catheterism.*

"If the tick of the watch be heard, and the external auditory passage, as well as the membrana tympani be found healthy, negative evidence is afforded that either the Eustachian tube or the middle ear is at fault. To complete the evidence, let the patient close his mouth and nostrils, and then make the movement of swallowing; if the tube be healthy, he will distinctly hear the air move in the ear with a kind of thug and producing a feeling of fullness, which is at once removed on swallowing with the nostrils unclosed. If there is mucus in the tubes, the patient will feel a gurgling in the ear, the result of air breaking in bubbles in the secretion; if the tube is obstructed, no sensation or sound will be experienced." *D. Hodgson.*

THERAPEUTICS OF DISEASES OF THE EAR.

As the theurapeutics of aural affections are not generally well understood, it may not be improper, previous to a description of the causes, symptoms, treatment, etc., of the various lesions of the auditory apparatus, to make a few remarks relative thereto, which will be equally applicable to both the acute and chronic forms. Aural therapeutics, if properly understood, can not materially differ from that of other diseases, at least so far as concerns the influence of depletives, counter-irritants, antiphlogistics, medicines which act specially on mucous or serous tissues, etc.; and the same class of medicines indicated in certain forms of disease in any organ of the system, will be found fully as useful in similar diseases of the ear, the only difference being, perhaps, in the mode of administration.—For convenience, aural therapeutics may be divided into two classes, the first, comprising general medication; the second local application.

I. GENERAL MEDICATION.

1. *Alteratives*, or those remedial agents which determine normal changes in the living solids and fluids of the economy, without occasioning any remarkable evacuation of the secretions or excretions; and which class of medicines will frequently be found of great value in the treatment of chronic affections of the ear. Alteratives may be of a stimulating, sedative, tonic, antistrumous, or antisyphilitic character; and, in the treatment of disease, that kind of alteratives should be selected, which will be the best suited to the temperament of the patient, and to the character which the symptoms of his disease present. And as the greater part of patients having disease of the ears, are of a strumous habit, it will be proper to select those agents which are termed antistrumous, or antiscrofulous, etc.; and if there is an abnormal activity, or depression in the vital condition of the tissues affected, a sedative, or a stimulant should be associated with the antiscrofulous agent, unless we can procure one already possessing stimulant or sedative antiscrofulous properties.

Among the agents used as alteratives are the preparations of Iodine and Bromine; of which the best are Iodide of Iron, Iodide of Iron and Manganese, (*tonics*), Iodide of Potassium, Iodide of Ammonium, Tincture of Iodine, (*stimulants*) and Bromide

of Ammonium, (*sedative*); the vegetable alterative preparations which have been found the most efficacious are, Compound Syrup of Aralia, (*stimulant*), Compound Syrup of Queen's Root, (*stimulant and diuretic*), Compound Syrup of Poke, (*sedative*), Compound Syrup of Turkey Corn, (*sedative and tonic*), Compound Syrup of Yellow Dock, Compound Tincture of Corydalis, (*tonics and cholagogues*), etc. An excellent preparation for children to use on their bread instead of butter, is made as follows: Take of fresh Butter four ounces, Iodide of Potassium one grain, Bromide of Potassium three grains, Chloride of Sodium (*salt*) half a drachm, mix thoroughly together.

As the system, after a time, becomes accustomed to the continued use of one alterative preparation, which thereby loses its remedial influence, it will be better to occasionally change or alternate the administration of these agents.

2. *Purgatives*, are generally of more value in acute inflammations than in chronic. Laxatives are preferable, as a general thing, in chronic affections, merely to prevent the bowels from becoming constipated, or irregular in action; occasionally, however, more active measures may be required. The purgatives preferred are the Oleo-resin of Blue Flag, Resin of Podophyllum, and in some cases, Aloes; or, the various pills into which these articles, together with Scammony, etc., enter. Rhubarb and Ginger, or Rhubarb and Sulphur, are excellent for strumous children with soft flesh, and torpid or impaired digestive functions. When there are morbid accumulations in the intestines, the neutral salts may frequently be used with advantage, as, Sulphate of Magnesia, Citrate of Magnesia, Sulphate of Soda, Seidlitz powders, etc.; however, the character of the laxative or purgative will depend upon certain circumstances attending the disease, and which have been referred to, heretofore.

3. *Emetics* are useful to dislodge unhealthy matters from the stomach; to stimulate the nervous energy of this organ when there is a tendency to dyspeptic complication; to cause a determination to the surface; and to impart a healthy shock to the general nervous system. They will be found useful more especially in lymphatic, bilious, and torpid constitutions; but should be avoided as much as possible in aural diseases, among those of full habit or of great nervous irritability.

4. *Diaphoretics* appear to be more useful in catarrhal or rheumatic affections of the auditory apparatus, as well as among aural patients of full habit; obstinate headache, accompanying old chronic inflammations of the labyrinth, are frequently relieved by a profuse perspiration. Diaphoretics may be said to include all the

means of exciting a determination to the skin, from bathing and friction, warm infusions, and sudorific tinctures, to the hot air bath.

5. In addition to the above, will be required, agents which exert a more special influence upon *mucous tissues;* those which more powerfully affect *serous tissues; antisyphilitics*, when deafness is due to the action of the syphilitic virus upon the membranes and bones of this complicated organ; *chalybeates*, when it is due to chloro-anæmia, etc.

II. LOCAL MEDICATION.

1. *Injections of Medicated Fluids or Vapors, into the Tympanic Cavity.* For the purpose of removing obstructions, mucous accumulations, etc., in the Eustachian tube and tympanum, injections of warm water have been recommended. They may be introduced by means of an ordinary syringe, after the Eustachian catheter has been passed into the orifice of the tube, by the means named on page 1235, and fixed by the frontlet bandage. This operation, so highly recommended by some writers, is really of but little service, and is seldom required; when performed, the fluid regurgitates into the throat, and is apt to occasion irritation.

The mucous membrane of the Eustachian tubes, being similar to that of the nostrils, may like it, secrete mucus in abnormal quantity, when exposed to inflammatory influences, and this mucus, like that of the nose, may become quite hard, very adherent, and only capable of being detached after having been moistened with warm water. At the junction of the osseous and cartilaginous, or narrowest part of these tubes, which is only about one-fiftieth of an inch, or a quarter of a line in diameter, a very small quantity of dry, hard, and adherent mucus at this point, would cause an obliteration of the canal, and occasion a rapid and complete deafness. Here is one of the few cases in which injections of warm fluid would be of service. But where there is only a thick and viscid mucus adhering to the ossicles, fenestra, etc., causing dullness of hearing, tinnitus, etc., injections of air or vapor will be found to answer a much better purpose.

The injection of medicated vapors for the purpose of altering the condition of the mucous membrane of the tympanum, or stimulating the nervous expansion on its surface, will frequently be found serviceable in the treatment of diseases of the middle ear. Various agents have been used for this purpose, as, for subacute or chronic catarrhal inflammations of the middle ear, the vapor from

infusions of Elder Flowers, Sassafras Bark, Flowers of St. John's Wort, Flowers of Marygold; the vapors of Benzoin, Tolu, Myrrh, Tar, Sweet Gum, etc., to stimulate the nervous filaments in old cases of nervous deafness; and the vapors of solutions of Iodine, Iodide of Ammonium, Hydrochlorate of Ammonia, Bromide of Ammonium, etc., to act as local deobstruents, discutients, or detergents. In nervous deafness, ethers, and medicated vapors act only through the intermedium of the membranes of the fenestræ ovalis and rotunda.

A very simple apparatus is required for this purpose; a glass flask capable of holding about a quart of fluid, has about one-third of its capacity, (*i. e.* 10 or 11 fluidounces) filled with the infusion or solution to be employed; this is placed upon a shallow sand-bath, over a spirit-lamp. A cork is fitted into the mouth of the flask having three orifices in it; *one* for a thermometer, which should pass far enough down into the bottle to have its bulb immersed in the solution; *the second*, for a glass tube to pass through, having one extremity nearly in contact with the bottom of the flask, and its other extremity communicating with an elastic tube the further extremity of which is attached to a bellows, an elastic bag, or which may be held in the mouth of the operator; *the third* orifice is for a piece of glass tubing, entering only a short distance within the flask; and to the outer end of which tube is attached an elastic tube, the further extremity of which is fastened upon the Eustachian catheter. These elastic tubes need not be over two feet, or two feet and a half in length.

It is used as follows: The Eustachian tube having been properly introduced, and fixed by the frontlet bandage, and the solution in the flask being sufficiently heated to give off vapors, the operator, either by means of the bellows, etc., or by simply blowing into the elastic tube leading to the long piece of glass tubing, forces a current of air into the fluid in the flask which displaces, and forces a portion of the vapor in the flask, to enter the short piece of glass tubing, pass along the elastic tube and catheter, and be expelled into the Eustachian tube and tympanic cavity. A continuation of the supply of air from the mouth or bellows, will keep up the supply of vapor upon the affected *parts* as long as may be desired. Care must be taken with regard to the temperature, which may be regulated by the thermometer, and which should be mild, halituous, and convey no sensation of burning or scalding.

For the injection of Ether, Chloroform, and other very volatile substances into the ear, urethra, etc. I have found the following apparatus very useful; it consists of an ordinary silver syringe

about six inches in length and half an inch in diameter. Close to the nozzle end of the barrel is an aperture into which the neck of a small vial or glass flask may be screwed; and a delicate valve is attached to the barrel-end of the nozzle, which will allow air to be expelled when the piston is pushed down, but will permit none to enter when it is drawn outwardly. The glass flask has a metallic band with male screw threads attached to its neck so as to fit the female screw in the aperture of the barrel; and a delicate valve is also placed within the neck, to allow the vapor from the fluid contained in it to escape into the barrel of the syringe, but not to return again into the flask. If necessary another valve may be placed in the piston head, similar to those in small air pumps. Through a short tube leading from the nozzle of the syringe to the properly introduced Eustachian catheter, the vapors may be injected into the tympanum without any trouble. A cloth wet with warm water and applied around the glass flask will cause the ethereal vapors to rise. I have used such a syringe for the last six years.—A somewhat similar but cheaper arrangement may be made, substituting a vulcanized rubber ball for the piston, and hard rubber for the barrel and nozzle.

Vapor of medicines may be introduced into the tympanum in very many instances, without the aid of the Eustachian catheter. Thus, by means of medicated cigarettes, one of which the patient is to smoke, (or by directly filling the mouth with the vapor, from the prescribed article, by means of suction or otherwise), and when the mouth is filled with the smoke or vapor, the patient keeping his mouth closed, and also holding his nostrils closed, will either make a strong expiration in order to force some of the vapor into the tympanum, or, (and which will usually succeed much better after a few trials), while keeping the mouth and nostrils closed, he may attempt to swallow some of the vapor, simultaneously making an effort to cause a crackling sound in the ears. And this may be repeated as often as deemed necessary.

Preparations of Opium, as Laudanum, etc., should never be placed in the ear, and especially the middle ear; their action is dangerous, and they have even caused death. Ether, or Chloroform, are not proper agents to introduce into the external or middle ear, except in vapor or very much diluted; otherwise, they produce irritation, a sensation of violent burning, with more or less severe pains. Violent and painful irritations in these parts may rapidly extend to the brain and give rise to serious consequences, as the brain is only separated from the ear by a thin lamina of bone, thinner than an an egg shell. Ether dropped into the ear was for a time highly

lauded for deafness, but it was found to produce serious cerebral disorders. Miss Cleret, who it was pretended had made the discovery, used it for her own deafness, and eventually became insane. Triquet recommends warm solutions of Tannin, Sulphate of Copper, and Benzoic Acid, in Glycerin; and Alum, and Sal Ammoniac, in water, as injections into the middle ear, or, to be dropped into the external; of course, they should not be too strong.* He also proscribes Nitrate of Silver, and Sulphate of Zinc, as being very painful and giving rise to serious symptoms, although, he uses Solution of Chloride of Zinc in polypus, etc.

The following preparations for injecting into the ear have been recommended by European aurists, and will often be found very advantageous, when properly applied:

Injections of Caustic Potassa. In cases where the diagnosis leads us to believe that the mucous membrane of the Eustachian tubes or of the tympanum, is in a mammillated condition, and especially among patients whose deafness is consecutive upon typhoid fever, M Marc d' Espine recommends the injection of a solution of caustic potassa into the middle ear, thus,—to a concentrated Aqueous Solution of Caustic Potassa, add twenty or thirty times its volume of water, or sufficient to impart a slight tingling sensation to the tongue, when the diluted solution is applied to it. This done, we take up in a pipette, syringe, or other small tube, fifteen or twenty drops of the diluted solution, and, by means of a caoutchouc vapor ball, we insufflate or blow into the middle ear, through the Eustachian catheter previously introduced into the pharyngeal orifice of the tube, the desired quantity of the solution. At first, this will be only four or five drops repeated every other day, and gradually increased to eight or ten drops, ceasing, when the tubes and tympanum are filled with mucous sounds during the insufflation. When the operation has favorably succeeded, the patient will complain of a sense of heat with formication or tingling in the ear. The pain is slight, and soon disappears, though occasionally it continues until bed-time. On the first day, if the pain should prove too severe, it will be prudent to inject into one ear only. If, at the

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* In acute catarrhal inflammation of the ear, Triquet recommends, after the pain has been removed by leeches, poultices, and injections of infusion of black tea, and when a discharge only remains,—to inject with, ℞. Rose-water one hundred parts, Honey of Roses thirty parts, Sulphate of Copper one part; mix. If this is not well borne, replace it for some days with an infusion of Elder, or Melilot, or with warm Tar-water, and then use the following: ℞. Sugar of Lead four and a half grains, Honey of Roses seven and a half drachms, Rosewater three ounces; mix.

commencement, the tubes are filled with mucous sounds in the expiratory efforts, or during insufflation, we should, for a week or two, be satisfied with the employment of injections of dry air, or a few drops of ether or chloroform may be added to it to render it slightly excitant. The dryest tubes soon become moist under the action of the potassa, as may be perceived in the mucus rattling sounds produced during the insufflation. The pain occasioned by this injection is not followed by any inflammatory symptoms; and no inconvenience results from its continued employment. Tinnitus frequently ceases while it is being used. Several injections may be required in order to effect a satisfactory result; sometimes, only one.

Injections of Iodine. Take of Tincture of Iodine ten grains, Iodide of Potassium one grain, Distilled Water one hundred grains; mix. This injection acts locally upon the membrana tympani, as, in thickening, a mammillated or fungous condition of it, etc.; beside, the heat of the cavity into which it is injected is sufficient to volatilize a small quantity of the iodine in this fluid, and this vapor, by its excitant properties, may stimulate the nervous membrane of the labyrinth, and even the auditory nerve itself,—being an energetic means of awakening the sensibility of this organ when the deafness is really due to a want of excitability. These injections are generally very painful, requiring great courage and determination on the part of the patient to submit to, and support them. The above-named solution should be diluted with one-third, two-thirds, or one-fourth its volume of water, before using it, according to the susceptibility of the ear.

Injections of vapor of Ether, or of Chloroform. Injections of air with chloroform added to it, may be employed concurrently with the potassa injections to modify the vital properties of the organs of the ear; these injections of ether or chloroform may be useful in cases where there is a paralysis of the acoustic nerve; they are of great service when the deafness is accompanied with tinnitus. To use them, we place some Acetic Ether or Chloroform, (say, commencing with one-fourth of a drachm, and at different times, from a drachm to a drachm and a half), in a hollow ball of India rubber, furnished with a metallic tap, or stop-cock; the heat of the hand applied over the ball is sufficient to volatilize the liquid. The outer extremity of the tap is placed in the opening of the Eustachian catheter previously introduced into the orifice of the tube, the tap is opened and a simple pressure upon the ball expels the vapor into the cavities of the ear.

Injections of Strychnia. If Ether or Chloroform fail, we may try

Strychnia, Nux Vomica, Veratria, etc. In obstinate and desperate cases, all means are legitimate, which are not injurious. Injections of Strychnia may be made of two strengths, thus:—No. 1. Take of Strychnia three grains, Acetic Ether, Distilled Water, of each, four fluidrachms; mix.—No. 2. Take of Strychnia four and a half grains, Acetic Acid seven drops, Distilled Water four fluidrachms; mix.—Make of these two perfectly transparent solutions, of which three or four drops are to be injected into each Eustachian tube. In employing No. 1, we inject at a sitting, one-thirty-fifth or one-fortieth of a grain of strychnia, or one-eighteenth or one-twentieth of a grain for the two ears. In employing No. 2, we inject one-twelfth or one-fourteenth of a grain of strychnia, or one-sixth or one-seventh of a grain for both ears. This injection is successful about once in ten or twelve times, and occasions no bad results; it may be employed once in every two, three, or four days. It, together with the one following, has also proved useful in deafness from rheumatism, and from partial anchylosis of the ossicles.

Injections of Veratria. No. 1. Take of Veratria one part, Acetic Acid one part, Distilled Water twenty parts; mix. This solution is never employed pure, but always diluted with four, five, or six times its volume of water. It is a very painful topical irritant.—No. 2. Take of Veratria one part, Alcohol twelve parts; mix. When used, this solution must be diluted with from two to twenty-four times its volume of water.

Veratria being an extremely irritating substance, we must commence with very dilute solutions. The weakest dose for an injection is one one-hundred and fiftieth of a grain in two drops of water; the sensation, from this quantity, is hardly perceptible; however, the ear into which it is injected becomes slightly irritated. The strongest dose in which veratria has been used is one-twelfth of a grain in three drops of alcoholized water. The effect was very violent, the pain in the ear torturing. Pure water was immediately injected to mitigate this pain; but after the seventh insufflation of the solution, there was a decided amelioration, sufficient to authorize the continuance of this agent. However, great caution is required in employing these stronger solutions.

2. *Leeches* or *Cupping.* Local depletions, by leeches or cups, will often be found useful in acute diseases of the auditory apparatus, and especially at the commencement of catarrhal phlegmonous inflammations of the meatus. When a single ear is affected, three or four leeches will be sufficient for children, and six or eight for adults. The number, however, will be variable according to the intensity of the inflammation. They should be applied as near to

the painful part as possible, and be kept in their place, by being, each one, enclosed in a small leech glass, having a bevelled mouth.

In inflammations of the auditory canal and membrana tympani, they should be applied immediately around and within the margin of the meatus, (previously placing a little cotton into the ear, both to prevent the leeches, as well as the blood, from entering into this organ); or, in the fossa behind the tragus, and sometimes in the hollow in front of the tragus formed by dropping the lower jaw. If the inflammation affects the region of the mastoid process, leeches should be applied over its surface at various points. If the inflammation is in the tympanum, they should be applied to the base of the mastoid process, or to the orifice of the corresponding nostril. In labyrinthine inflammations, scarifying and cupping is preferable, applying the cups along the sides of the mastoid region, at the root of the neck, and at the nape of the neck, repeating them as often as may be required. After the leeching, care must be taken not to allow too much blood to flow from the bites.

However, the use of leeches can frequently be dispensed with, as anodyne fomentations, or the vapor arising from infusions of anodynes may be effectually applied to the outer parts of the ear as well as to the external auditory canal; and this will be still more promptly efficacious, if aided by profuse perspiration effected by means of the spirit vapor bath, and a sinapism along the whole extent of the spinal column. Hypodermic injections will also be often of great service in painful and active inflammations of the ear. In the chronic forms of aural diseases, local depletion is seldom, if ever, required.

Scarifications of the mucous membrane of the external auditory canal is recommended by Triquet, in inflammation and tumefaction of this membrane, as a really excellent measure. He says: "A long experience has convinced me that these scarifications are useful, not only when the inflammation is on the decline, but also in the acute stage and especially when the swelling is considerable. One or two deep and longitudinal incisions, made with a small tenotomy scarificator, about one-third or one-sixth of an inch long, will suffice." If possible, a small pledget of cotton should be gently introduced as far as the bottom of the auditory canal, to prevent the blood from coagulating upon, and irritating the drum membrane; and, to promote the flow of blood, the surface of the incisions should be frequently and gently washed with a small piece of soft sponge moistened with warm water,—light pressure upon the tragus will also aid in obtaining this result. Or, the ear may be syringed from

time to time, when the above can not be accomplished, with a small quantity of warm water.

3. *Perforation of the Membrana Tympani.* Abscess of the drum more frequently discharges itself through the drum membrane than by any other route, and, it has been observed, that several persons who had experienced this accident, recovered a certain degree of hearing. In consequence of which, many aurists have perforated the drum membrane in some of their deaf patients, and with varied success. But, the only instance, in which perforation of the membrane is at all serviceable, is in deafness due to the absence of air in the cavities of the middle ear; or, where these are so filled with pus or other fluids as to distend the membrana tympani and render it liable to rupture; and, perhaps, in cases where there is a permanent thickening and opacity of the membrane, which obstinately resists all the measures employed for effecting its thinning by absorption. But, then we should be certain of these conditions, and also of the fact that they can not be remedied by any other means. Indeed, it may be truly said, that the operation is rarely required, and is apt to be followed by the most serious consequences, even death, if not performed in a careful, delicate, judicious, and proper manner. The value of the operation is much diminished by the difficulty in keeping the orifice open after it has been made.

Toynbee performs the operation by means of the sharp triangular end of a probe, for temporary benefit; and where a more permanent opening of the membrane is required, he makes a triangular flap, about a line long, by means of a small scalpel, having the apex of the flap above, so that it can be turned down. He states that the part best adapted for the perforation is that between the handle of the malleus and the posterior margin of the membrane, so that if we are mistaken in our diagnosis, and there is no effusion, etc., in the drum, the chain of ossicles remains intact, the wound soon heals, and the hearing is not compromised. Wilde selects a similar spot, "its inferior, thin, vibrating portion;" he uses what may be termed "Wilde's perforator." He gently introduces its point into the membrane, and drawing it downward and forward, makes a simple incision about a line and a half in length. Occasionally a crucial incision is made. The patient is often unconscious of its performance, until made aware of its completion by the rushing out of the air through the aperture. If left in this condition it would soon heal up; he, therefore, cauterizes the edges of the wound to prevent them from adhering. The operation may be occasionally repeated, whenever the wound shows an inclination to heal.

The operation should be performed through the speculum auris,

and with the membrana tympani well illuminated by the sun's rays, or by a strong artificial light, and the operator must hold the instrument lightly in his hand, so as not to carry it too deeply into the drum; before undertaking it, a last and careful examination of the membrane should be instituted. Triquet prefers a cataract needle, and selects the anterior and inferior part of the tympanic membrane, about one-thirteenth of an inch from its circumference; the instrument should be passed in about one-eighth of an inch at the farthest, and, in withdrawing it, turn the blade on its axis, so as to allow the fluid to flow out. He says, experience has proven that wounds of this membrane, without loss of substance, readily heal, provided the membrane is kept for a few days from the action of sound-vibrations; and for which purpose he keeps a plug of cotton in the ear, after the discharge has ceased.—Perforation of the drum membrane presents serious inconveniences, even dangers; and when the perforation persists, it is constantly followed by a considerable diminution of hearing, and a suppuration of the tympanum difficult of cure.

4. *Perforation of the Mastoid Process.* This operation is stated by writers to be of service in cases of deafness, where the middle ear and mastoid cells are filled with a sanguineous or purulent fluid; it affords an escape for the pus, and restores the hearing. It has not always been successful, and has occasionally terminated fatally. Wilde recommends the operation in acute myringitis, where no relief is had from the other means employed, and where an indistinct sense of fluctuation can be discovered; also in acute otitis, in which, he remarks,—"So soon as it can be determined that matter has formed under the periosteum, or that the structure itself, or the bone of the mastoid process beneath it, is deeply implicated in the inflammation, the surgeon should not hesitate to make a free incision, as I have recommended, etc.—Promptness and decision in this matter will often save a patient's life, even in an advanced stage of the disease."

Toynbee says,—"Perforation of the mastoid process also suggests itself, and this operation may, doubtless, be performed in those cases where the matter is pent up in the cavity of the ear, and is causing such urgent and serious symptoms, as are likely, if not relieved, to terminate in death. I have never performed this operation, but I should not scruple to do so in a case where the life of the patient was threatened." Notwithstanding, perforation of the mastoid process is not without danger; and when it is practised, as some have recommended, for renewing the air of the mid-

dle ear, it must necessarily give rise to a painful and disagreeable fistula.

When there is a collection of pus filling the mastoid process, distending the cells; when the walls of this process have become raised or bulged out from the suppuration; when the skin over this region presents bluish, or purplish-red spots, protruding and presenting a manifest fluctuation; when the abscess is observed to be on the point of rupturing; when, in addition, the membrana tympani can be observed thrust outwardly, presenting a prominent convexity; and when all the symptoms of fullness and distention of the tympanic cavity are present, we should promptly perforate the mastoid process. Too long a delay is fraught with serious danger.

In performing the operation, place the patient in the recumbent position, with the head slightly raised and resting upon the healthy side, and in a situation well exposed to the light. The diseased region must be properly shaved; and before commencing the operation, the physician should make a final examination of the diseased part. Some cataplasms of Linseed, previously applied over the affected region, will render the examination more easy. After having verified the existence of fluctuation and crepitation, the operator will select the point at which the operation should be performed. This point is variable; however, as a general rule, it should be selected where the tumor is more prominent, the fluctuation more manifest, the skin purplish-red, adherent to the subjacent bone, or, where the abscess would open if left to itself. The incision should be made about three-quarters of an inch from the attachment of the auricle, so as to avoid the posterior auricular artery, and, as nearly as possible, in a line parallel with the auricle.

Grasping a stout scalpel between the fore-finger and thumb, so as to leave only about an inch of it uncovered, an incision is to be made, until the bone is reached; the process may then be perforated with a trocar, or, the scalpel may be carried through the bone, and the pus be allowed to discharge.*

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* Dr. Von Trœltsch, a celebrated German aurist, states that, the cells of the mastoid process are in open communication with the tympanic cavity, are covered with the same mucous membrane, and participate in all the affections of that cavity. Pus accumulates the more readily in these cells, as their communication with each other and with the anterior part of the middle ear, is often very narrow, so that the pus is easily shut in, beside which a large portion of the mastoid process lies deeper than the membrane of the tympanum, and the meatus auditorius. We may, therefore, perforate the membrana tympani, which will allow the pus in the tympanic cavity to freely escape outward, but not that within the

The subsequent treatment consists in injecting, but with care and without much force, emollient fluids, as infusions of Slippery Elm, Marsh Mallow, Flaxseed, Barley, or Buckhorn Brake Root, etc. At the commencement, the Eustachian tube being still obstructed, we may rupture the membrana tympani if we inject too strongly. Some days later, the tube having resumed its normal calibre, we will observe that the injection will fall into the pharynx, and then we may use it more frequently.

When all the inflammatory symptoms have subsided, we may stop any further discharge and heal up the fistula, by employing irritating injections, as of Iodine, for instance. But we must not be in too much haste to suppress the discharge, nor to make these irritating injections; it is much better to wait until there is no longer any pain, fever, nor any trouble on the part of the brain, as an injection of this kind made prematurely, will prove hazardous. The irritating injections may be aided by revulsives, caustics, setons, etc., and by an antisyphilitic, antiscrofulous, or tonic, etc., treatment according as the otitis has supervened under the influence of syphilis, scrofula, or fever.—If the pus becomes effused, through a fissure in the mastoid process, into the sheath of the sterno-mastoid muscle, and the cellular tissue of the neck, it may become necessary to open all this abscess by Caustic Potassa, or Moxas.

5. *Catheterism of the Eustachian Tube*, already described on page 1235, is practised for the purpose of giving an exit to fluids effused into the middle ear, and to facilitate the entrance of the air into

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mastoid process; and if this does not form a spontaneous opening externally behind the ear, there is no choice left, in order to give vent to the pus, but to break through the external layer of the bone. The tissues adjoining the mastoid process, viz.: the dura mater, the internal carotid, the internal jugular vein, and the sinus transversus, are so important, that a morbid process which spreads to them from the middle ear, is fraught with danger to life, independently of the circumstance that the sense of hearing may be weakened or even be entirely annihilated by the presence of pus in the middle ear. He recommends an incision behind the ear and parallel with the concha, about an inch long; it is better to make the incision three or four lines behind the insertion of the concha, as if made further forward, the posterior auricular artery or its branches might be wounded,—and if made further back, there is danger of touching the sinus transversus with the chisel; then a hollow chisel should be inserted in the middle of the incision, at an equal height with the opening of the ear, and ought to be carried horizontally and a little forward, thus avoiding the dura mater and the sinus transversus. The instrument must be used gently, and stopping occasionally to cleanse the wound and probe it, as during trepanning, and also to avoid a sudden piercing of the bone. If the bony layer which has to be perforated is very thin and fragile an ordinary buttoned probe may be used instead of the chisel.

this cavity; and is always to be preferred instead of the two preceding operations when it can be effected.

When this operation is performed as a simple means of dilatation, very fine bougies must be used, gradually increased in size, and leaving them in long enough each time to be of service, say from five minutes to one or two hours. In a normal state, the diameter of the internal orifice of the Eustachian tube does not exceed one-fourth of a line, hence, the bougies will require to be very small, and their increase in diameter to be carefully graduated; beside which, their extremities should not be too pointed, lest they pierce the membrana tympani, or some portion of the tissue through which they are passed. This operation is frequently pursued to free the tube, and prepare it for injections of medicated vapors, etc.

6. *Syringing the External Auditory Canal.* This may be done for the purpose of cleansing this passage, to remove foreign bodies, ceruminous masses, etc., from it, or, to cleanse the passage, in order that we may the more thoroughly examine its condition as well as that of the membrana tympani. As a general rule, syringing with tepid water is quite sufficient to remove all small, or rounded solid bodies which have found an entrance within this canal. But, in order to be successful, the operation must be performed properly; to place the nozzle of a syringe in the meatus and force the fluid into the auditory canal, is not alone all that is required. The following rule must be observed, whenever syringing the ear becomes necessary:

An ear syringe must be procured, which will hold at least three and a half fluidounces; also an ear spout to carry off the water into a basin, as it runs from the ear. The patient must also be placed in a suitable position for the light to fall into the ear.—Grasping the upper part of the auricle with the fingers of the left hand, we draw it slightly upward, outward, and backward, so as to straiten the auditory canal as much as possible; then placing the point of the nozzle of the syringe (which should be about the size of the blunt end of a common probe), against the upper and back part of the orifice of the canal, we steadily inject a stream of tepid water, in such a manner that it passes along the posterior wall of the passage, and flows around and behind the foreign body, bringing it forward and externally, as it (the fluid) rebounds from the membrana tympani. This is the only method by which a foreign body can be removed by injection; and, if it be so large, that it can not be carried out of the ear, it may be thrown outwardly to such a distance, as will bring it the more readily within reach of the ear forceps, or other instrument. This injection may be repeated several times before the foreign body will be dislodged.

Syringing the ear sometimes occasions coughing or sneezing, perhaps syncope, and occasionally sickness at stomach; but these symptoms need occasion no uneasiness, where the practitioner has performed the operation in a proper manner. It should always be resorted to, in preference to any other mode, and not until we are fully satisfied that the foreign body can not be removed by this means, ought we to adopt other measures.

It is important in all cases where foreign bodies are removed by syringing, or where any growth has been removed from the meatus, especially when these bodies or growths have existed for some time, excluding the action of the air from certain sensitive parts of the organ, to see that the ear is well protected from cold and the action of the atmosphere, until the parts have again become accustomed to their influence; the introduction of a pledget of cotton wool into the orifice of the meatus, either dry, or oiled, will generally be sufficient.

7. *Counter-irritation.* Blisters, setons, moxa, caustics, etc., have been advised. But, probably, a very stimulating liniment, or the Compound Tar Plaster, will answer much better purposes; in applying them, means should be used to protect the back part of the auricle from their action. They will rarely be found serviceable in cases of nervous deafness, but may prove of some value in idiopathic purulent otorrhea, as a substitute for the morbid excretion of the external auditory canal, in thickening of the membrana tympani in chronic engorgements and other affections of the middle ear, and in aural disease supervening disease of the throat and air-passages. The best place over which to apply them is, the mastoid region, beneath the mastoid protuberance and immediately behind the lobe of the ear, and along the sides of the neck; they will be of no service whatever, if applied to the nape of the neck. To be of any efficacy, they will require to be persevered in for weeks and even months.

As stimulating applications, the Compound Tincture of Iodine may be used; the Croton Oil Liniment; the Compound Tincture of Camphor, etc. To relieve neuralgic pain, the Aconite and Chloroform Liniment; the Compound Liniment of Stillingia; Compound Belladonna Plaster, etc.

8. *Direct Cauterization* is often indicated, especially in catarrhal deafness accompanied with chronic affection of the throat, and to remove diseases of the mucous tissues of the naso-pharyngeal passages, the morbid conditions of which tissues frequently extend through the Eustachian tube to the middle ear. For this purpose, Solution of Nitrate of Silver, of various strengths, is applied by

means of probangs, or injection tubes, to the superior part of the pharynx, to the nasal passages, etc. It produces a favorable influence upon the diseased mucous tissues of the pharynx, which influence may gradually extend, even into the middle ear.

9. *Gargles*, and *Sternutatories* are often employed in the treatment of deafness, to modify the condition of the pharyngo-laryngeal and pituitary membranes. The first are usually of an astringent nature, as Alum, Geranium, Beth, Witch Hazle, Tannic Acid, etc., or combinations of tonics and astringents. The second are usually composed of special excitants of the pituitary membrane, as powder of Arnica, Asarum, Bayberry, Myrrh, Benzoic Acid, Bloodroot, etc., and which are also occasionally combined with some of those tonics which act more especially upon mucous tissues.

10. *Electricity*, *Electro-magnetism*, etc. I have employed electricity, galvanism, and electro-magnetism in many cases of deafness, and have also witnessed their application in the hands of others for the treatment of similar affections, but can not conscientiously say that they have ever produced any permanent benefit in a single case. I formerly thought they were serviceable in some cases, but am now convinced it was only due to a restoration of the vital action of the mucous membrane of the tympanum and Eustachian tube, and which might possibly have resulted from the influence of the other measures pursued. These agents can not certainly be safely brought to exert any action upon the internal ear, at least by any of the methods at present used; and, as a remedial means in diseases of the ear, I believe their employment can be entirely dispensed with.

DISEASES OF THE AURICLE AND SURROUNDING PARTS.

The diseases or abnormal conditions to which the auricle is subject, are:

1. *Congenital Maliformations.* These are various; thus, the auricle may be as if it were stretched at the expense of the several folds and sinuosities which perform so important a part in the forwarding of sound vibrations; or, the helix may be wanting or extended more or less considerably, with effacement of the furrows; or, the tragus may be pressed so as to completely close the meatus, in which case, a small silver tube will have to be constantly worn, or a portion of the tragus be removed; or, there may be a total absence of the auricle.

All these malformations exert an influence in lessening hearing

to a greater or less amount; and although the sense of hearing may remain, still it must necessarily be imperfect. Those cases reported by writers where, notwithstanding these malformations, the hearing still continued good, were either not closely investigated, or present themselves as exceptions to the general rule. It must be remembered that in most cases of congenital malformation of the auricle, some defective condition of the external auditory canal, or of the middle ear, will be present.

In the way of treatment but little can be done in these cases; where the malformation is due to defect or arrest of development, the inconvenience may sometimes be palliated by instruments, as, ear trumpets of proper shape, artificial caoutchouc auricle; where several auricles, or separate parts of an auricle are present, and where there is an excess of development, the interference of surgery will be required to give its proper form to the ear as nearly as possible.

2. *Acquired Malformations*, in which the auricle is flattened and rests upon the part of the head behind it, or on the temple, instead of forming with it a slight angle opening forward; this condition of the auricle interferes very much with the perception of sounds, and is very difficult to treat, the only chance of benefit being in the employment of small ear trumpets. It is generally produced by the bad habit of parents in covering the heads of their children to excess, imprisoning their ears, interfering with their free growth, and impressing upon them a faulty direction; likewise, by the habit of tucking the ears under the hat when it is worn.

Wilde, in speaking of malformations of the external ear, states, that "Congenital malformations and abnormal peculiarities of the external meatus and auditory canal are by no means uncommon; the passage is frequently smaller, and often more tortuous than natural, and it has been found closed with a polypus excrescence at birth. There is great variety in the length, calibre, and curvatures of the sides of the external auditory passage among different persons,—perhaps just as much as there is in the shape of the nose, the auricle, or any other feature of the face. I had no idea how much diversity existed in the auricle until I began to study diseases of the ear; and latterly I have so frequently observed congenital peculiarities and malformations of the auricle in persons who have applied for advice on account of some aural disease, that I have been forced to the conclusion, either that these peculiarities occur much more frequently than is supposed, or that, in some way which is at

present unaccountable, persons possessing such peculiarities are more subject to aural diseases than the rest of the community."

3. *Deformations of the Auricle.* These are the results of injuries or diseases, the most frequent of which are as follows:

a. Wounds. When produced by pointed or pricking instruments, are not, as a general rule, followed by any serious results; but when they are occasioned by a cutting instrument, they may cause a disfiguration of the auricle from faulty cicatrization of the wound. To avoid this result, the practitioner should not hesitate to immediately reunite the parts, even by sutures passed into the cartilage itself, if it be necessary. Instances have occurred in which adhesion took place, even after the part had been completely removed. Lint, spread with white of egg, and applied so as to keep the parts in strict apposition, is stated, by Wilde, to have been used with much advantage.

Occasionally, eczematous eruptions, or erysipelatous inflammation may follow a piercing of the lobe, or other portion of the ear, with a pointed instrument; but, this occurs so seldom as to warrant us in introducing sutures, as above named, in cut wounds of the auricle. The occurrence of these cutaneous affections must be met by the appropriate measures.

Wounds, the result of blows or blunt instruments, are more serious than those effected by cutting instruments. An immediate reunion of the parts is not practicable; the lacerated, torn, or gangrenous margins of the wound must be partly removed before cicatrization will take place. And as the cicatrix is generally extensive, it modifies the form and structure of the auricle sufficiently to interfere with the hearing in many instances.

b. Bruises of the auricle are common among prize-fighters, boxers, wrestlers, etc. The results of the blows, pressures, and bruises of the auricle, are, detachment of the skin, separating to a greater or less extent from the cartilage, and forming a sac or pouch filled with blood. A repetition of these bruises eventually determines a hypertrophy of the subcutaneous cellular tissue. And those who engage in these rough exercises, usually have an increased development of their ears; the integuments are redder, thicker, have lost their pliancy, and form a kind of rounded swelling, frequently of such monstrous dimensions, that the auricle falls like that of certain animals.

When these contusions have been repeated, it is by no means rare to have sanguineous cysts (hematocele) form on the external

surface of the auricle. These cysts are met with among fighting characters, as well as among the insane, due, in the latter instance, to the personal violence which is sometimes used toward them.

These cysts are mostly situated on the external part of the auricle in the cavity of the helix, and may affect both ears, more commonly but one. Obscure fluctuation and sometimes a slight degree of crepitation may be observed, and the skin presents an ecchymosed appearance; the hearing is intact, and the general health good,—though, at times, cases will be met with in which the growth will advance so as to close the external meatus. These growths are more apt to be met with among cachectic, scorbutic, or strumous habits, as well as among those who are disposed to cerebral congestions and paralysis. If not properly treated they ultimately occasion great disfiguration of the ear.

The matter in these cysts is generally of a sero-sanguineous character, which may be allowed to discharge by a puncture or a free incision into the sac; lint is then introduced into the cavity, with Tincture of Iodine, or other stimulant to excite suppuration, granulation, and union of its walls. If the auricle remains thickened, it may be painted over with a liquid composed of Iodine one drachm, Iodide of Ammonium two drachms, Water two ounces and a half. This may be repeated every second or third day. Methodic compression of the parts will sometimes prove a useful auxiliary measure in the treatment. In some obstinate cases, a seton passed longitudinally through the thick and indurated part will be of some efficacy; but this has in several instances occasioned inflammation, followed by abscess.

4. *Tumors of the Auricle* are of two kinds, viz., erectile and fibrous. The erectile tumors exhibit themselves under two forms, arterial and venous. *a*. Arterial erectile tumors occupy a great part, if not the whole of the auricle; this organ presents a reddish tint, more or less violent pulsation, increases in volume, and the dilatation of the arterial branches of the ear extends into the vessels of the neighboring parts. By pressing upon the artery, near its source, the tumor lessens in size, and becomes flaccid, but resumes its volume on removing the pressure. Venous erectile tumors are generally circumscribed, and appear in the form of bluish maculæ, of a livid, repulsive aspect.

In the treatment of the more severe cases, with dilatation of the blood-vessels, ulceration, and hemorrhage, it will be necessary to ligate the auricular arteries, and should this prove insufficient, the

carotid artery will require ligation, in order to save life. But if these tumors are isolated and without complication, they may be treated by cauterization, filiform setons, injections of Perchloride of Iron, or vaccination.

b. Fibrous Tumors of the auricle are usually of slow growth, and may attain a considerable size; they are not apt to be painful. When they become so large as to present a deformity, they may be removed by a surgical operation.

5. *Fracture of the Cartilage* of the auricle may, notwithstanding its ordinary flexibility, occur, more especially when the ear is forcibly, or suddenly and violently doubled up, and which will interfere with hearing in proportion to the character and extent of the injury. An ear trumpet may lessen the deafness.

6. *Burns* or *Scalds* of the auricle are more common among children, and are apt to be accompanied with an analogous burn or scald, of greater or less extent, of the face. Although not serious as far as life is concerned, it may seriously affect the function of hearing. The inodular tissue of the cicatrix disfigures the affected organ, and thus, mechanically, interferes with the action of the sonorous vibrations.

To prevent the sad consequences of a faulty cicatrix, the aurist will, beside his local applications to the burn, be careful not to permit any obstruction to the external auditory canal; he will also keep the auricle at its proper angle of insertion, as well as protect the various inequalities of its surface.

7. *Cutaneous Affections* of the auricle are frequently met with, and, if not successfully treated, may extend into the external auditory passage, affecting its walls as well as the outer layer of the membrana tympani. The most common affections of this kind, are the following:

a. Chronic Erysipelas of the auricle may be the termination of the acute form of the disease, or it may appear independent of this. It is of a very annoying character, and is often exceedingly intractable to treatment. The auricle becomes thickened and hardened, with the skin of a dark buff color, and the meatus considerably lessened in calibre. Sometimes the ear loses its natural form, and its surface becomes exceedingly tender. It may occur

at any period of life, but more commonly among females who have passed the "turn of life."

Poultices of Elm and Lobelia will be found of service, especially when assisted by other local applications, as, solutions of Sulphate of Iron, Perchloride of Iron, Nitrate of Silver, Sulphate of Zinc, or of Iodine and Iodide of Ammonium, etc. Or, the treatment named below for Eczema, may be successfully pursued in many instances. (*See Erysipelas*, page 1065.)

b. Eczema Aurium. This disease may be confined to the auricle, or it may extend into the external auditory passage; it may also occur in connection with eczematous eruptions on other parts of the body. It is often met with in children, but more frequently in females somewhat advanced in years; it may, however, exist with both sexes, and at all periods of life. The auricle is more or less irritated, smooth, shining, and deep red, and generally speckled with yellow patches of thin branny scales; sometimes there is a discharge of a thin ichorous matter. In some instances, especially among adults, the auricle becomes hypertrophied, loses its natural shape, and becomes hard, thickened, and lumpy.

The disease, when occurring in the auditory passage, is frequently the result of introducing pins, ear-picks, and acrid substances within the meatus. In this case, a fullness in the ear is frequently experienced, but the most troublesome symptom is the itching, to allay which, pins, ear-picks, etc., are frequently introduced so as to scratch the parts; this, however, affords but a momentary relief, while it aggravates the disease. The meatus becomes red, sensitive, and sometimes tumefied; its calibre becomes diminished, in proportion to the amount of infiltration of its walls, and it is sometimes so narrowed as to prevent an ocular inspection of the membrana tympani. A thin, watery or whitish discharge from the meatus is generally present, more or less profuse, and fetid unless the canal is frequently washed out with a syringe. Sometimes, however, the meatus, as well as the external surface of the membrana tympani, will be dry and scaly. The meatus will often be blocked up with large quantities of epithelial scales thrown off from its surface, with more or less cerumen intermingled; though, as a general rule, the ceruminous secretion is arrested in this disease.

Audition may continue unimpaired; but when deafness exists, its degree will depend upon the amount of infiltration of the walls of the canal, upon the quantity of accumulated discharge and epithelial scales in the meatus, as well as upon whether the membrana tympani, and the tympanum are involved or not. In

quite a number of cases, the drum membrane will be found thickened and opaque. An examination of the external meatus is best made in this affection, with Wilde's half speculum or gorget.

Treatment. This disease is often very difficult to cure, both on account of its being frequently associated with some constitutional taint, and the trouble in making local applications to the meatus in a thorough manner. And when the parts affected have undergone a change in form and texture, it requires a long and tedious course of treatment to restore them to their original condition.

The first thing to be done in treating this disease is to keep the parts as clean as possible, for which purpose the affected auricle must be washed two or three times a day with tepid water, and if the meatus is also affected, it must be washed out, at least twice a day, with a good syringe and warm water, both for the purpose of removing accumulated matters, and soothing the irritable membrane. If the meatus be dry and scaly, a little Almond Oil dropped into it, will soften the particles and facilitate their subsequent removal with the syringe. To allay the itching warm poultices of Elm and Lobelia, or of Elm and Hops, may be applied over the auricle, and then covered with oiled-silk to prevent evaporation; or the meatus may be exposed to the action of warm vapors from water alone, or from sedative infusions.

Various agents have been found useful as local remedies, in removing this obstinate complaint. When one of these is to be applied within the meatus, it may be accomplished by means of a small camel-hair brush holding some of the substance within its fibres; the brush, after having been passed within, for about half an inch, should be gently twisted around, so that every part of the walls may be touched by the medicinal substance. At first, this occasions considerable pain, which, however, remains only a short time; but as the disease improves, the pain will lessen more and more. When the action of the remedy is too severe, an injection of warm water, will generally check it at once; warm soap-suds, if an oil or ointment be used. The applications should always be made by the aurist himself, and be repeated as often as indications require.

Among the best agents are, Solution of Caustic Potassa, ten grains to the fluidounce of Water, up to thirty grains, being careful to graduate the strength of the solution according to the severity of the disease, and not to permit the stronger solution to come in contact with the drum membrane. Indeed, three to five grains of the Potassa to the ounce of Water, will be sufficient for this membrane. If the disease improves under this application, the uneasiness in the

ear subsides, the meatus becomes wider, a large quantity of serous fluid exudes, which, however, gradually diminishes in amount. the hearing improves, and the affected parts assume a healthy appearance. After the disease appears to be gone, a weak solution, three grains to the ounce, should be applied every day or two to the parts, in order to prevent its return. A very effectual remedy in erysipelas and many cutaneous affections of the auricle, is a mixture of one part of Carbolic Acid and three or four of Glycerin, which may be applied by means of a brush; if too severe, the quantity of Carbolic Acid may be lessened. Or, the following may be applied; mix together one drachm of pure Carbolic Acid, half a drachm of Liquor Potassa, and four fluidounces of Distilled Water.

Wilde recommends a solution of Gutta Percha in Chloroform to be painted over the part several times, until a complete coat has been formed; which should be repeated from day to day, as often as it peels off. Solution of Nitrate of Silver; Citrine Ointment; Solution of Sulphuret of Potassa one part to twenty parts of Water; Turbith Mineral one part to twenty parts of Lard or Rape Oil; Zinc Ointment; Tincture of Chloride of Iron; Solution of Sugar of Lead, etc.; have all been used with more or less benefit, according to the statements of writers. The same rules as regards diet, exercise, attention to skin and bowels, etc., that are necessary to pursue in other forms of chronic disease, are also required here. If constitutional means are indicated, the Compound Syrup of Yellow Dock, or solution of Iodide of Ammonium may be administered. (*See Ezcema*, page 1018).

Other cutaneous affections of these organs require to be similarly treated, according to the character of the disease; and the remedies for which will generally be the same as indicated for these maladies when existing upon other parts.

8. Just above the insertion of the sterno-mastoid muscle, and on a line with the external meatus, will be found a small gland, lying upon the mastoid process, which occasionally swells and becomes irritable and painful. Young females are peculiarly liable to it. It does not readily yield to treatment. Tonics and chalybeates internally, with local applications of Compound Tincture of Iodine, may be employed.

Scrofulous ulcers, tumors, abscesses, etc., occurring upon the auricle or parts around it, require the same treatment as when seated elsewhere. Abscesses are apt to be attended with diseased bone.

Tumor of the mastoid process, caused by accumulations of matter,

in connection with the mastoid cells, and being either the result of acute or chronic inflammation of the middle ear, have already been referred to, as far as treatment is concerned, under the head of *Perforation of the Membrana Tympani*, and *Perforation of the Mastoid Process*, on pages 1252 and 1253. These tumors, if not attended to promptly and in time, prove fatal.

DISEASES OF THE EXTERNAL AUDITORY CANAL.

1. *Malformations of the External Auditory Canal.* The external auditory canal may be absent, or imperforate; a few cases of each of these malformations have been met with.

The *imperforation* may occur in two ways; the skin may pass in the auditory canal and completely close it up. A simple incision will suffice to open it to a normal condition,—but, before attempting the operation, we must make sure that the canal exists behind the obstacle that closes its entrance.

Or, a membrane may be developed either across the entrance of the canal, or at a point more or less distant from it. The treatment will consist in the excision of this membrane. If it is not situated very deeply within the canal, the operation will be very easy; in the contrary case, we must carefully guard against injuring the walls of the canal, and especially the membrana tympani. Perhaps instances may be met with where the false membrane can be removed by caustic.

Stricture of the auditory canal is of more frequent occurrence than its obliteration by a false membrane. It may be either congenital or acquired, depending upon an exostosis developed on the walls of the canal, and which, if of syphilitic origin, may yield to some preparation of Iodine, or other antisyphilitic. It may be due to swelling of the soft parts, as is frequently observed among children who have suffered from inflammation of these parts. In this case the treatment will consist in gradual dilatation, by means of prepared sponge, gentian root, etc., and which must be continued for a long time, in order to prevent a relapse. Also, using mild astringent injections in the absence of irritation or inflammation; or, still better, moistening the walls with a solution of Tannic Acid in Glycerin.—If the stricture be due to a congenital lesion of the osseous portion of the tube, nothing can be done.

If the stricture be owing to a union of the opposite walls, from inflammation or ulceration, and if it be located at the entrance of the canal, the adhesions may be destroyed by a blunt probe, a

bistoury, or trocar, and the opening so made, should be dilated by the introduction of prepared sponge, gentian root, etc. But if the absence of the auditory passage be congenital, nothing can be done.

Hardness of hearing is frequently due to an anomaly in the direction of the auditory canal; as this is seated in the osseous part, it is beyond the reach of art.

2. *Foreign Bodies in the External Auditory Canal.* These bodies may be animate or inanimate. Among the first, are divers insects, as, ants, worms, fleas, flies, earwigs, and even maggots, resulting from a hatching of the eggs deposited around the external orifice by large meat-flies. These insects sometimes occasion intolerable pains, depriving the patient of sleep; sometimes, the brain will be sympathetically affected,—there will be delirium, coma, or even lethargy. Epilepsy, and even death have been known to follow the introduction of foreign bodies into the ear, as well as after rude and forcible attempts at removing them. The diagnosis of living bodies in the ear is not more difficult than that of ceruminous obstructions. The patient may have slept upon the ground, and the insect may then have easily entered the passage, since which there has been a suppuration from the ear, constituting a form of *Otorrhea.* An examination with the speculum will at once enable the physician to determine the presence of a foreign body.

The *treatment* is very simple, viz., to remove the insect by an injection of warm water, which, as a general rule, will answer the purpose. (*See* page 1256.) But, sometimes, from the large size of the insect, or other cause, other means will be required. If the tepid water will not kill and remove them, it will be necessary to introduce some substance into the ear, in order to destroy them, and thereby prevent any irritation from their movements or struggles. In their dying struggles insects are apt to fasten their claws upon some part of the auditory passage, in which case, they are not very easily detached. Almost any simple substance will effect their destruction, as, tepid water, Olive Oil, Oil of Sweet Almonds, Mucilage, Decoction of Wormwood, or of Hops, solution of Tannic Acid twenty grains in Glycerin one ounce, etc. In introducing the fluid into the ear, the patient should incline his head to the opposite side, and retain the fluid in the canal for some time, in order to be certain of the death of the insect; after which, it may be removed by one of the means named presently.

Among the inanimate bodies which may be introduced into the ear, are beads, glass, marbles, peas, cherry-stones, small pebbles,

grains of corn, pins, paper balls, etc.; if allowed to remain they may become a source of inflammation or suppuration (*Otorrhea*); some of these bodies are more hurtful than others, especially the seeds, which swell up after a time, distend the canal, and occasion much suffering.

The *treatment* consists in removing these bodies by syringing; if, after a proper and sufficient syringing, they still remain in the ear, their extraction must be undertaken by a careful employment of Toynbee's lever ring forceps, or, his rectangular forceps, being very cautious not to injure the ear, or the membrana tympani. Thus, it may be necessary to cut or break the foreign body, to employ a curette, etc. In some instances, even these may fail, and such measures must be adopted as the circumstances will suggest. In the American Journal of Medical Sciences, for October, 1858, p. 409, will be found the description of an instrument for removing certain foreign bodies from the ear, made by Mr. J. H. Gemrig, surgical instrument maker, Philadelphia. As it is necessary in these operations to have the patient perfectly quiet, it is better, with children, to administer chloroform, than to run the risk of injuring the ear, by fruitless attempts to use ear forceps or other instruments with a frightened, screaming, and struggling child.—Any inflammation remaining after the extraction of the body, must be treated, according to its severity, by antiphlogistic means, as, warm emollient and anodyne injections, warm anodyne vapors, etc., protecting the canal from the influence of cold air by loosely placing a plug of cotton in the meatus.

3. *Ceruminous Concretions.* The external auditory canal may be obstructed by ceruminous masses, and which is a cause of deafness that should always be present to the mind, so that we may not pronounce a case of deafness incurable, which may be cured by one or two injections of warm water. The cerumen or wax of the ear is an unctuous, amber-yellow secretion, somewhat resembling honey, and which is secreted in the auditory canal by small glands called "ceruminous." This wax may form concretions in the auditory canal, varying in size from that of a grain of hemp, to a size large enough to completely obstruct the canal.

The color of these ceruminous collections varies from an amber-yellow tint to a dark-brown, and even to a black; at first, not having been long exposed to the air, the cerumen is yellow; at a later period, the particles floating in the atmosphere are deposited upon the collection giving to it a darker and darker-brown color, and finally, it

becomes completely black. This black appearance is not owing to any morbid change in the cerumen, but only to its admixture with the small particles of dust which are deposited upon it. The consistence of these collections also varies considerably; at first, they are soft, semi-fluid, but gradually assume a firmer consistence, until they may become so hard as to be taken for calculi.

When an accumulation of cerumen becomes so large as to fill up the auditory canal, the pressure it exerts upon the walls of this canal may occasion an inflammation; the inflammation causes a detachment of the epidermis, and the detached epidermis forming a layer upon the mass, increases its size; new layers of epidermis take the place of the detached ones, these, in turn are set free to unite with the wax, and thus the accumulation proceeds. Added to this, the inflammation is often so intense as to occasion suppuration; and then the pus, softening and detaching the epidermis, forms clots with it, which become detached to the ceruminous concretion. Independent of this last-named cause of increase in the size of the obstruction, we find another in the irritation of the ceruminous glands, the secretion from which is augmented. But, their secretion is generally suspended, when inflammation affects the tissues around them.

These collections also exert an influence upon the membrana tympani, inflaming its epidermic layer, and determining there, the same as upon the walls of the auditory canal, exfoliation and suppuration; and if the suppuration remains for a length of time, perforation of the drum membrane may ultimately ensue.

The *causes* of these ceruminous concretions are more commonly, the carelessness or neglect of patients with regard to personal cleanliness, or cleanliness of the ear. An irritable condition of the ceruminous glands, may render their secretion more abundant, and give rise to accumulations. Pressing the wax inward by means of a finger, or point of a towel; irritation of the parts by the introduction of pins or ear spoons; exposures to cold, and especially, cold with moisture, are among the causes, as well as all circumstances which will establish a superficial inflammation or irritation of the auditory passage. These collections may be met with at any period of life, but more commonly in middle life.

The *symptoms* of a collection of cerumen, are: pain, this is not always present, but when it does exist, is due to distension of the auditory passage by the ceruminous mass; deafness, which is constant, and is more or less complete in proportion to the size of the concretion; tinnitus, in all its varieties. The pressure exerted by the ceruminous concretion will also give rise to to various unpleas-

ant symptoms, as, giddiness, fullness in the ear, confusion of ideas, inability to walk, sense of weight and pressure on the head, etc.— Many patients complain of a whistling, rustling, or purring noise, the cause of which has been heretofore explained; and which they describe as being in the head, and fear an attack of apoplexy.— The hearing is usually better in the morning; it is lessened while the jaws are in motion; and, very often, after a crackling sound in the ear, the hearing becomes suddenly re-established.

The *diagnosis* of deafness occasioned by these ceruminous plugs in the ear, is always easy. The patient has not been in the habit of cleansing his ears, or else he has had a discharge from the ear for a longer or shorter period.

Upon an examination with the speculum, which should always be made in all cases where it can be, and where it is not contra-indicated by pain, inflammation, etc., we will be able to see the accumulated mass, and an error in the diagnosis will be almost impossible, at least in the greater number of cases. One can hardly mistake a polypus, or a large perforation of the membrana tympani for one of these ceruminous obstructions. We may distinguish polypus by the impossibility of dissolving it in oil or tepid water, as well as by the other characters named hereafter when treating upon this morbid growth.

Perforation of the membrane can hardly be confounded with a ceruminous mass, if we examine with care. At first sight, this perforation will appear at the bottom of the canal as a blackish spot, because we see the tympanum through the aperture, which absorbs all the rays of light without reflecting any; this spot may appear of equal size with that of the auditory canal, and present an aspect resembling that of old ceruminous concretions, but, if we introduce a probe having a soft extremity, we will readily avoid any error in this matter.

As to the *prognosis*, I will remark that the greater number of patients recover their hearing, as soon as the obstruction is removed; as there is no other difficulty or lesion of the ear, the simple removal of the hardened wax is followed by a cure; though the tinnitus may continue for some time after the hearing has been restored.

Some recover their hearing only for a few hours, and the ceruminous obstruction is renewed; because there is with these patients some difficulty beside the obstruction, as, inflammation of the external auditory canal, and of the tympanum. At the same time that the auditory passage has been filled with cerumen, the tympanum is loaded with mucus secretions. Each of these conditions

is a cause of deafness; in removing one of them, the state of the patient is ameliorated, and he may fancy himself cured, but the illusion is not of long duration. To perfect the cure, the mucous matters must be likewise removed from the tympanum, by means of injections through the Eustachian tube.

Others do not hear for several days, or even several weeks after the removal of the concretion. Itard has given a plausible reason for this. He says, "the ear having been for a long time a stranger to the impression of sonorous vibrations, phenomena must occur with it analogous to those which happen when we remove the opaque crystalline lens of a person affected with cataract. At first he is dazzled, and can not distinguish objects; however, nothing prevents the luminous rays from falling on the retina, and he has to newly educate the sense of sight before he can render it of service to him. Similar phenomena occur in the hearing apparatus. A certain time is necessary in order that it may resume its functions, awake from its sleep, its lethargy, and when the sense of hearing has undergone, as it were, a new education in the method of perceiving sounds, when its sensibility has been newly awakened, the patient recovers the faculty of hearing."—Finally, some patients will experience no benefit from the removal of the ceruminous mass, because, in addition, there also exists another lesion of a more serious character, and which may be incurable.

The *treatment* consists in softening these concretions, and then removing them by syringing; examining from time to time, during the operation to ascertain what progress is being made, as, after the last portion has been removed, it is not desirable to continue the syringing. No pain should be produced by any of the operations for removing the hardened mass of ear-wax. Very frequently injections of tepid water, alone, will soften and dislodge the obstructions; or, warm Castile soap-suds may answer. Occasionally, however, they will be found so hard and impacted, and the parts so tender, that other agents will require to be used for softening them, as, the introduction into the ear, one, two, or three times a day, of warm Olive Oil; a Solution of Carbonate of Soda, one drachm to an ounce of Water; or, a mixture of equal parts of Olive Oil and Liquor Potassa, etc. Sometimes a single injection will suffice; at other times, several will be required. Very rarely indeed will an ear curette, or forceps be required. If, after the obstruction has been taken away, the membrana tympani continues vascular, or, whitish and moist, or thickened, it must be treated by the appropriate means hereafter referred to.

A *deficiency* in the secretion of the ceruminous glands is generally

the result of an inflammatory condition in the neighboring structures, more commonly the superficial, though sometimes, the deep seated; more or less deafness accompanies a deficiency of cerumen in the ear, and if the difficulty be of long standing, the external layers of the walls of the meatus, and of the membrana tympani, become thickened. These cases are difficult to cure, requiring time, perseverance and patience; alteratives, diaphoretics, stimulants, and tonics are useful. Iodine may be given internally, and likewise be applied locally to the membrana tympani and walls of the meatus, by means of a camel's-hair brush. Equal parts of Oil of Turpentine and Olive Oil, or, of Oil of Turpentine and Oil of Butternuts, applied to the meatus and drum membrane by means of a probe having its end covered with cotton, has been found very advantageous in many cases of deficient ceruminous secretion, as well as in cases where there was an abnormal secretion of it.

4. *Abscess in the External Auditory Canal*, differs only from those met with elsewhere, by their small size; they are more frequent in females than in males. They may be seated at any point of the meatus, but more generally near or at the external orifice, and either upon its anterior or posterior wall. They vary in size from a pin's head to that of a pea, and upward, and more commonly several of them appear in sucession. There is more or less pain, increased by touching the part, or by moving the jaws; an itching or burning heat, throbbing, buzzing, and sometimes a purring sound or tinnitus. After some time, a drop or two of pus, or perhaps a teaspoonful is discharged, and the symptoms gradually pass away.

The *treatment* is similar to that for boils or hordeolum; as, fomentations and poultices;—warm anodyne vapor;—tepid injections; and protecting the meatus from cold air by a tampon of cotton. When the tumor enlarges, or is painful and fluctuating, it may be opened to allow the matter to escape; and, generally, the abscess will then heal up. In some cases, constitutional treatment will be required, as well as remedies to improve the condition of the digestive organs.

5 *Sebaceous Tumors in the External Auditory Canal.* These tumors are due to glandular hypertrophy of the sebaceous glands. Growing in the auditory canal, they frequently become of quite a large size, so as to produce, without any pain being experienced, absorption of the bone, which may proceed so far as to form communica-

tions with the mastoid cells, the tympanic, and even the cerebral or the cerebellar cavities. The symptoms are deafness, fetid discharge from the ear, (*otorrhea*), or, those common to cerebral irritation; the latter being, generally, the forerunners of a fatal termination.

These tumors may be *determined* from bony tumors in the meatus, having the dermis covering them, by slight pressure with a probe; the osseous tumors will be hard and unyielding; the sebaceous, will be softer and yielding.

According to Toynbee, the only permanently successful treatment, is to thoroughly remove the whole tumor, together with its capsule. For this purpose a crucial incision must be made into the tumor, its contents be evacuated, and then seizing the firm wall of the capsule with forceps, withdraw the whole of it. If any portion should remain behind, it must be removed either by the forceps or caustic. Carbolic acid, one to three parts to one hundred parts of water, may be advantageously applied to remove the remaining portions; or, if it be desired to use it still stronger, from one to six parts of Carbolic Acid may be dissolved in six part of Glycerin, and applied.

6. *Molluscous Tumors in the External Auditory Canal* are by no means a rare disease, especially among persons of advanced age; they must not be confounded with the sebaceous tumors. They may be seated in any part of the canal, but more commonly at its superior and posterior part, near to the attachment of the membrana tympani. If their progress be unchecked they are apt to produce serious results.

Molluscous tumors, so called, from their supposed resemblance to the knots on maple bark, or to certain molluscous animals, originate in the skin or dermis, and have a color varying from that of a reddish flesh to that of a mahogany or copperish red, and which has erroneously led to the supposition that they were of syphilitic origin. They are of variable form, being roundish, elongated, flattened, or pedunculated, and have a soft, spongy, slightly-elastic consistence. As a general rule they ulcerate, present a bad appearance, and discharge a more or less acrimonious serous pus, (*otorrhea*); they may be absorbed without ulceration, or, form wart-like excrescences. When ulcerated, fungous vegetations sometimes shoot out. Their contents consist principally of epidermic cells, finely-granulated amorphous matter, some fusiform or ovoid bodies, oil globules, fibro-plastic nuclei, etc.

These tumors in the ear, gradually enlarge, fill up the auditory

canal, cause absorption of the layer of bone separating the meatus from the mastoid cells, and frequently extend into the mastoid cells; or, if the tumor be situated on the floor of the meatus, its lower osseous wall will be absorbed. They may also cause an absorption of the upper portion of the membrana tympani and of the adjacent bone, and, through the opening thus formed the tumor may extend into the tympanic cavity. When irritation of the dermis is produced by the size of the tumor, there will be more or less pain, catarrhal inflammation, and discharge.

The *treatment* consists in removing the contents of the tumor, by forceps or otherwise, and subsequently syringing the canal with tepid water two or three times a day. Stimulating applications applied to the tumor or ulcerated surface will frequently prove serviceable, as dilute Tincture of Iodine, dilute solution of Chloride of Zinc, etc., adapting the degree of dilution to the tolerance of the parts.—As the disease generally occurs in bad states of the body, constitutional measures will also be required, as, Iodide of Ammonium, Bromide of Ammonium, etc., with a well-regulated diet, exercise in the open air, and attention to the skin, kidneys and bowels.

7. *Osseous Tumors* are occasionally met with in the external auditory canal, more commonly at its middle third; though it may be located at any part of the bony meatus. These tumors consist of hard and dense bone, covered by the lining membrane of the meatus, which membrane is often thick, spongy, and deprived of more or less of its sensitiveness. When the irritation caused by their presence produces a chronic inflammation, there will be more or less fetid discharge, (*otorrhea*). When the bone is exposed, it will often appear white, glossy, hard, and insensible. The bony tumor is usually white, hard to the touch of a probe, smooth, with a broad base, and free from moisture.

The symptoms will vary according to the seat of the disease, the size of the tumor, and its complications with other lesions. At first there will be no symptoms heeded by the patient; until he finds that he is gradually becoming deaf, that there is a feeling of fullness, swelling, and weight on the affected side, with giddiness, noises, etc. The membrana tympani, when it can be seen, will usually be dull. The deafness may be continuous, or, especially when first observed, be intermittent. More than one tumor may be present at the same time, in the same meatus.

The *treatment* to be successful should be commenced at as early

a period as possible, giving internal alterative treatment, with an attention to the hygiene of the patient. If the membrane covering the tumor be thickened, it may be, at first, touched every four or five days, with a solution of Nitrate of Silver, (3j to the f3j); and afterward by Tincture of Iodine, or a solution of two drachms of Iodide of Ammonium, and one drachm of Iodine, in two and a half ounces of Water. This same solution, or an ointment made by substituting lard for the water, should also be rubbed daily behind the ear, over the mastoid process, and above the ear. The meatus, and especially that part beyond the tumor, should be kept free from all obstructions, either by means of forceps, or by syringing; and to prevent drops of water from entering the ear when the patient is washing his face, a small pledget of cotton wool should be inserted in the orifice of the meatus.

8. *Chronic Inflammation of the External Auditory Canal.* This inflammation has been divided into the two following forms:

a. Simple Chronic Inflammation of the dermoid tissue of the external meatus, *without discharge*, may follow an acute attack, or it may be *caused* by cold, residing in a moist atmosphere, irritating the ear by picking it with a pin, ear-pick, or other body, or irritation from other causes. Sometimes it accompanies certain impaired conditions of health attended with debility of the general system. Ordinarily the symptoms are not very severe; frequently the only symptom present will be a severe itching within the meatus; at other times, the ear will feel as if filled up, or distended, with or without a slight degree of pain accompanying. If an examination be made, the dermis will be found red, more or less denuded of epidermis, more or less swoln, sometimes to such a degree as to lessen the calibre of the canal one-half; and large flakes of epidermis will be thrown off, often in such quantities as not only to obstruct the meatus, but to dilate it, giving rise to acute inflammation, or even to disease of the bone.

The *treatment* consists in first syringing the canal with tepid water, so as to cleanse it from the irritating flakes of epidermis; and which syringing should be continued from time to time during the course of the disease, so long as the epidermis continues to accumulate within the canal. About six or eight ounces of water should be used at each syringing, which should be repeated two or three times a day; and, as this operation is apt to cause great pain where the surface of the meatus is extremely tender and sen-

sitive, it should be performed with care and gentleness. The following may also be rubbed well in behind the ear, and upon the back part of the ear, and will be found of great service: Take of Aconitina two grains, Acid Hydrocyanic, diluted, one drachm, Glycerin half an ounce; mix. A small portion, only, to be used at a time.—A drop or two of this rubbed over the walls of the external meatus, will also be found useful to relieve severe pain.

After the inflammatory symptoms have subsided, or, in cases where the dermis is congested but without much tenderness, a weak solution of Nitrate of Silver (five or ten grains to one ounce), or, a solution of Chloride of Zinc (two or three grains to one ounce), may be applied upon its affected surface by means of a camel's-hair brush, and be repeated twice a day. Sometimes a solution of Tannic Acid (four or five grains to one ounce), will answer a better purpose than either of the preceding. Should the patient reside in a damp place, it may be necessary for him to remove to a dry one before a permanent cure can be effected.

b. Chronic Catarrhal Inflammation of the dermoid tissue of the external meatus, *with discharge*, frequently follows idiopathic acute catarrhal inflammation of the meatus, as well as when this acute inflammation attends measles, small-pox, catarrh, scarlet fever, typhoid fever, etc. It may also be due to frequent exposures to cold, cold and dampness, to injuries of the part, to teething, to the improper application of stimulants to the ear, etc., and is more common among lymphatic or scrofulous persons, or those suffering from impaired health. Children are especially liable to it. It is a very obstinate and difficult disease to remove, frequently requiring ten or fifteen months of treatment before a cure can be effected, and, in many instances, proving intractable to all remedial measures.—Irritation of the tympanic cavity is frequently attended with catarrhal discharge from the dermis of the external meatus, as well as from the dermis of the membrana tympani, which symptoms cease with the removal of the irritation.

The *symptoms* vary according to the cause. When it follows a previous acute attack there will generally be more or less dullness of hearing, a dull pain in the tragus and its neighborhood, little or no redness of the affected part, but considerable heat and swelling, with tinnitus, and an abundant discharge. Under other circumstances, the first symptom may be a slight itching in the ear, with or without the discharge of a few drops of a watery fluid daily; again, pain may be the first symptom noticed, while, in

other instances, the discharge itself will be the first symptom that will attract the patient's attention. Sometimes, there will be considerable irritation within the canal, with a sanguineous discharge; this latter symptom is very apt to exist when the disease is complicated with polypus. Generally, the dermoid layer of the canal will be found either congested, or hypertrophied. Pressure made upon the tragus, or directly in front of it, will produce pain; and when this pain is present, a small engorged ganglion may be observed underneath the lobe.

In this malady, the principal thing that annoys the patient or his friends is the discharge; this is more or less profuse, varying in color from milky white to dark slate, sometimes bloody, generally, very offensive, and constituting one form of *otorrhea*.* The matter discharged mixes with water forming an opaque fluid; it has no

* Otorrhea, or a chronic discharge from the ear, is generally described under a separate head, notwithstanding it is a very common symptom, one of a serious character, and which may be owing to several lesions of the ear.

Triquet makes the following remarks in relation to this symptom, its causes, treatment, etc.: "There is not a practitioner, however little versed in the knowledge of diseases of the ear, who has not been struck with the interminable duration of these discharges, the difficulty of curing them, the dangers attending them, and the fatal results frequently following them. . . . . The symptoms of otorrhea have a great analogy, whatever may be their seat. . . . . The discharge is at first simply mucus, then pus globules become added, gradually it becomes muco-purulent, and by insensible degrees it becomes wholly purulent.

"Idiopathic otorrhea is that which recognizes for its cause a primitive disease of the ear, an external or internal otitis, catarrhal, phlegmonous, or periosteal, an inflammation of the membrana tympani, or the presence of a foreign body in the ear; also external periosteal otitis, and granulations of the membrana tympani. Symptomatic otorrhea is, on the contrary, a discharge, the origin of which exists outside of the auditory apparatus. For instance, we have a symptomatic otorrhea when a collection of pus, formed near the ear, is discharged into the tympanic cavity, or in the auditory canal through the fissures of Santorini; also, when it originates in abscess of the parotids, caries, necrosis of the petrous portion of the temporal bone, or of neighboring bones, exostosis of the tube, etc.; and, as remote causes, the influence of syphilitic and scrofulous diatheses. It may also occur during catarrhal epidemics, characterized by a general affection of the mucous membranes of the eyes, nose, fauces, as well as of the ears. The discharge may also flow through the Eustachian tube.

"The symptoms of otorrhea are the symptoms of the diseases giving rise to the aural discharge. Thus, for otorrhea following external catarrhal otitis, the patient has been exposed to cold and dampness, there is a painful point immediately in front of the tragus, and a swoln ganglion underneath the lobe.—An otorrhea determined by the presence of a foreign body in the auditory canal, will be detected by the commemorative symptoms, and an examination of the canal. We may also ascertain if the otorrhea be due to a polypus, by this examination. If nothing be found in the external auditory canal, observe if the membrana tympani be inflamed, or perforated, or if the discharge comes from

collections of mucus in it, except when polypus is present, or when the fibrous layer of the drum membrane is ulcerated.

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the tympanum, and should be attributed to an internal otitis; also ascertain whether the internal otitis is catarrhal or phlegmonous.

"After having recognized all the symptoms of the diseases that may occasion the discharge, we will next consider its quality and quantity; it may be mucous, muco-purulent, or purulent. Its quantity will be found to vary, even from one day to another; and we will observe that when the otorrhea diminishes, this diminution will be accompanied by general symptoms, an uncomfortable feeling, vertigo, loss of appetite, vague pains in the limbs, and a feeling of extreme lassitude. When the discharge returns to its original quantity, these symptoms disappear. Add to these symptoms the habitual fetor of the discharge, always considerable, and we have all the characters of otorrhea.

"Persons affected with otorrhea sometimes present a symptom which may give rise to very serious consequences, but which may be easily remedied, I mean obstruction of the auditory canal and the retention of pus. This obstruction may be due to the pus drying and forming crusts which entirely fill the auditory canal, or else to an inflammatory swelling of the soft parts which form the walls of this canal. The consequence of this retention of pus, may be the flow of the pus into the internal ear, into the cranial cavity, or else the formation of mastoid abscesses; and, lastly, the passage of the pus into the cellular tissue of the neck. . . . . .

"The complications of otorrhea are numerous; as, caries of the mastoid process, paralysis of the facial nerve, flow of pus into the labyrinthine cavities, meningitis, abscess of the neck, and metastatic abscesses. . . . . The formation of the mastoid abscess is generally the primitive lesion that eventuates in caries. At other times, the pus does not come from the tympanum, it is secreted within the interior of the mastoid cells themselves. It may be due to an inflammation of the mucous membrane alone, and then, the caries is the result of the abscess; but, in some cases, the caries is the primitive affection causing the suppuration. Whatever may be the origin of this suppuration, it may convert the mastoid process into a single cavity distended by pus, a true burrow.

"After a greater or less period of time, the walls of the process become thin, raised up, and ultimately permeable. The pus is effused into the cellular tissue, and forms what has already been pointed out as abscess of the neck. In passing from the mastoid process, the pus spreads throughout the whole length of the sterno-mastoid muscle, behind it, behind the deep-seated coat of its sheath; it may descend even to the clavicle, but, more commonly, it does not go so far, and the purulent collection is arrested at the middle part of the neck. The deep-seated coat of the sheath of the muscle, becoming inflamed by the contact of the pus, after a time, forms of itself a source of suppuration. At the same time, the deep-seated lymphatic ganglions of the neck become engorged.

"We may also observe at the base of the mastoid process, a fluctuating tumor, manifestly communicating with the purulent collection in the tympanic cavity; and, by palpation, we may feel along the sterno-mastoid muscle a chain of engorged ganglions, which may reach as far as the clavicle. All these small tumors are painful; at first hard, they soon soften and become so many small purulent centers; after having been distinct from each other, they coalesce and form with the original one, a spacious burrow. At the same time that these abscesses form, there will frequently be symptoms of torticollis, contraction of

When the dermoid layer of the membrana tympani becomes affected by the inflammation, it becomes congested, and often

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the sterno-mastoid muscles, and sometimes, spasmodic movements of these muscles.

"I have treated a patient with whom there was an effusion of pus behind the sterno-mastoid muscle; there were spasmodic contractions on both sides, movements of inclination of the neck, either to one side or the other, which motions were analogous to those observed in chorea. Added to these symptoms there were encephalic disturbances, indicating a commencing encephalitis, as, for instance, cephalalgia, a tendency to coma, and contractions alternating with convulsive motions of the whole of the right side. Fortunately, the energetic treatment pursued, consisting especially of revulsives, effected a cure. . . . . .

"*Paralysis of the facial nerve*, sometimes met with, is due to the suppuration (having caused the osseous laminæ forming the walls of the auditory canal, or of the tympanic cavity, to give way), finding its way into the canal of Fallopius and coming in contact with the facial nerve. This nerve, then being irritated or inflamed, remains without the power of transmitting nervous influence to those muscles it ought to animate. At other times, the suppuration does not reach the facial nerve itself; it stops at a certain distance in the canal of Fallopius; but it produces an ostalgitis in the osseous layers forming the walls of this canal, the consequence of which is, hypertrophy of these layers, diminution of the canal containing the facial nerve, and thence compression of this nerve.

"Or, again, the discharge, limited at first to the external auditory canal, determines an inflammation of the membrana tympani, and then an internal otitis; the suppuration may then reach the deeper parts of the ear,—it may penetrate into the labyrinthine cavities, either through the fenestra ovalis, which becomes opened when the stapes has been dislocated, or, through a loss of substance caused by the ostalgitis and caries of the osseous partitions which separate the internal from the middle ear.—This inflammation of the internal ear is a serious complication. The pain is violent, and we have to fear meningitis or meningo-encephalitis.

"Inflammation of the brain or of its membranes is always a consequence of pus passing into the cranial cavity, whether it passes directly from the tympanum into this cavity, or, reaches it only after having traversed the labyrinthine cavities. . . . . .

"The *diagnosis* of otorrhea is based upon the symptoms which have preceded it, and upon the diseases which have occasioned it; and which have been, each, studied separately throughout the work.—The *prognosis* of this affection is unfavorable; indeed, we generally have to fear that the discharge will continue for a long time, and that the hearing will never be restored. It becomes still more unfavorable, when any of the above named complications are present. . . .

"The *treatment* must be at the same time general and local. The general treatment must be directed against the presumed general cause of the otorrhea. If the patient is of a strumous diathesis, Cod Liver Oil, ioduretted preparations, tonics, sea-bathings, salted water baths, iodine baths, etc. The physician will employ these different means, alternately, without pursuing any one of them exclusively; he will successively pass from one to the other, satisfied that the system becomes accustomed to only one kind of treatment, and that, if this be too long continued, it will gradually cease to exert a remedial influence upon the system.—Thus he may commence with the ioduretted preparations and salted water baths; if the patient's pecuniary circumstances will allow, advise sea-

hypertrophied; changes its color and form; its external surface becomes flattened; and the processus longus, and, in many instances,

bathings for a season. Then follow with chalybeates, tonics, bitters, generous wines in moderate quantity, roasted meats, toasted bread, etc. When, by these means, long continued, we have materially modified the economy, the time will then have arrived for the commencement of the local treatment.—If a syphilitic taint be present, an antisyphilitic treatment will be required; if a scorbutic diathesis, antiscorbutics will be indicated; if the otorrhea be due to some febrile disease, we must facilitate convalescence by a tonic, analeptic treatment, residence in the country, etc.

"As to local treatment, it will principally consist in revulsives, drastic purgatives, caustics to the temple, and mastoid processes, or even moxas, and a seton to the neck.—We may also shave the head of the patient, and rub it well with the balsam of Fioravanti,* or any other stimulating tincture. The wearing of flannel should be advised, as well as vapor baths, and sudorific infusions, to excite the functions of the skin. At the same time, employing only emollient injections, into the ear, to favor the discharge, or even to increase it, while its acridity and fetor is being diminished.

"Only, after having continued the use of these means for a long time, to modify the entire economy, will it be prudent to attempt measures to diminish and suppress the morbid discharge, by astringent and substitutive injections. . . . . Itard prefers a solution of Subcarbonate of Potassa two drachms, dissolved in two pints of water; or, Caustic Potassa one drachm in Rose-water two pints; or, Wine of Lanfrance two drachms in Rose-water four ounces. These are to be warmed previous to injecting, and employed twice a day.

"But these means should be employed only with great reserve. If the discharge should suddenly diminish or even cease, and the patient at the same time be seized with serious encephalic symptoms, the astringent injections will have to be wholly suspended, and all possible means be employed to recall the flow. For this purpose, Itard recommends half of a loaf of bread from the oven, as hot as can be borne, to be placed over the diseased ear, and also to make use of irritating injections. . . . . At the same time, we must return to the revulsives, purgatives, and sudorifics. The astringent injections should not be resumed again, until after a longer or shorter time, and with great cautiousness. It is only by prudent, judicious, and slow treatment that we will be able to suppress otorrhea without having to fear the serious complications spoken of above. . .

"As to the complications, meningitis must be promptly combated by leeches to the mastoid process, or to the anus; ice to the head; revulsives; seton in the neck; caustics; moxas; and drastics.

"Abscess of the neck must be opened by successive applications of Caustic Potassa. If the opening of the abscess becomes fistulous, irritating injections must be passed into it, as, for instance, of Solution of Iodine. These injections will not only modify the condition of the fistulas and the abscess, but they will penetrate within the mastoid process, and into the tympanum. If there is a perforated drum membrane, they will at the same time, run out through the Eustachian tube, and through the external auditory canal.

* Balsam of Fioravanti is a French remedy, the product of distillation of resinous or aromatic substances, as, turpentine, myrrh, elemi, canella, cloves, ginger, etc., after having macerated them for several days in alcohol. The first alcoholic product obtained by distillation from a sand bath, is the article referred to.

the processus brevis, are completely concealed by it. (*Toynbee.*) Deafness invariably accompanies this complication.

Treatment. The pain and irritation must be overcome by frequently cleansing the canal with a syringe and warm water; as well as by local applications of warm vapors from anodyne infusions, warm fomentations, etc., at the same time attending especially to the condition of the skin, bowels, kidneys, and general hygiene of the patient. In connection with which, such constitutional remedies must be administered as are indicated by the general condition of the system, as, tonics, chalybeates, alteratives, etc.—The syringing with tepid water should be practised daily, during the whole course of the treatment, whatever other measures are employed. And if there be much fetor in the discharge it may be entirely overcome, and a healthy stimulus be imparted to the tissues, by injecting a solution of Carbolic Acid one to three parts in two hundred parts of Water; if necessary, this solution may be made still stronger, or, a dilute solution of Permanganate of Potassa may be used. The application of the aconitina mixture mentioned above, will also be found useful.

As soon as pain and irritation have been removed by these measures, we must, in severe cases, carefully apply to the surface of the meatus, by means of a camel's-hair brush, a solution of Nitrate of Silver (ten to forty grains to the fluid ounce), and which may be repeated every third or fourth day. Or, a solution of Chloride of Zinc (three to six grains to one ounce), or, of Sul-

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"These injections will act at the same time upon all the diseased parts, and while they favor cicatrization of the abscess and fistulas of the neck, they will modify the condition of the mucous membrane of the mastoid cells, the tympanum, the Eustachian tube, and the auditory canal, and destroy the causes of the otorrhea.—The treatment should be perseveringly continued, for it will require several months, or even years, to effect a cure."

He treats facial paralysis proceeding from the cause heretofore named, not by blisters, electricity, endermic applications of strychnia, etc., which are useless, but by remedies suitable to the particular diathesis which accompanies or has produced the otorrhea, and which has given rise to the disease of the bone occasioning the paralysis. Every morning Cod Liver Oil in doses of one, two, or three spoonfuls, gradually increased; every evening, Tincture of Iodine, commencing with five drops for a child of seven years old, and gradually increasing to twenty drops; salt baths every other day, prolonged for an hour, the bath containing eight pounds of salt; permanent cauterizations over the mastoid process; dropping into the ear Tincture of Myrrh, or of Iodine, or weak solution of Sulphate of Copper.—From this the reader can obtain an idea of the general treatment to be pursued in these cases. Permanganate of Potassa, in solution, has been found serviceable in many cases of otorrhea, used as an injection into the external meatus.

phate of Zinc (three to six grains to one ounce), may be substituted. In a number of these cases, I have derived much benefit from a daily application of the following preparation: Take of Chloride of Zinc six grains, Chloride of Gold and Soda three grains, Distilled Water one fluidounce. Dissolve. If this causes too much smarting or irritation, it may be diluted to the strength required.

In mild cases, the discharge will frequently disappear by the use of gentle astringent solutions applied to the affected parts, instead of the preceding, as, solution of Acetate of Zinc, (five or six grains to one ounce); solution of Carbolic Acid, one to six parts in six, ten, or even forty parts of Glycerin; solution of Tannin; infusion of Geranium and Golden Seal; infusion of Witch Hazel and Bayberry, etc. If the membrana tympani has become involved in the disease, it must also be touched with the local application employed. It may be proper to state here, that the most serious results have been known to follow the use of powerful astringents applied with a view to stop the discharge; mild preparations only are admissible.

When the discharge has lost its green color, its fetid odor, and has become whitish, Triquet recommends the alternate use of the following preparations: No. 1. Tannin twenty grains, Rose-water eight fluidounces; warm and dissolve. Use three injections per day. No. 2. Sulphate of Alumina and Potassa four drachms, Water four ounces; warm and dissolve. Use two injections per day.

In severe or obstinate cases, counter-irritation over the mastoid process will be indicated, as, Croton Oil Liniment, to produce pustulation; or the Irritating Plaster, which may be applied first over the mastoid process, and then to the nape of the neck, alternately changing it from time to time, first over the process, and again on the nape, and persevering in its use for a long period. Even, if these means do not effect a cure, they may prevent the occurrence of ulceration of the drum membrane, caries of the bones, and extension of the disease to the brain. There is a great tendency in these diseases to extend to the brain, and thus cause death, a result which may be avoided in most cases, by carefully watching for collections of matter as they form, and affording them a free exit externally, as well as by the use of counter-irritants or revulsives to lessen or arrest the amount of discharge internally.

Sometimes, during the treatment, or, when there has been no treatment, the discharge will suddenly cease. Occasionally this is due to an acute inflammatory attack occurring about the time of the cessation, and which will require the usual treatment for such inflammation. But, when the inflammation is due to an irritating

cause that has thus suddenly checked the discharge, and is accompanied with severe cerebral symptoms, we should endeavor to recall the discharge, by hot fomentations to the diseased ear, aided by stimulating injections, as, warm Oil of Rue, etc., and active counter-irritants over the mastoid process and to the nape of the neck, as well as upon the temples, as, Croton Oil, Granville's Lotion, Gondret's Ammoniacal Ointment, etc., or, cauterizations with Vienna Paste, etc.

Chronic catarrhal inflammation of the external meatus may, from neglect or improper treatment, produce ulceration of the dermis, and, ultimately disease of the bone. This will require treatment similar to that pursued for similar ulcerations occurring on other parts of the body.*

It must be borne in mind, that chronic inflammation with discharge from the ears, frequently occurs among children who are troubled with worms; the irritation produced by these entozoa extending along the mucous alimentary canal to the throat, fauces, Eustachian tube, etc. And upon the removal of the worms and the mucous irritation they have produced, the ear affection will speedily cease.

POLYPUS OF THE EAR.

Certain fleshy growths, termed *Polypi*, probably the result of a long-continued irritation of the dermis of the external meatus, are frequently met with, and which differ from all other forms of polypi, from never being developed without having been preceded by a chronic discharge, and also, by being more commonly attached to the dermoid layer of the meatus. They are usually painless, except when they grow very large, when they cause headache, giddiness, and other symptoms of congestion. Their shape is from that of a small

* "A slow disorganization of the bone, dura mater, or substance of the brain may be taking place, and the only symptom indicating the existence of formidable disease be the presence of a discharge from the external auditory canal; consequently, no person suffering from catarrhal inflammation of the dermoid layer of the meatus, the membrana tympani, or of the mucous membrane of the tympanum, can be assured that the disease is not being prolonged to the temporal bone, the brain, and its membranes,—and that any ordinary exciting cause, as an attack of fever or influenza, a blow on the head, etc., may not induce the appearance of acute symptoms, which, as a general rule, are speedily fatal.

"Catarrhal inflammation of the dermoid layer of the external meatus, may last for many years, without pain being present or any other symptom indicative of disorganization of the bone, dura mater, and cerebellum.—Affections of the external meatus and mastoid cells are apt to occasion disease in the lateral sinus, and cerebellum." (*Toynbee.*)

round body to a large lobulated mass, and their color, before extraction, varies from deep red to pink, having, with the exception of the cartilaginous polypus, a great resemblance to the reddish, fleshy masses seen springing from the surface of blisters, and irritable ulcers. The chronic discharge, during which they become developed, is almost always the result of an inflammation of the external ear, more commonly that which occurs during an attack of small-pox, typhoid fever, scarlatina, etc. The discharge preceding or accompanying polypus of the ear, constitutes another form of what is termed *Otorrhea.*

Polypi may be developed in the tympanic cavity; upon the dermis of the external meatus; and upon the membrana tympani; there are several varieties of them, which have been variously described by different writers. Thus, we have

1. Polypi springing from the cavity of the tympanum. These are excrescences of a more or less firm character, but always presenting the color and form of those fleshy vegetations which shoot forth from wounds and carious bones; they all seem to be of a similar nature, that is, of the character of fleshy granulations, cellular, and in the composition of which a great quantity of fibro-plastic elements are found. Wilde says of these fungous vegetations, that when they pass through the aperture of a perforated drum membrane, they expand and form a nail-like or mushroom head, which spreading over the outer surface of this membrane, may be deceptive, and give the appearance of an open tympanic cavity.

2. Polypi which are developed upon the membrana tympani, a kind of fleshy production analogous to pannus of the cornea, and which may be called pannus of the drum membrane.

3. Polypi of a cartilaginous character, which are rather a transformation, a kind of chondroma.

Toynbee divides polypi of the external meatus into three classes, viz.,

1. The *Vascular*, or *Raspberry Cellular Polypus*, consisting of round heads resembling in appearance the free surface of a raspberry, and which are attached by small filaments to a central stem, which forms the root. It is very soft, breaks up very easily, and bleeds freely. It may be attached to any part of the meatus, more generally to the inner half of the tube, or, close to the membrana tympani; when small it is deep red, but becomes paler as it increases in size. Sometimes, but not always, considerable pain, and discharges of blood are present.

2. The *Fibro-gelatinous Polypus*, next in frequency to the preceding, it resembles the gelatinous polypus of the nose, though differ-

ing from it in structure, being composed of corpuscles and fibrous tissue. Its surface is smooth, having a soft, jelly-like appearance, is usually pediculated, frequently attains a very large size, and sometimes attains to so great a degree of hardness that it is with difficulty cut through by a pair of scissors. It is generally of globular form, consisting of from one to as many as six or eight rounded heads, each having pedicles connecting them with the root.

3. The *Globular Cellular*, or *Vascular Polypus*, consists of a single globular mass, perfectly smooth on the surface, and without any appearance of granulation. It is of a deep-red color, softer than the ordinary cellular polypus, seldom grows larger than the size of a pea, is confined to the inner fourth or sixth of the meatus, being usually developed from its upper part, is attended with an offensive mucous discharge, containing flocculi of mucus composed of thread-like particles, and is common among children and young persons. The discharge from catarrhal inflammation of the mucous membrane of the tympanum, resembles the above, but differs from it in being of a yellow color, and presenting large irregular-shaped masses of floccular mucus. The discharge appears to be confined to the surface of the polypus only.

Wilde describes several forms of polypus of the ear; "fungus, or vascular and granular masses which generally grow either from diseased bone, or after the destruction, in whole or in part, of the membrana tympani, and the attachments of which are to be found principally at the very bottom of the auditory passage in the tympanum; while polypi are, for the most part, confined to the glandular portion of the tube, about midway between the external orifice and the membrana tympani, and are attached by narrower roots than the fungi." "They are generally of a florid-red color, smooth, and polished on the surface while still within the meatus, and generally immersed in the discharge; but as soon as they appear externally, they become pale, cuticular and comparatively insensible. They are more sensitive at the root than toward their free extremity, and vary in size and form, being ovoid, lobulated, or divided by deep sulci into a number of minor bodies." They may vary in consistency, being friable and gelatinous; fibrous; fibrous and firm; or dry, cuticular, tough, and unyielding. They may be attached by narrow pedicles, or by an extensive base. When flabby, livid, and excessively fetid, they are of a malignant character, and may be accompanied after a time with sloughing and hemorrhage.

Symptoms. We may suspect the presence of these morbid

growths in the ear, when, following a discharge from the ear of longer or shorter duration, there are strange noises in the ear (tinnitus); or a sense of fullness from distension of the auditory canal; fetid discharge; pain, but this symptom is not always present; slight discharge of blood, in some cases; heaviness, giddiness, and confusion in the head, which last symptoms are increased when the enlarged polypus is pressed upon. There will always be more or less deafness, according to the size of the polypus, and the amount of obstruction it presents in the auditory canal. The pain may be severe or slight, constant, or occur only at irregular intervals, or, it may be entirely absent. Complete insensibility will sometimes follow a pressure made upon the polypus by means of a probe. This will be more apt to occur when the polypus springs from certain portions of the tympanic walls; and, even when insensibility does not occur, the pressure may occasion acute pain, perhaps vertigo, or lachrymation of the corresponding eye, as a general thing. But slight local pain, if any, will accompany pressure upon a polypus springing from the walls of the external auditory canal, when not too near the membrana tympani.

Diagnosis. In all cases of disease of the ear, and especially when a discharge is present, the practitioner should never forget to thoroughly examine the external auditory canal; and if, from the presence of matter or other substance, he can not satisfactorily see the condition of the canal, he should carefully syringe it with tepid water to remove the obstructions; after which, he may again attempt its inspection. If polypus be present, he will see a fleshy mass covered with a thin pellicle, or, in some cases, presenting a surface that bleeds upon the slightest touch; and, when the mass is a vascular vegetation extending from the membrana tympani to the orifice of the meatus, it is apt to be the seat of a constant bloody discharge, and it is important that we should get the patient rid of it as soon as possible.

When the polypus is seated more deeply within, it will become much more necessary to use an ear-speculum in making the exploration. We should always endeavor to ascertain its place of attachment, which will frequently be a very difficult matter; for which purpose we may attempt to lift it off the membrane, or to circumscribe its base with a very fine blunt probe, when, by following it up to its base, we may ascertain whether it passes into the tympanic cavity. But this operation will often be difficult and painful, and to recognize a polypus springing from the tympanum we will only have the commemorative symptoms.

Other foreign bodies in the ear may be distinguished by their

difference of form and color, a difference readily ascertained if the examination be carefully made, and be preceded by an injection. Another characteristic of many polypi is the discharge of blood determined by examining them with a probe.—Ceruminous concretions may be distinguished from polypi, by their different aspect, and by the facility with which they dissolve under the influence of an injection of warm oil or water.

Triquet, who has made a number of post-mortem examinations of the ears of persons laboring under long-continued and obstinate discharge from them during life, states that he has constantly found the mucous membrane of the tympanum hypertrophied, with small papillary eminences thereon, which, in his opinion, were truly the commencing point of polypus of the ear. He likewise states that in all his observations where a polypus existed, he invariably found the membrana tympani destroyed to a greater or less extent. Probably, he refers to those morbid growths which spring from the tympanum; for it is well known that a polypus of the external meatus may continue for a long time, and the drum membrane remain without being perforated or destroyed.

The *prognosis* of polypi of the ear is by no means favorable; many months may be required for their removal, as they all have a tendency to continue for years, as well as to re-appear after their removal is supposed to have been permanently effected. Hearing is not always restored after the removal of a polypus, especially when its growth commenced in the tympanum; so that on this question we should be very reserved.

Treatment. Various means have been recommended for the removal of these morbid growths. For vascular polypus growing near the membrana tympani, after syringing with warm water, Toynbee recommends the Potassa cum Calce, cast into very thin and small sticks, with a small quantity of Iron added to render it firmer and less deliquescent. Before applying the caustic, the ear should be well dried with cotton wool; the caustic should be allowed to touch no part save the free surface of the polypus, and the practitioner should see to what part the caustic is being applied. A glass tube may be used to shield the meatus. It seldom causes pain, but should it occasion any, it may be arrested by immediately syringing the ear with warm water. In a few minutes after its application, the growth becomes livid, and blood will ooze from it; before leaving the patient, the practitioner should again syringe the ear with warm water. The caustic may be re-applied the next day, or every three, six, eight, or ten days according to circumstances, in the same way. In some cases when the polypus has

been nearly removed in this way, and its fetor has also been destroyed, the ear may be advantageously injected twice a day with a solution of Tannin thirty grains, Water four ounces.

Carbolic Acid, applied by means of a brush or sponge-mop, will prove effectual in many instances; and if care be taken not to have the brush or sponge too wet with the solution, that a drop may not fall on other parts, the escharotic effect of the acid will be confined to the surface to which it is applied. One part of Carbolic Acid may be dissolved in thirty-four parts of water; or, if it be desirable to have it still stronger, the addition of a small quantity of Ether, or Acetic Acid, will enable the fluid to dissolve a still greater proportion of the carbolic acid.

These growths may also be removed with Toynbee's lever-ring forceps, or Wilde's snare, care being taken not to tear or injure the external layer of the membrana tympani when the polypus is being extracted. Should there be any portion of the polypus remaining subsequently, it may be removed by carefully touching it two or three times a day with a solution of Diacetate of Lead four grains, Water one ounce; with Alum half an ounce, Water two ounces; with diluted Caustic Potassa; a solution of Sulphate of Copper, one part to from thirty to sixty parts of Water; or, with a mixture of equal parts of Compound Tincture of Iodine, and Water,—according to the circumstances attending the case, and the effects produced by the agent used.

The above agents have been likewise recommended for the cure of polypus, without a previous use of the instruments; so also have the following: a solution of Chloride of Zinc ten grains in Water one ounce; a solution of Acetate of Zinc forty grains in Water one ounce; with vesicating paper, Croton Oil, or other counter-irritant over each mastoid process. Finely-powdered Sulphate of Copper blown into the ear upon the polypus has also effected cures.

The treatment I recommend is the *careful* extraction of the polypus, either by ligature, using the snare of Wilde; or by extraction with Toynbee's lever-ring forceps, employing a force combining both traction and torsion; and then touching the part remaining with Nitrate of Silver, or one of the above-named caustics; being very careful to confine the action of the caustic to the granulating or fungous surface only, and not to allow it to come in contact with the healthy parts of the auditory apparatus. During this treatment the ear should be syringed two or three times a day with tepid water, or with some sedative solution.—In cases where the polypus is small and seated near the orifice of the auditory canal,

it may be removed by cauterization alone. When it is satisfactorily ascertained that the polypus arises from the membrana tympani, or very near it, it should be removed by ligature, if small, or by cauterization and the knife, if large.

Cures of large polypi of the ear have been made by cutting into the polypus, and inserting into the puncture a small cylinder of Persulphate of Iron, formed by making a thick paste of the iron and mucilage well rubbed together. Every day or two, after gently syringing out the ear, introduce another cylinder, and so continue until the cure is effected, say, from ten to thirty days. In order to keep the cylinders or small portions of the persulphate in contact with the polypus, bits of cotton may be pressed upon them; and, as the deeper parts of the polypus are reached, the quantity of iron applied may be diminished. There is no danger of injury to the adjacent tissues from the use of this salt. Nitric Acid, and Chromic Acid, very carefully applied have likewise been successfully used; but they must not be permitted to cause much pain or inflammation. Triquet states that he employs the Liquid Chloride of Zinc, the action of which, being under the direct eye of the physician, can be limited at will; in more than sixty cases in which he employed this agent, he has not failed in a single instance.

It will always be well to use constitutional treatment in conjunction with the local, as, tonic, antiscrofulous agents, chalybeates, antisyphilitics, etc., according to the general state of the system and the indications it presents. It must be remembered, however, that the removal of polypus may frequently require a persevering treatment for months, perhaps, years; and that it will often obstinately persist in returning. And, again, although the polypus may be permanently removed, and all discharge dried up, yet, the hearing may never return again.

DISEASES OF THE MEMBRANA TYMPANI.

1. *Injuries of the Membrana Tympani*, are in general produced by penetrating instruments, as, pins, for example; also by foreign bodies introduced into the ear, as, the introduction of ear-picks, improper manœuvers in attempting the extraction of foreign bodies, which may not only be pressed against the membrane so as to rupture it, but may even be thrust through it into the tympanic cavity. Again, the drum membrane is frequently ruptured by bathers who plunge into the water from a great height; the water enters the ear, suddenly and forcibly presses upon the column of air

contained in the auditory canal, causing the membrane to project inwardly, and, in many instances, the pressure is so strong as to effect a rupture. In a similar manner, a blow or box on the ear is very apt to cause a laceration of this membrane; or blowing the nose very strongly; as also, a sudden, sharp, loud noise, as the report of a cannon. Artillery-men, and those exposed to loud noises of this character should place plugs of cotton in their ears, and when the cannon is to be fired off, stand to windward of it, holding their mouths slightly open.—The membrana tympani has also been ruptured by the too forcible introduction of air or water into the Eustachian tube.

The *symptoms* of a rupture of the drum membrane, are, at the time of the accident, a sharp, loud noise, as if something had burst in the ear, sometimes hemorrhage and considerable pain, with more or less deafness. An examination with the speculum will reveal the difficulty.

As to the *treatment*, nothing will be required unless inflammation arises, which must be met by appropriate means. The margins of the ruptured membrane, remaining in contact with each other, soon unite and the membrane becomes again imperforate without much damage to hearing. Perhaps, in order to facilitate union of the edges of the wound, and keep the membrane as immovable as possible, and free from sound vibrations, it would be better to place a small tampon of cotton in the ear.—This treatment will answer where there is no loss of substance, but when a portion of the membrana tympani is lost, the edges can not be made to unite, and a permanent fistulous opening will remain.

In hemorrhage from the ear in hooping-cough the membrana tympani is always ruptured. In these cases, Triquet recommends cups or leeches over the mastoid region; derivatives and antiphlogistics; and plugging the ear with cotton to keep the membrane at rest, and protecting the patient from sounds or noises. A mixture of Tannin a grain and a half with Glycerin two and a half drachms, may be applied to the torn membrane, with a pencil, repeating the application once or twice a day, to favor cicatrization; or, a small piece of gold-beater's skin which has been thoroughly moistened with a drop of collodion, may be applied to the wounded drum membrane.

Spontaneous perforation of the drum membrane from abscess, or pus in the tympanic cavity, is always accompanied with a loss of substance, and the edges will not unite unless the orifice spontaneously made be quite small. In order, therefore, to guard against this difficulty, it will be better in all these cases, where we are fore-

warned of a rupture of this membrane, to puncture it; the wound thus made is without loss of substance, and readily heals. (*See Perforation of the Membrana Tympani*, page 1252.)

2. *Relaxation or Collapse of the Membrana Tympani.*—Relaxation of this membrane may be due to a loss of contractile power of the internal muscle of the malleus, which is the tensor muscle of the drum membrane; it may be occasioned by a hypertrophied condition of the mucous layer, the result of cold, or, by inflammation of the fibrous layers; it may also be due to a complete or partial closure of the Eustachian tube, in which the external atmosphere presses the membrane inward; also, to inflammation of the tympanic cavity, in which adhesive bands have formed between the inner surface of the membrane and the walls of the tympanum. Pus, or other matters enclosed in the tympanic cavity, may distend the membrana tympani, and, should these matters be subsequently discharged through the Eustachian tube, a relaxation of the membrane will occur corresponding in degree to that of its distension.

The *symptoms* of relaxed drum membrane are, more or less severe deafness, with or without tinnitus; in some cases, the hearing will be restored when air is passed into the tympanic cavity through the Eustachian tube, either by swallowing while the nostrils are held firmly closed, or by making a forcible expiration with the nostrils closed,—but as soon as the air escapes through the tube, the inflated membrane again collapses, and the deafness returns as before; if there is any derangement of the ossicles, formation of adhesive bands in the tympanum, or, obstruction in the Eustachian tube, this result will not occur; in some instances, the person will hear best, when in the neighborhood of loud noises, as, when in a mill, a car, a carriage, etc., or when bells are being loudly rung near the patient, or the rattling of a wagon, firing of guns, etc.

Upon an examination with the ear speculum the membrana tympani will be found collapsed or more concave than natural, with the handle of the malleus and the tubercle, apparently standing outward very prominent; or, if the ossicles be deranged, the concavity or pressing inward of the membrane will be more complete, no prominence of the handle being observed; the texture of the membrane may be unaltered, or, it may be thickened, opaque, white, shining, with the bright spot longer than natural; or, it may be congested, red, and dull. If the Eustachian tube be not obstructed, and we have the patient to inflate the cavity of the tympanum, by holding his nostrils, closing his mouth, and then swallowing, the membrana tympani will be seen to expand and resume its natural

form, and which will continue until the patient swallows with the nostrils free, when it will again collapse. If the Eustachian tube be obstructed, or the collapse be due to adhesive bands, this effect will not be observed, or, at least, only to a very small extent.

The *treatment* of this difficulty is not always followed by the success that could be desired; and the longer the collapse has existed the less favorable will be the prognosis. If there be any opacity or thickening of the membrana tympani, this must first be removed; for which purpose, a solution of Nitrate of Silver should be applied to its external surface, of a strength varying from three to thirty grains to the fluidounce of water; and this may be occasionally alternated with a solution of Chloride of Zinc, two to five grains to the fluidounce of water. I have found considerable benefit in cases of thickened membrana tympani, from solutions of Iodide of Ammonium, and of Chloride of Gold and Soda; carefully painting its external surface with one of them. These applications may be made once, twice, or thrice daily, according to their action, and should be persevered in until the abnormal condition of the drum membrane is removed.—In addition to these measures, it will also be proper to make counter-irritation over the mastoid process, and along the sides of the neck.

When the thickening is removed, we may then attempt to overcome the relaxation, if this does not disappear with the removal of the thickening of the membrane, and here the chances of success are small. The external surface of the membrana tympani should be painted over two or three times a day with tonic and astringent solutions, as an aqueous infusion of Rhatany Root; an infusion of equal parts of Geranium and Hydrastis; a solution of Nitrate of Iron, or, Sulphate of Iron, or Sulphate of Zinc; being careful not to have the mineral solutions so strong as to pain or injure the parts with which they come in contact. Tannic Acid dissolved in Glycerin, or, Geraniin dissolved in the same fluid, will sometimes be found of benefit, as a local application to the membrane. So, likewise, will a dilute aqueous solution of Carbolic Acid, say one part to one or two hundred parts of Water, or Glycerin. At the same time, vapors of astringent and tonic solutions should be passed into the middle ear through the Eustachian tube, and even gentle stimulants, as, vapors from water containing small portions of Benzoin, Tolu, Sweet Gum, Oil of Turpentine, Carbolic Acid, Acetic Acid, certain volatile oils, Iodine, Bromine, etc. The ear should be kept closed with cotton in order to protect the membrana tympani from sonorous vibrations, and from much pressure of the external atmosphere.

Constitutional measures must also be pursued, according to indications present, administering tonics, chalybeates, alteratives, antisyphilitics, etc., as may be required; as well as giving a close attention to hygiene. It seems to me that if electro-magnetism can be at all useful in diseases of the ear, it would be in collapse of the membrana tympani, where the ossicles and tensor muscle remain intact.

3. *Chronic Inflammation of the Membrana Tympani. Chronic Myringitis.* (*See Healthy and Unhealthy Appearances of the Membrana Tympani*, pages 1228 and 1230). This is commonly the result of acute inflammation of the membrane, though it may occur as a result of general ill health, and exposure to cold, without a previous acute attack. The *symptoms* will vary according to the character of the inflammation. In the simplest form there will be more or less tumefaction of the dermoid layer of the membrane, varying from a slight swelling to a true hypertrophy, with or without abnormal secretion of epidermis, and with from a scarcely perceptible loss of hearing to a considerable degree of deafness. In some cases no inconvenience is experienced by the patient, while in others, he will complain of noises and unpleasant sensations in the ear, as well as in the head; occasionally there will be a tickling sensation, and a slight pricking, tearing pain in the bottom of the meatus, sometimes extending across the temple to the top of the head. An examination with the ear speculum, will detect the membrane less polished and transparent than natural, with more or less epidermis upon it, or around it, and of a reddish color. When the dermis of the membrana tympani is hypertrophied, the mucous lining membrane of the tympanic cavity, is apt to be thickened.

In the *catarrhal form*, which is by no means uncommon, there will be a more or less profuse discharge, containing epidermic cells, (another form of *otorrhea*), with various degrees of dullness of hearing, irritation in the ear, tinnitus and other unpleasant symptoms, a speculum examination, after the ear has been carefully syringed so as to remove the discharge, will discover the dermis of the drum membrane deprived of epidermis, swoln, opaque, and from a pale red to a deep-red color, or, merely streaked with red; in some instances, the dermis will be either partially or wholly white, or, resembling parchment. If not removed, this affection may result in the formation of granulations, of polypi, or, in ulceration. A similar condition of the meatus may be associated with this disease.*

* Kramer, in his work on Diseases of the Ear, translated by Bennett, in speaking of Chronic Inflammation of the Membrana Tympani, observes: "On examina-

When chronic myringitis assumes a *strumous form*, there may or may not be a discharge; in the latter instance the auditory canal will be dry. If there is a discharge, it soon becomes purulent, giving rise to another form of *otorrhea*. There will be various noises and sensations in the ear, catarrhal symptoms, increased in cold and damp weather, seldom any pain, or, pain may manifest itself at longer or shorter intervals, more or less deafness, which often varies with the dry or moist condition of the atmosphere, and in a great many instances there will be swelling of the glands of the neck, or of the tonsils, and, perhaps some strumous affection of the eyes. A speculum examination may detect different conditions of the membrana tympani in different persons; with some its color will be found varying from a pinkish to a red color, (being dark red when the middle ear is also affected), opaque, and thickened. With others again, the membrane will be thickened and opaque, often resembling wrinkled parchment, and studded with pearly-like spots over its surface, while a few red vessels may be seen running parallel with the manubrium; and, any exciting cause will soon tend to produce a dark-red color of the whole membrane. The thicker and more opaque the membrane, the less will be the amount

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tion, the membrana tympani is observed to be reddened, either partially or throughout its whole surface, the color exhibiting every shade of red, from a bright pale to a deep-brown red. Striking alterations in the texture of the membrane are also observed. It appears opaque, thickened, uneven, and swoln, so that generally the long process of the malleus, and even the natural naval-like depression of the membrane can not be seen. On this inflamed reddened surface there may be frequently observed granulations of various sizes, and either of a pale or blood-red color; sometimes very soft, sensitive, and bleeding readily; at other times, of cartilaginous hardness, insensible, and not bleeding; situated sometimes on the center, and sometimes on the circumference of the membrane; at other times, covering its whole surface. More frequently, however, one or more openings are observed, (generally close before or underneath the handle of the malleus, seldom behind it), which vary much in size, from that of a pin's point to a split pea, or are even so large as to have destroyed two-thirds of the membrana tympani; in the latter case, the mucous membrane of the cavity of the tympanum is exposed to view. . . . . The secretion (from the meatus) may be copious, and become a real discharge, especially if polypi exist at the same time; or it may be so scanty as to escape the notice of the patient, or of a superficial observer; while at the same time the membrana tympani and the walls of the meatus are covered with foul, greenish-yellow, dry crusts. It may be watery, white, mucous, or greenish-yellow, brownish, mixed with bloody streaks, bland or corrosive, void of smell, or very fetid and of a disagreeable ammoniacal odor. Its quantity is often augmented by a simultaneous affection of the mucous membrane of the cavity of the tympanum. There is a total absence of cerumen as long as the morbid secretion from the membrana tympani and the adjoining parts continues."

of redness, from the fact that an increase of deposit interferes with the circulation.

Sometimes, there will be observed upon the tympanal membrane a thin, whitish layer with minute radiating lines running through it; at other times, there will be seen spots, and reddish thickenings, somewhat of a fleshy resemblance, and very analogous with pannus of the cornea. Or, an opacity of a half-moon shape may be observed upon the inferior and posterior part of the membrane, having a well-defined margin, a somewhat rough surface, and which opacity gradually extends over nearly the whole of the membrane, without appearing to produce a general thickening or opacity, and the membrane itself is less sensible in those parts in which this condition is noticed; it results in permanent deafness.

Chronic Myringitis may also be associated with, or be due to, a *syphilitic*, *rheumatic*, or *gouty* condition of the system; and which will have to be determined by the commemorative history and symptoms, in connection with those present.

All these forms of chronic inflammation of the membrana tympani, if not removed, will give rise to changes in the structure and in the appearance of the membrane, as,—morbid sensibility, or insensibility; "hypertrophy, or thickening and opacity of the membrane from deposits of lymph, which may involve all the layers of the membrane, and which not unfrequently proceeds to so great an extent that the membrane is ten or even twenty times its natural thickness, and it becomes opaque, hard, and dense like a piece of cartilage; ulceration, involving only one of the layers, or extending to the whole of them, partially or completely destroying them and causing perforation; an increase of the external concavity, so that its internal surface is in contact with the promontory, to which it is frequently firmly adherent; an absence of the external concavity, in place of which it is perfectly flat; scrofulous degeneration, in which all the layers lose their natural structure; calcareous degeneration, in which there is often not a vestige of healthy structure in any of the layers; and an increased degree of tenseness, frequently accompanied by the presence of membranous bands, which connect the inner surface of the membrane to the promontory, stapes, or other parts of the inner wall of the tympanum.

"The external or epidermoid layer may alone be hypertrophied or considerably thickened, forming a dense laminated mass which adheres to the outer fibrous layer; or, it may be slightly thicker than natural, with numerous small round masses, studded over its surface, and also forming a firm adhesion to the fibrous layer. Or, the outer, radiating, fibrous layer of the membrane may be thicker,

whiter, and more dense than natural, while the internal, circular, fibrous layer is perfectly healthy. The outer layer may also become thickened, vascular, and covered with deep-red granulations, or giving growth to polypi. In other cases, the internal, circular, fibrous layer will be much thickened, while the outer layer is translucent and healthy. Ulceration may occur in one or both of these layers; sometimes the whole of both these fibrous coats are destroyed by ulceration, and the mucous layer remaining entire falls inward, and covers the surface of the promontory and the inner wall of the tympanum. Sometimes one-half of the membrana tympani will be destroyed, and the border of the remaining half becomes adherent to the inner wall of the tympanum, forming a closed cavity; or, the entire substance of this membrane may be ruptured, more generally that portion between the posterior margin and the handle of the malleus.—The internal mucous lamina of the membrana tympani, which, in its natural state, is so thin that it is frequently difficult to detect its presence, becomes thickened by chronic inflammation, and is sometimes so much hypertrophied that its inner surface is in contact with the promontory." (*Toynbee.*)

The *prognosis* is always difficult in these cases. The more simple the character of the inflammation, the earlier it be attended to, the less morbid changes produced in the drum membrane, and the slighter the degree of deafness, the more favorable will be the prognosis. But, in those cases of thickening, vascular fleshy growths, ulcerations, etc., of long standing, with almost, if not quite, entire deafness, it will be doubtful; for, though we may remove the morbid changes effected in the drum membrane by the disease, we will not always be able to restore the hearing.

"Thickening of the membrana tympani, with or without collapse, is a frequent result of inflammation; it is very difficult of cure, especially if occurring in a debilitated constitution and of long standing. The deafness is very great, and in collapse of the membrane incurable. If any traces of inflammatory action remain on the membrane, we may hope, by removing the morbid action, to improve the condition of our patient; and the means employed for chronic inflammation of the membrana tympani will be the most suitable. But if the membrane is dry, white, and tense, and the meatus in the same condition, and devoid of cerumen, little hope of improvement remains."

Chronic inflammation of the membrana tympani may be discriminated from otalgia, or neuralgia of the ear, by the changes in the membrane, the tinnitus, and other symptoms of inflammatory action; while, in otalgia, which alternates without any apparent

cause, and without any change of structure, the membrane remains of about the color of the skin on the back of the hand.

The *treatment* will depend somewhat upon the peculiar characters which the chronic inflammation of the part, may present.—If it be of the simple form, without hypertrophy of the dermis, injections of warm water, or of warm infusions of Golden Seal, Solomon's Seal, or Black Cohosh, repeated once or twice daily, will suffice; but if hypertrophy be present, it will be necessary, after syringing the ear, to apply to the surface of the affected membrane a solution of Nitrate of Silver, (five grains to the ounce), or, a solution of Chloride of Zinc, (one grain to the ounce), or, a weak solution of Bromide of Ammonium; or, a solution of Hyposulphite of Soda and Silver, three to five grains to the ounce of Water. In some obstinate cases, counter-irritation over the mastoid process will aid in facilitating the cure.

In the catarrhal form, it will likewise be necessary to syringe the ear daily, and then apply one of the above solutions to the membrane; or, a solution of Tannin, (three grains to the ounce), may be applied; or, a solution of Chloride of Soda and Tannin. In several instances, I have derived much benefit from the application of the following: Take equal quantities by weight of Sweet Gum and Olive Oil, apply enough heat to dissolve the Gum, strain, and stir till cold. Apply on a camel's-hair pencil. Previous to making this application the membrane must be freed from the fluid injected upon it, and which is best done by taking a small piece of old muslin, removing some ten or twelve strands of thread from one end of it, so that when rolled up and attached to the end of a stick it will form a kind of brush; the loose, brush-like end may be placed upon the membrane without occasioning the least pain, and will rapidly absorb the fluid from its surface.

Thickness and opacity of the membrana tympani does not always admit of a cure, and especially when the membrane presents a pearly-white appearance, with one or two red vessels running along the malleus; and, even in favorable cases, many months will be required before the treatment will result in success. One of the following preparations may be rubbed upon the insensible membrane by means of a piece of cotton wool wound around the end of a probe; a solution of Nitrate of Silver, (ten or twenty grains to the ounce), or, a solution of Chloride of Zinc, (three or five grains to the ounce). As soon as a dark layer is formed by the silver solution, we should not re-apply it until the layer has peeled off. (*See Collapse of the Membrane*, page 1292.) If the membrane becomes red and inflamed from the treatment, we must omit it until these conditions have

passed off. Granulations, as well as redness of the membrane without inflammation, may be similarly treated. It must not be forgotten, that a more or less dilute solution of Carbolic Acid will relieve fetor of the discharge as well as lessen it, will check a tendency to morbid growths, and will, also, frequently tend to diminish the thickening of the drum membrane; it may be applied on a small piece of cotton wool wrapped around a probe or small pine stick. Solution of Permanganate of Potassa has a similar effect. Polypi, or Ulceration, must be treated as recommended under their respective heads.

As in the simple form, it may be frequently required to aid the treatment by auxiliary measures, as, the application of counter-irritants to the mastoid process, to the nape of the neck, and along the sides of the neck. These may consist of powerful rubefacients, vesicants, suppurants, or, cauterants, according to the peculiar features of the disease, and the influence exerted by the agent employed. Sometimes, the following preparation, well rubbed over the mastoid process, and on the back part of the ear, will be found beneficial: Take of Aconitina two grains, Hydrocyanic Acid, off. one drachm, Glycerin half an ounce; mix; use a small portion only at a time.

In the strumous form of chronic myringitis, one of the above solutions may be applied to the membrana tympani, always after having syringed the ear, repeating it two or three times daily. A very excellent preparation for syringing the ear when there is a profuse and fetid discharge, is composed of Pyroligneous Acid one part, Water three parts; this mixture may be injected into the ear two or three times a day. Also, a dilute aqueous solution of Carbolic Acid, or of Permanganate of Potassa. Kramer recommends, in chronic inflammation of the drum membrane, a solution of Acetate of Lead, one or two grains to the ounce of Water, to be dropped into the ear two or three times a day. He says: "The Acetate of Lead removes, in a singularly rapid and complete manner, the disagreeable ammoniacal odor of the discharge. There is no reason to imagine that by this remedy the inflammatory state will be suddenly and rashly suppressed, or transferred to the brain. I have even observed obstinate chronic headaches relieved, in proportion as the Acetate of Lead overcame the increased vascular action of the membrana tympani and the surrounding parts." Counter-irritants should also be applied over the mastoid process, and down as far as the angle of the jaw; those which will produce a slight vesicular rash are to be preferred, as, the Croton Oil Liniment, Compound Liniment of Turpentine, etc.

But, whatever, local treatment may be employed it is highly

necessary, that in the strumous form of chronic myringitis, constitutional treatment be administered; the Compound Syrup of Yellow Dock, Iodide of Potassium, Iodide of Ammonium, Iodide of Iron, Bromide of Potassium, Bromide of Ammonium, etc., are the agents from which the greatest benefit is to be derived; and the particular agent prescribed, should be selected in accordance with the indications presented by the system.

If the myringitis be due to, or be associated with, a syphilitic, rheumatic, or gouty condition of the system, constitutional remedies must be given to combat these conditions, in addition to the local measures heretofore advised.

In all the forms of chronic myringitis, it is important to act upon the faucial orifice of the Eustachian tube, and the fauces, once or twice every day, and which may be accomplished by applying the liquids on a small probang, or by injection; the agents used for this purpose may be weak solutions of Nitrate of Silver, Acetate of Zinc, Chloride of Zinc, Chloride of Soda, Tannin, or, Alum, etc.; and, in some of these forms, as, the strumous, and syphilitic, it may become necessary to pass medicated vapors into the Eustachian tube, and especially when the tympanic surface of the drum membrane is involved. The vapors may consist of Water and Hydrochlorate of Ammonia; Water and Iodine; Water and Bromide of Ammonium; Water and Tar; Water and Sweet Gum; dilute Carbolic Acid, etc.; and the vapors from which may be introduced according to the methods heretofore named.

Iodurettted or Bromuretted vapors may be obtained by dissolving Bromide of Potassium two hundred forty grains and Bromine one Troy ounce, in distilled Water four fluidounces; or, Iodide of Potassium two hundred and forty grains, Iodine one Troy ounce, dissolved in Distilled Water four fluidounces. A portion of one of these solutions may be added to water, according to the strength desired, and the vapor arising therefrom when heated, be conveyed into the Eustachian tube by the method heretofore named on page 1246. Or, paper saturated with the desired medicinal agent, may, when dried, be formed into cigarettes, the smoke from which may be passed into the Eustachian tube by the method described on page 1247.

During the treatment of chronic myringitis we must not neglect hygienic measures; the bowels must be kept regular; the functions of the skin be attended to; exercise in the open air, at proper seasons, be ordered; the diet must be properly regulated, etc.; and all these measures must be pursued in accordance with the indications present in each individual case. In adult females the state of the

uterine system must be attended to, and any irregularity, if present, be corrected by the proper means.

4. *Morbid Deposits in the Membrana Tympani.* These deposits are usually calcareous, and form in the fibrous layers of the drum membrane, which may be wholly or only partially involved. They may occur at any period of life, but more commonly during middle age, and especially among females. They may exist independent of any other lesion, or, they may be the result of inflammation. The principal *symptom* is more or less deafness with or without a discharge, troublesome noises in the ear, and rarely pain, and a sense of fullness or stuffing in the ear. A speculum examination will find the deposit more generally in the anterior vibrating portion of the membrane, presenting a yellowish color, a sharp, well-defined edge, and imparting a gritty sensation when scratched with a sharp instrument.

Not much can be expected by *treatment.* If a discharge be present, the ear should be syringed with tepid water as often as may be necessary; every day or two, the following solution may be applied to the diseased surface of the membrane, by means of a camel's-hair pencil: Nitrate of Silver ten grains, Nitric Acid, pure, ten minims, Water one fluidounce; mix. Or, the following may be similarly applied: Acetate of Zinc two grains, Acetic Acid twenty minims, Water one fluidounce; mix. A slight discharge should likewise be kept up from the surface of the mastoid process, constantly, proper attention be bestowed upon the hygiene of the patient, and any taint or diathesis of the system be met with the proper remedies. A cure is doubtful, though a persevering treatment for one or two years may remove distressing symptoms.

5. *Ulceration of the Membrana Tympani.* This affection is generally the result of either acute or chronic inflammation of the membrane; it may be confined to the outer dermoid layer, or may extend into, or originate in, the fibrous layers. When confined to the dermoid layer there will be a discharge from the affected ear, more or less offensive, (*otorrhea*), a loss of hearing, more or less severe pain in the ear, headache, perhaps giddiness, tinnitus, and, not unfrequently a discharge of blood. A speculum examination will find redness and swelling of the membrana tympani, and a depression where the ulceration exists, the bottom of which is formed by the external or radiate fibrous layer of the membrane, and which will sometimes be covered with deep-red granulations;

if the tympanic cavity be distended, the fibrous layers may be seen bulging outwardly through the ulcerated part.

When the fibrous layers are involved in the ulceration, the outer surface of the internal mucous layer of the membrane may be seen (after cleansing the ear by syringing), through the ulcerated part, and, generally, the membrana tympani will be observed fallen in, so as to be nearly in contact with the outer surface of the promontory, thus lessening the size of the tympanic cavity.

The *treatment* will depend upon the extent of the ulceration. If this be confined to the dermoid layer of the membrane, syringing the ears with an attention to hygiene, will be all that is necessary in the milder forms; in the more severe forms, the ear should be syringed with mild astringent solutions, and a discharge be kept up from the surface of the mastoid process.

If the fibrous layers be involved, much care will be required in syringing the ear, especially where the ulceration has extended through them to the inner mucous membrane; as a forcible syringing might rupture this latter membrane. The ear should be gently syringed twice a day, with a tepid infusion of Golden Seal, Solomon's Seal, or Bayberry Bark, and in some instances, infusions of gentle astringents, as, Beth Root, Witch Hazel, etc., may be advantageously employed, not only to remove the discharge but also to exert a tonic and stimulating influence upon the membrane and its ulcerated surfaces. A solution of Nitrate of Silver should likewise be applied to the surface of the membrana tympani every day or two; the solution may have the strength of twenty or thirty grains to the fluidounce of water. The vapor of diluted Carbolic Acid passed directly upon the membrane, through a small glass tube, will also be advantageous; but it should not be employed in conjunction with the nitrate of silver.—A weak solution of Permanganate of Potassa, will also often be of service, used as an injection. Counter-irritation should also be applied to the surface of the mastoid process, and to the nape of the neck; in obstinate cases keeping up a discharge from the former location. In addition to which, constitutional remedies should be employed whenever indicated, and a rigid attention be given to hygienic measures. If the treatment fails in overcoming the difficulty, we may expect that perforation of the ulcerated membrane will sooner or later take place.

6. *Accidental Perforation of the Membrana Tympani.* The causes of accidental perforation are various. "It may exist congenitally," says Mr. Wilde, or, "it may happen by accident, such as a pene-

trating instrument, a foreign body in the meatus, loud sudden noises, sneezing, coughing, or blowing the nose, diving to any great depth, falls and blows upon the head, etc. An ulcer may eat its way through, and leave, from loss of substance, a permanent opening; but the most frequent cause of perforation is, otitis, or inflammation of the membrane in common with the lining of the cavitas tympani; when during the suppuration which ensues, the pent-up matter bursts through the inflamed membrane as the nearest external outlet." Among the more common causes of perforation, are the febrile exanthematous diseases, especially scarlet fever. And it is during the presence of these diseases, or, as early as possible during the stage of convalescence, that the efforts of the physician to prevent perforation from occurring, will be crowned with success. And if this be neglected, the lesion will then be presented to us as one of a chronic character.

The *symptoms* accompanying chronic perforation of the membrane, are, a more or less profuse, and offensive discharge, which may be mucous, muco-purulent, purulent, curdy, or bloody; thin, or thick and viscid; and of a whitish or yellowish color. Also diminution of hearing, and sometimes pain will be present.—While the membrana tympani protects the tympanic cavity from external deleterious influences, as cold, moisture, vicissitudes of temperature, etc., it also aids in rendering the hearing more delicate; yet, notwithstanding, it can not be considered absolutely as an essential part of the organ of hearing, because, although a perforation through it will render the hearing less distinct, it does not necessarily involve a total loss of hearing. A perforation may impair the hearing, but it is only after the prolonged action of cold, moisture, etc., upon the unprotected tympanum, developing otorrhea, polypi, or other morbid conditions in the middle ear, that entire deafness, or cophosis, occurs. In a few cases, there will be no discharge at all. Where the discharge is profuse, the walls of the external meatus will be found red, tender and swoln, or, hard, cartilaginous, and insensible.

If a speculum examination be made, the membrana tympani will present different aspects according to its condition; if inflammation be present, the membrane will vary in color from a pale pink to a red color, according to the degree of inflammation; otherwise the membrane will present a redness only at the edges of the rent part, or, it may be mottled, red and white, white and opaque, etc. If there be a thickened and relaxed condition of the remaining portion of the drum membrane, or of the tympanic mucous membrane, the deafness will be greatly increased. The aperture itself may vary in size, from a slit to that of a pin's head, or even to an almost total

destruction of the membrane. Its location may also vary; more commonly it is opposite the internal orifice of the Eustachian tube, though it may be located at any part of the membrane; its position, however, does not interfere with the healing process. If the orifice be large enough to render the walls of the tympanic cavity visible through it, they will be seen either bright red and congested, pale red and more or less moist, rough and white, or red, thickened and granular. In order to determine whether it be the drum membrane or the tympanic walls that we are looking at, we may pass a very fine and delicate probe and percuss the surface under inspection; if it be the membrana tympani, the character of its texture is at once detected, and the patient will complain considerably; but if it be the tympanum, (of which the promontory more commonly presents), the firmness and hardness of the part will be readily detected, and the patient will experience a sensation as of something knocking against the skull, and will also complain less.

If one or more globules of air are observed entangled in the discharge filling the meatus, Mr. Wilde states that we may rest assured that the tympanal cavity is open externally; and, we may bring these globules to the surface so as to be within sight, (if the drum membrane is ruptured), by pressing upon the root of the tragus with the point of the finger. He also observes, and truly, that when the membrana tympani is perforated, an air globule or a mucous bubble existing at the bottom of the meatus, or entangled in the aperture, may frequently be seen to pulsate synchronously with the heart and arteries, by keeping the eye steadily fixed upon it. This occurs more especially when the aperture is rather small, and situated posteriorly.

In syringing the ear to remove the discharge, if there be an aperture the patient will complain that some of the fluid passes into the throat. And if the tympanic cavity be inflated, a loud whistling rale will be heard, or a squealing or gurgling sound.

The *prognosis* in chronic perforation of the drum membrane is not very favorable. If the aperture be small, and treatment be commenced shortly after its occurrence, the chances of success will be much greater than where the aperture is quite large, and where a long time has elapsed since its formation. Perforations occurring in individuals of a strumous diathesis, or following exanthematous diseases, or ulcerations, are less apt to heal. Those resulting from ordinary inflammations caused by colds, etc., are more disposed to heal; while those following punctures, or which are the results of accident, usually heal without any difficulty. The most favorable cases are those in which there is no discharge from the m ddle ear,

the aperture being small, not to exceed one-fourth of the surface of the membrane, and in which a thickening of the membrane, or of the neighboring tissues, or other morbid conditions, do not exist, or, at all events, are present in only a very limited degree.—If we can not always heal the aperture, yet, by a proper treatment, we may, in many instances, effect such normal changes in the condition of the tympanum, and of the remaining portion of the membrana tympani, as to check all discharge and greatly improve the hearing.

In the *treatment* of perforated membrane, the first indication is, to check the discharge and to allay any active inflammatory symptoms, or to remove any organic changes of the membrana tympani, which may be present. It will be useless to attempt healing an aperture the edges of which are constantly maintained in a morbid condition, by uninterrupted contact with an abnormal discharge, and by an undue amount of inflammatory action or organic change in the membrane itself; beside which, as the discharge issues from the walls of the tympanum, and not from the meatus, it would not only be impossible, but undesirable and unwise to heal the aperture through which the discharge finds an exit, until the condition of the tissues from which it proceeds have been restored to a normal condition, or sufficiently so to prevent any further suppuration.

If undue inflammation be present, it may be relieved and finally overcome, by gentle counter-irritants over the mastoid process and sides of the neck, and by steaming the ear with vapors from infusion of Hops, or Poppies, Lobelia, Catnip, etc., at the same time bathing the surface of the body, and producing gentle diaphoresis. In some obstinate cases, leeches may be applied behind the inferior half of the ear, in front of the tragus, and even around the orifice of the meatus. And while pursuing this treatment, the accumulation of pus in the meatus should be removed, by syringing with warm water as often as may be required. And as long as the redness and congestion of the whole surface of the membrana tympani continues, the above course should be rigidly pursued. As a general thing, as the inflammation subsides, the redness of the membrane will gradually disappear, the discharge become diminished, and the edges of the aperture grow together, the cicatrix, however, remaining red and congested for a considerable time, while a slight opacity of the membrane may continue for a few weeks.

It must be borne in mind, that closure of the perforation is effected by local inflammatory action; and if this action be confined wholly to the edges of the rent, as indicated by the redness being only around them and not diffused over the surface of the

membrane, our efforts to allay this inflammation should then cease, for, if we arrest this local process before the healing of the aperture takes place, we may render the perforation a permanent one.

If, notwithstanding the measures previously recommended to subdue the inflammation, the redness and congestion of the membrane continue, the acute stage having subsided, astringents should be applied upon the surface of the membrane, by means of a camel's-hair pencil, or by syringing. Various agents for this purpose have been recommended, as, solutions of Nitrate of Silver, Acetate of Zinc, Sugar of Lead, Tannin, etc., the strength of which solutions should be in accordance with the peculiar conditions present in each case; being rather weak at the commencement, but gradually augmenting their strength, until they are found to constringe the blood-vessels of the membrane, and to diminish the redness and congestion. I have derived much benefit, in these conditions, by the application, three or four times a day, of an infusion of equal parts of Witch Hazel Bark and Lobelia Leaves. The astringent should be dispensed with as soon as the red and congested appearance of the drum membrane has disappeared, except that portion immediately around the edges of the perforation. If, after this period, the healing process should go on very slowly, or not at all, it may be necessary to stimulate the edges, or even excite an artificial inflammation in them, in order to induce a closure of the aperture. For this purpose we may apply a solution of Nitrate of Silver fifteen or thirty grains to the ounce; or, an infusion of Capsicum; Lugol's solution of Iodine; Oil of Turpentine; infusion of Bloodroot, etc. The agent selected should be carefully and gently applied only to that portion of the membrana tympani situated immediately around the margin of the aperture and should not be pushed through the orifice. The easiest and readiest way of applying it, is to take a small pine stick, and whittle one end of it to a blunt point; around this end carefully wind a strand of cotton-wick,—saturate this with the liquid employed, and apply it to the edge of the hole in the manner just stated.

The application should be repeated according to its effect; if only a small amount of irritation is caused, it may be applied every day; if greater, it may be repeated every two, three, or four days, according to the degree of irritation produced.—Should inflammation be excited by the stimulating application, as, known by a redness of the whole surface of the membrana tympani, its use should be omitted for a time, until the inflammation has subsided of itself, or, been subdued by proper treatment; it should likewise be

discontinued when the orifice instead of diminishing in size, tends to become larger.

The above treatment is more especially indicated at an early period of the perforation, before any great organic changes can have occurred in the drum membrane and neighboring tissues. But when the perforation is truly chronic, having existed for several years, a somewhat different course of treatment will be necessary. Such cases are more unyielding to treatment, and afford the most unsatisfactory results.

In these long-standing cases, the first indication is, to remove any morbid conditions present, as, granulations, polypi, congestion or thickening of the tissues of the meatus, membrane, etc.; also, to keep the ear clean, when a discharge is present, by syringing once or twice daily. And it may be proper to state here, that, even where it is impossible to heal the perforation or restore the hearing, in cases where a discharge is present, syringing the ear will generally prevent the disease from extending to deeper-seated parts and the brain, thereby preventing a serious result.

The same local means may be employed to remove the morbid conditions above referred to, as have been heretofore recommended; aided by the introduction of iodureted or bromureted vapors into the tympanum through the Eustachian tube, and by the application of more or less active counter-irritants over the mastoid process and extending as far as the angle of the jaw. And when the parts have been restored to a normal condition and the discharge has ceased, attempts may be made to heal the aperture by the application of a strong solution of Nitrate of Silver, forty or sixty grains to the ounce, upon the part surrounding its edges; being guided by the preceding rules as to the periods of repetition, discontinuance, etc. Triquet recommends that the edges of the perforated membrane be touched two or three times a day, with a small fragment of Sulphate of Copper, or, still better, of Lapis Divinus. A still more useful remedy is a solution introduced upon the morbid membrane composed of Tannin one part, Gum two parts, Water five parts. He considers injections worse than useless unless there be a discharge.

Acoustic oils, drops, washes, and all stimulating preparations, "for removing deafness," should positively be prohibited, as they will be found useless, injurious, and may even give rise to very painful and serious symptoms. And the patient should likewise be very careful to protect his ear from the entrance of cold water while washing his face and neck, or during a river or sea bath, by placing a plug of cotton wool within the ear; the same course may be adopted to protect the ear from the unhealthy influence of cold and

dampness, whenever exposed to draughts of air, cold wintry weather, high winds, and foggy atmosphere. This temporary use of a plug, under the circumstances named, will prove beneficial, but it should never be worn constantly, as this would give rise to mischievous results, by preventing free action of the atmosphere upon the walls of the meatus, and by favoring accumulations of the morbid matters which may be discharged therein.

When the perforated membrane can not be made to heal, or when it is entirely destroyed, several plans have been recommended, whereby the hearing may be restored in a greater or less degree. These plans have but one object in view, the employment of an artificial membrana tympani, as a substitute for the perforated one. Mr. Toynbee has recommended a thin lamina of vulcanized caoutchouc or gutta percha, attached at its center to a small wire stem for the purpose of withdrawing and replacing it; the artificial membrane should be cut as nearly of the size and shape of the natural one as possible, having the cut margins smooth and regular, and after having syringed the ear to remove any discharge present, the membrane, moistened with warm water, must be gradually introduced into the meatus until the natural position of the true membrane has been reached.

Mr. Yearsley recommends the introduction into the ear of a pellet of cotton wool moistened with glycerin or sweet oil; a piece of thread being attached to it by which to remove it whenever required. Occasionally, these appliances will be found to answer the desired object, but by no means so frequently as their originators would lead us to believe. Sometimes, the irritation produced by their presence in the ear renders them infeasible; at other times, it will be extremely difficult to apply them; and, again, in numerous instances when applied no advantage results therefrom. Beside which, Mr. Toynbee's membrane is very liable to displacement.—Since penning the above, an improvement has been made upon Toynbee's artificial tympanum by a German; to the extremity of the fine wire he attaches a coil or spiral arrangement, so that the disc is fastened to it somewhat in the manner of a cork to a corkscrew, and may thus be properly retained in the canal of the meatus with less danger of becoming loosened and causing irritation. And, unless the patient can easily and properly apply them himself, instead of calling upon the aurist every time, but little benefit can be expected from them, for the patient would be placed in the condition of one who would be required to call every day upon an oculist to have his spectacles properly adjusted upon his nose.

Certain conditions appear to be necessary for the success of these

artificial membranes, viz., there should be no granulations, polypus, or other morbid growths present, no undue amount of unhealthy suppuration, and no inflammation of the walls of the meatus or of the tympanic cavity; the Eustachian tube should not be obstructed, the tympanum should be healthy, and the membrana tympani should not be wholly destroyed.

Thomas Westroff, Esq., of Bristol, has also proposed an artificial membrane, though more troublesome in its preparation than either Toynbee's or Yearsley's. An idea of it may be had by his description of it: "Having accurately inspected the meatus into which we desire to insert an artificial membrane, we must make a model of it in some hard timber." (I should suppose wax, or hard shoemaker's wax, would answer equally as well.) "This should be as perfect almost as a cast, though not too tight; its end should be flat, cut obliquely, (to suit the direction of the drum membrane), and the circular edge rounded off. This cast or model, previously oiled, should be dipped six or eight times into a solution of gutta percha in chloroform, or, until a film of sufficient thickness is formed, to peel off in one unbroken piece; each coat or film should be allowed to dry perfectly. A slit with a knife can be made longitudinally, without detriment, to aid its coming freely off, but the cut should not go within a quarter of an inch of the flat end; it is sometimes necessary to touch with some of the gutta percha solution any inequalities of the membrane. The tube should not be too thick, else it will be hard and tough, and irritate the ear; it will take two or three days to finish it.—This tube, if the timber model has been properly made, will be found to fit the meatus comfortably, and when oiled and coated with cerumen, to exclude the external air from the tympanic cavity; it should not be allowed to protrude, but should be cut obliquely, so as to lie entirely within the meatus; when it becomes advisable to clean its surface, it can be easily taken out by the patient with a small pair of tweezers, washed in cold water, oiled, and re-inserted. If found to fit, several should be made and given to the patient, who should be taught their use," and the model should be marked and preserved, in case it should become necessary to prepare more."

Rupture of the membrana tympani is sometimes caused by violent paroxysms of hooping-cough, and is generally attended with a hemorrhage, the blood proceeding from the edges of the wound. These linear ruptures readily heal by adhesion. To favor the cicatrization the following mixture may be applied to the lips of the wound, two or three times a day, by means of a small hair pencil; dissolve Tannin one or two grains, in Glycerin two or three drachms.

The patient should be kept from noises which will agitate the membrane and interfere with prompt reunion of the flaps; and immobility of the membrane should be maintained by pledgets of cotton introduced into the ear and placed in contact with the surface of the ruptured septum, by means of a speculum and blunt probe. Or, a small piece of very thin prepared intestine of a sheep, moistened with a drop of Elastic Collodion, may be carefully placed in contact with the membrane.

DISEASES OF THE EUSTACHIAN TUBE AND MIDDLE EAR.

1. *Obstruction of the Eustachian Tube.* The Eustachian tube is a long, narrow canal, slightly inflected obliquely, passing from above downward, and from behind forward, and forming a tube of communication between the pharynx and the tympanic cavity. Its principal functions are, to discharge the matters secreted in thel tympanum as well as in its own cavity, and, to permit the renewa of the air in the cavity of the tympanum; the entrance and exit of this fluid at the moment of vibrations, are two conditions necessary to enable the waves of sound to produce their impression on the sensible parts of the auditory apparatus. Consequently, the tube is almost constantly open,—a disposition resulting from the osseous, cartilaginous, and fibrous structure of its walls. Being continuous with the middle ear, on the one hand, and with the superior portion of the digestive and respiratory passages on the other, it is furnished throughout its whole extent by a mucous membrane, being a continuation of that of the pharynx and which extends into the tympanum.

The peculiar situation of this tube protects it from accidental wounds or injuries; but the nature of its functions, its length, its narrowness, its relations with the pharynx and the middle ear, render it liable to the diseases of these parts, as, inflammation, congestion, ulceration, stricture, and even obliteration.

In order to the healthy exercise of the sense of hearing, it is absolutely necessary that the Eustachian tube should be pervious. If it be obstructed, the result would be, not only an accumulation of secretions giving rise to numerous unpleasant symptoms, but, from the absence of air in the tympanum, there would be a want of the proper equilibrium between the air in the tympanic cavity and the external air required to prevent too great tension of the drum membrane, and, of course, the hearing would become more or less seriously affected.

These obstructions are more commonly caused by collections of mucus; congestion and thickening of the mucous membrane surrounding its faucial orifice, more or less, throughout its whole extent, or at its tympanic orifice; relaxation of the mucous membrane, especially around the faucial aperture; or, stricture of the osseous and cartilaginous portion of the canal. And, occasionally, the orifice of the tube may become obliterated.

The *symptoms* are a more or less complete loss of hearing, depending upon the character and extent of the obstruction, as well as upon the amount of air in the tympanum, and various noises in the ears; sometimes a cracking noise in the ear will be followed by a temporary improvement in hearing, especially when the obstruction exists at the faucial orifice of the tube; and again, the symptoms will be suddenly reproduced upon sneezing, coughing, or blowing the nose, probably, from the mucous matters around the faucial entrance of the tube being driven within the tube by the compression of air in the pharynx during these acts; a feeling of pressure or heaviness in the ears is frequently experienced—sometimes even affecting the head, with dullness of spirits. If the nasal mucous membrane be much thickened, the person is very apt to breathe through the mouth, which, during the hours of sleep, produces loud snoring. And an examination of the mucous membrane of the throat and fauces will find it more or less red or thick, sometimes the mucous membrane of the nose also; and frequently the tonsils will be enlarged. Upon employing the otoscope no air can be heard entering the tympanic cavity upon making either a forced expiration, or a movement of swallowing, with closed mouth and nostrils. A speculum examination will detect the membrana tympani dull, or of a leaden hue, opaque, more concave than natural, and uneven upon its outer surface, as shown by observing, instead of the triangular bright spot, two or three irregular bright spots, or, the triangular spot may be duller than natural, or larger.

Mr. Toynbee observes, that the whole of the mucous membrane of the Eustachian tube, excepting at the two extremities, is so surrounded by muscles and bone, as to be little liable to become the seat of disease; also, that the mucous membrane covering the bone which forms the *tympanic extremity of the tube* is, on the contrary, liable to congestion and hypertrophy, being, like the mucous membrane of the tympanum, exposed to the influence of the cold air entering the meatus externus. Mucous disease of the walls of the tympanic cavity, and of the tympanic orifice of the Eustachian tube, usually exist together. And in these cases, there will be loud

noises in the ears, a great concavity of the membrana tympani, which will generally be white, opaque, and frequently thickened from being involved in the disease of the mucous membrane of the tympanum, and there will likewise be an impervious condition of the Eustachian tube; the fauces not being necessarily implicated with the mucous disease of the tympanic aperture of the tube, may remain in a natural state, though, if found red and thickened, it will have no bearing on the disease at this part of the tube.—It must be recollected that deafness from obstruction of the Eustachian tube usually comes on rapidly, often disappears, and as rapidly returns; while that arising from disease in the mucous membrane, is generally slow and regular in its progress.

Obstruction from *relaxed mucous membrane at the faucial orifice of the tube*, is occasionally met with, and is not so common among children and adults liable to glandular enlargements, as among those of an opposite tendency. It is generally due to a cold, or other debilitating influence, as, overwork, late hours, hot rooms, etc. The mucous membrane gradually becomes relaxed, the lips of the tube close, and the muscles can not open them wide enough to allow the air to enter. The deafness comes on gradually; with it there is a singing, ticking, beating, rumbling, or cracking sound. Upon lying down, or turning the head round so as to look somewhat backward, the hearing becomes slightly improved. Frequently, there will be a sense of weight in the ear, as well as a feeling of confusion in the head. The patient has an appearance of being weak, perhaps, anemic; if we examine his throat, the mucous membrane of the fauces will not be found thicker than natural, but it will be relaxed and red, and striated with large blood-vessels,—the uvula will be paler than natural and relaxed, sometimes so much so as to rest upon the root of the tongue. Upon attempting to inflate the tympanic cavity, the Eustachian tube will be found obstructed. A speculum examination will detect the drum membrane more concave than natural, its surface, glossy and of a dark-leaden hue, with irregular bright spots upon it; and, sometimes, the long process of the incus may be seen through it. (*Toynbee.*)

Where the obstruction is seated at the faucial extremity of the tube, the *prognosis* is always more favorable, than where it is located along the course of the tube, or at its tympanic extremity. It is also more favorable when the obstruction is not complicated with disease of the internal ear, or with a scrofulous, or syphilitic taint of the system. In stricture of the tube, the further the narrowing is situated from the faucial orifice, the less favorable will be the

prognosis. In obstructions from bands or bridles, or in obliteration of the tube, the prognosis is always unfavorable, although cases of this kind, have occasionally been cured, or considerably benefited by treatment.

As to the *treatment*, before entering upon it, it will be proper to impress upon the mind of the practitioner that, in all cases of deafness where the Eustachian tube is obstructed, he must ascertain the true character of the obstruction by a close and careful examination. (*See* page 1235.)

If the *faucial orifice of the tube* be found thickened, this condition must be removed, before there will be any great improvement in the hearing; and the treatment, in order to be effectual and permanent, will frequently require considerable time. The measures to be pursued, are local, constitutional, and hygienical. The *local* treatment consists in applying stimulating and astringent preparations to the congested and hypertrophied mucous membrane, and stimulating or counter-irritating applications upon the external part of the throat. Nitrate of Silver, in strong solution, or even in the solid form, has been highly recommended as an application to the mucous membrane of the orifice of the tube, of the fauces, and over the surface of the tonsils should these be enlarged, as well as to the congested and thickened mucous membrane of the nostrils, when present; repeating the application according to the effect produced, one, two, or three times per week; and its application is usually followed by success. But, I am convinced, from considerable experience in the treatment of this difficulty, that there are other agents which, in many cases, will answer equally as well; thus, a solution of Tannin one drachm, in one drachm of Glycerin and a half a drachm of Rose-water, will be found a very valuable local application; so will a solution of Carbolic Acid one part in two, four, or ten parts or more of Glycerin; or, Iodide of Zinc five grains to half an ounce each of Glycerin and Water. This last solution may be applied every day, or every other day, increasing its strength to ten, twenty or thirty grains to the ounce of fluid, as the parts become accustomed to its action,—it causes a smarting sensation for an hour or two. Or, take one ounce of Olive Oil, one ounce and a half of Sweet-gum; mix, and apply heat, stirring constantly until the Sweet-gum is dissolved, and strain while hot. These articles may be applied to the diseased parts on a sponge-probang, by means of a camel's-hair pencil, or by injection, etc., repeating their application once, twice, or thrice per day, according to their influence upon the affected membrane. As they do not so permanently stain the skin, nor leave such an unpleasant

taste as the nitrate of silver, preference should be given to them in all cases where they act beneficially.—I will remark here that applications to the mouth of the Eustachian tube may be greatly facilitated by the use of a reflector or a rhinoscope, especially when they are made through the nasal passages.

Gargles composed of stimulants and astringents are likewise indicated; a very excellent one is composed of Dilute Acetic Acid, Water, each, one pint, Salt a tablespoonful. This mixture may be used as a gargle two or three times daily; and to improve the condition of the mucous membrane of the nostrils, a portion of it may at the same time be drawn up through the nose, and passed out by the mouth. Or it may be passed upon the mucous membrane of the nasal cavities by means of injections by hydrostatic pressure, referred to at page 548. Other gargles may be similarly employed, as, an infusion of equal parts of Black Cohosh Root and Geranium Root; an infusion of equal parts of Golden Seal Root, Witch Hazel Leaves, and Bayberry Bark; an infusion of equal parts of Golden Seal Root and Blue Cohosh Root, to every pint of which add half an ounce of Alum; or, Chlorate of Potassa four ounces, Hydrochloric Acid forty minims, Distilled Water one pint; mix.

When there is considerable congestion of the mucous membrane, some rubefacient liniment, as the Compound Capsicum Liniment, Black Liniment, Compound Liniment of Turpentine, or, Compound Tincture of Camphor,* may be applied to the external surface of the throat, over the region of the tonsils more especially, rubbing it in thoroughly, and repeating it two or three times a day. And in very obstinate cases, pustulation over the region of the tonsils, the upper part of the sternum, and over the inferior part of the clavicular region may be produced and kept up for a length of time, by means of Croton Oil Liniment, etc.—Sometimes there may be a discharge from the external meatus; if it be profuse or troublesome, treat it according to the method laid down on page 1281. Usually, if there be no active disease of the tympanum or its membrane, the discharge will cease with the removal of the tubal obstruction.

Enlargement of the tonsils, can not of itself give rise to deafness, but when the engorgement and hypertrophy extends to the adjacent parts and to the orifice of the Eustachian tube, obstructing or closing it by thickening or inflammatory exudation, then more or less deafness may be present; and this has been called "throat deafness." Ablation of the tonsils is in no case justifiable, unless the

* The preparations referred to in this work, where the formulæ are not given, are those described in my *American Dispensatory*.

hypertrophied organ, being increased to three or four times its original size, gives rise to an irritation or chronic inflammation of the surrounding mucous tissues, which the local applications can not remove; in which case, the removal of the enlarged tonsils, (and with them the source of constant irritation), will render the neighboring mucous membranes more readily amenable to treatment. I have frequently cured cases where there was more or less dullness of hearing at irregular intervals, occasional cracking sounds, ringing, or buzzing, with a sense of fullness and indistinct soreness in the ears, merely by removing the inflamed and thickened condition of the fauces, and faucial orifice of the Eustachian tube, by means of local applications; and, in some instances, this condition had existed for fifteen or twenty years, the hearing very gradually becoming worse, and occurring at shorter intervals.

Catheterism of the Eustachian tube is seldom or never necessary in obstruction of its faucial aperture from the preceding cause; nor, indeed, should it be practised in any case of obstruction of this tube, when the mucous membrane surrounding this orifice is thickened; the congestion and hypertrophy of this tissue must first be removed, or at all events be considerably diminished, before attempting catheterism. If the attempt be made before this is effected, it will be found rather a difficult operation, and of no utility even though air be successfully passed into the tympanic cavity; beside, if frequently repeated, it will augment the abnormal state of the membrane, and, may cause laceration of it, emphysema, and even death. After the thickening has been removed, should any mucous interfere with the passage of air into the tympanic cavity, catheterism may be undertaken and air be blown through the tube into the cavity, if the patient can not effect this by the movement of swallowing with the mouth and nostrils closed. These cases are often very obstinate and unyielding, requiring many months, and even two or three years, before any permanent benefit can be effected.

In all cases of obstruction of the Eustachian tube, from whatever cause, attention must be bestowed upon the external meatus and membrana tympani, treating any abnormal condition of them by the means laid down therefor, under their respective heads.

The *constitutional* treatment will depend entirely upon the anemic, strumous, rheumatic, etc., disposition presented by the patient, using those agents which will strengthen and invigorate the system, and overcome, in a greater or less degree, the peculiar disposition manifested. Thus, Citrate of Iron, Citrate of Iron and Quinia, Iodide of Iron, Iodine, Iodide of Potassium, or of Ammonium, Bromide of Potassium, or of Ammonium, bitter vegetable tonics, scrofulous,

antisyphilitic, or alterative syrups, etc., will all prove serviceable when properly employed according to the indications.

The *hygienic* treatment will be that given in the Introduction to this work; keeping the feet, limbs, and body warm; attending to the functions of the kidneys, bowels, and skin; sponging the throat and neck, the upper part of the chest, and the shoulders, night and morning with cold water, and then rubbing the skin with a rough towel, till it becomes red and hot; very sensitive persons should commence with lukewarm water, and gradually accustom themselves to its employment cold. This course tends to overcome the disposition which many have to contract cold upon the slightest causes. Likewise taking plenty of exercise in the open air; attending to diet; avoiding exposures to cold, moisture, and sudden changes of temperature; avoiding overwork and fatigue in either physical or mental labors; breathing always through the nostrils instead of through the mouth, etc.

When the obstruction is due to a *relaxed condition of the mucous membrane of the faucial extremity of the tube*, the treatment will be somewhat different from that just given, in omitting the employment of nitrate of silver, and in having the local applications of a more stimulating character. The *local* applications will consist of stimulants and astringents, as, Tannin, Oil of Capsicum, and Glycerin; Carbolic Acid and Glycerin; solution of Alum; as well as some of the local preparations just named for thickening of this part. Some of these may also be applied directly upon the parts, used as gargles, and drawn through the nostrils, as previously recommended. A very excellent preparation which may be used in injection, or as a gargle, and drawn through the nostrils, is composed of Geranium, Bayberry, Golden Seal, each two drachms, Capsicum one drachm, Whisky half a pint; mix all together, heat to the boiling point, cover, and when cold, strain. It may be used two or three times a day. In connexion with these measures, counter-irritating applications may be applied along the sides of the neck, and to the upper part of the throat. The *constitutional* and *hygienical* treatment will be similar to that just named above.

When the obstruction is due to a *thickening of the mucous membrane of the tympanic orifice of the tube*, the treatment will be the same as that named for hypertrophy of the mucous membrane of the tympanum.—Obstructions in the tube from *stricture of its osseous* or *cartilaginous portions*, as well as from *adhesions by means of membranous bands*, very rarely occur, and there is no successful treatment known for them. It is in cases of deafness from these obstructions,

and in obliteration of the tube, that perforation of the membrana tympani has been recommended. (*See* page 1252.)

2. *Chronic Inflammation of the Eustachian tube* is commonly associated with that of the tympanum, so that the treatment will be the same.

3. *Chronic Inflammation of the Mucous Membrane of the Tympanum.* This is generally the result of a previous acute inflammation, which may be the result of cold, or it may occur as a sequel of measles, scarlet fever, hooping-cough, or typhus fever, etc., and which may be ascertained from the previous history of the case. And if the disease be allowed to progress it may extend to the brain, affecting the dura mater.

When the mucus secreted from the affected membrane, accumulates to such an extent within the cavity of the tympanum as to press the membrana tympani outwardly, in a more or less convex form, the layers of this membrane gradually yield to the pressure, becoming thinner and thinner, until finally they rupture, and the mucous discharge finds an exit through the opening thus affected, forming an *otorrhea.* Or, the discharge may not accumulate to a very great extent, being eliminated, as fast as it is secreted, through the Eustachian tube; in which case hypertrophy of the tympanic mucous membrane and of the membrana tympani will ultimately take place.

In the first instance, that is where the drum membrane ruptures, the principal *symptom* is the discharge, which may vary from a thin to a thick and viscid mucous secretion, occasionally offensive; and with which one or several of the following symptoms will sooner or later be associated, viz.: dullness of hearing, attacks of giddiness, more or less pain in the ears and head, heat and a sense of weight in the head, confusion in the head, sensation of swimming in the head, hissing, whizzing, buzzing, humming, rattling, and other sounds, which symptoms are apt to be aggravated by cold, fatigue, or slight excitement. Sometimes there will be paralysis of the muscles of the face, owing to the disease affecting the portio dura nerve. Upon an examination with the speculum, more or less of the membrana tympani will be found destroyed; if any portion of it remains it will be white, thickened, and opaque,—but it must be remembered that this thickening of the walls of the tympanum, and its membrane may occur without symptoms of inflammation hav-

ing at any time been manifest. Sometimes a portion of the drum membrane will be found fallen inwards, perhaps, adhering to the promontory; or membranous bands may extend from one part of the tympanum to the other, etc.

In a healthy condition, the mucous lining membrane of the tympanic cavity is smooth, polished, rather dry, exhaling a very slight quantity of thin mucus, so thin as frequently to require the assistance of the touch as well as of the sight to detect it, and so transparent that the bone beneath gives to it a silvery or grayish-white color; it is furnished with numerous nerves which render it exceedingly sensitive, but less so than the drum membrane. During inflammation, its numerous blood-vessels becoming filled, impart to it a color varying from light pink to red, more or less thickness, and sometimes ulceration.

In the disease under consideration, if the aperture in the membrana tympani be large enough to enable the examiner to see any of the tympanic walls, he will find them deep red and smooth; red, thickened, and villous; velvety; pulpy; or occasionally white. The thickening may vary in degree from a slight hypertrophy to one nearly filling the tympanic cavity; and very frequently the external meatus will also be found lessened in diameter, from congestion and thickening of its walls; in many instances, the promontory may be plainly seen. We should also ascertain by the methods already explained, whether the Eustachian tube is free or obstructed; if partially free, a prolonged squealing, gurgling, crackling, or hissing sound will be heard.

In the second instance, that is where the secreted matters are passed off through the Eustachian tube, the membrana tympani remaining entire, the *symptoms* will be similar to those previously named, but considerably slighter; or, partial deafness alone may be present without any other appreciable symptom. Here, we can not detect the condition of the walls of the tympanum, but we can form an idea of it from the appearance of the membrana tympani, the inner mucous layer of which must participate in the unhealthy action, as well as its other layers ultimately. The speculum will reveal the condition of the drum membrane; it will be found to have lost its polish; to have a rough, irregular surface; to have become thickened and opaque, sometimes so much so that the handle of the malleus can not be seen, while, in some instances, the short process may be readily observed; and to present a grayish-white, whitish or parchment-like color, sometimes mottled red and white, or slightly pinkish. If the Eustachian tube be obstructed, the membrane will be collapsed or unnaturally concave on its exter-

nal side, unless the tympanic cavity be so greatly filled with morbid secretions as to distend it and give to it a convexity. The meatus may be healthy, or, more generally, smooth, white, polished, and, if the disease has existed for a long time, there may also be an absence of cerumen. If the thickening of the tympanal mucous walls is so great as to obstruct the tympanic orifice of the Eustachian tube, the patient will be unable to inflate the cavity of the tympanum.

In the above cases, if, from a small aperture in the drum membrane, or, from this membrane being unruptured, a large amount of secretion is retained within the tympanum, all the symptoms will be aggravated, and the disease, extending to the brain, may occasion death.*

Occasionally the mucous membrane of the tympanum becomes ulcerated, in which case there is apt to be more pain, a fetid odor about the ear, and, sometimes, paralysis of the muscles of the face, or convulsions. A speculum examination will find the mucous membrane destroyed, and, perhaps, thick, tubercular deposit in the cavity.

The *treatment* will depend upon the condition of the parts. If the membrana tympani be not ruptured, and the morbid secretions of the tympanic cavity are not in such an abundance as to distend this cavity and cause a bulging outwardly of the drum membrane, but, instead thereof, a whitish, opaque, thickened, and collapsed condition of this membrane is present,—a solution of Nitrate of Silver (ten or twenty grains to the ounce), may be applied every day or two to the external surface of the membrane for the purpose of

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*Toynbee states that "affections of the tympanic cavity are very apt to produce disease in the cerebrum. This circumstance is accounted for, first, by the great liability of the mucous membrane of the tympanum to undergo pathological changes; and, secondly, by the existence of very intimate relations between this membrane and the dura mater. The affection of the tympanum which most frequently produces disease in the cerebrum is chronic catarrhal inflammation of the mucous membrane, an affection thus far known only as an otorrhea. The changes produced by these tympanic affections are:—1. Inflammation of the dura mater, and its separation from the surface of the petrous bone by serum. 2. Ulceration of the dura mater, and its complete detachment from the petrous bone. 3. An abscess in the substance of the cerebrum. 4. Undefined suppuration of the substance of the cerebrum. From a careful examination of cases, it appears that chronic catarrhal inflammation of the mucous membrane of the tympanum may exist as many as twenty or more years, without the production of any disease beyond it, or at least *without the existence of symptoms by means of which the presence of such disease can be diagnosed;* nevertheless, in the great majority of cases, vital structures become sensibly affected in a much shorter period." Triquet states that, from his own investigations upon the subject, he can not admit these statements.

removing its hypertrophied condition. Or, instead of the nitrate of silver, one of the local applications named under the treatment of "Relaxed Membrana Tympani," page 1292, or, under that of "Chronic Inflammation of the Membrana Tympani," page 1297, may be substituted.

At the same time vesication or counter-irritation must be applied behind and under the affected ear, and be maintained more or less constantly. The faucial mucous membrane of the Eustachian tube must not be neglected; if this be congested and thickened, the same treatment must be pursued as recommended in the treatment for "Obstruction of the Eustachian Tube," page 1312, and this treatment must be persisted in until the parts are restored to a normal condition. Then, and not until then, (unless the tube be free and unirritable), we may endeavor to pass into the tympanic cavity vapor of water, or, of infusion of Hops, Catnip, Balm, etc. If these enter the cavity readily without giving rise to pain or other unpleasant symptoms, more active vapors may be introduced for the purpose of overcoming the diseased condition of the walls of this cavity, as, for instance, some of those named on page 1299, under the treatment of "Chronic Myringitis." But, the practitioner can not be too strongly impressed with the fact that catheterism of the Eustachian tube, unless properly and carefully accomplished, will prove worse than useless, and probing it by means of elastic probes introduced through the catheter, is very rarely required, and is more apt to produce injury than benefit.

If there be a slight discharge from the external meatus, this must be treated by the means heretofore recommended on page 1281.

If, however, the tympanic cavity be so distended with morbid secretions as to endanger rupture of the drum membrane, it will be better to perforate this membrane artificially, see page 1252. Toynbee truly observes, "It is of great importance to be able to decide when the membrana tympani should be perforated by artificial means, or when an orifice in it should be enlarged." The greatest difficulty in these cases, will be to keep the punctured orifice from closing in a few days. The balance of the treatment will be the same as just described above.

If the drum membrane be already perforated, the above treatment, together with that named on page 1304, for "Accidental Perforation of the Membrana Tympani," will be proper. When there is an ulcerated condition of the mucous membrane of the tympanum, the treatment will be the same as just named.

In chronic inflammation of the tympanic mucous membrane, and especially when this membrane is ulcerated, or exposed to the action

of external agents from perforated drum membrane, the contact of cold air with the affected parts will give rise to pain and irritation, and augment the chronic inflammation, etc., which we are treating; in such cases the ear should be protected, not by plugging up the orifice of the external meatus, but by placing therein a loose and not very thick layer of cotton wool, or, a handkerchief may be worn so as to cover the ears, whenever the patient is exposed to cold or damp atmosphere.

In chronic myringitis not only must the proper hygienic measures be pursued; but, as the constitution is almost always more or less affected, the same constitutional rules must be adopted, as named on page 1314, under treatment for "Obstruction of the Eustachian Tube." Of course, we can not expect rapid or miraculous cures in these diseases; in many instances, much benefit may be had, but no cure.

4. *Rigidity of the Mucous Membrane of the Tympanum.*—This affection may occur in young persons, but is much more common among elderly persons, being, according to Toynbee, "*the* disease which causes *deafness in advancing years.*" It is not due to any derangement of the auditory nerves. This disease is almost always caused by repeated attacks of cold, and not unfrequently is associated with rheumatism, as well as chronic inflammation and hypertrophy of the fibrous layers of the membrana tympani. In this rigid condition of the tympanic walls, the ossicles, the membrane of the fenestra rotunda, and the labyrinthine fluid, gradually become involved, and finally become fixed and immovable. The disease may or may not be preceded by pain or inflammation; in advanced years, these *symptoms* rarely occur. More or less deafness is present, and this deafness is of a peculiar kind, being rather a want of adapting power of the auditory organ, occasioned by the fixed condition of the ossicles and muscles. With some persons sounds are heard, but seem to be perverted, as the patient can not describe them correctly; others can distinguish single sounds, however low, but become confused and hear indistinctly when two or more sounds are made; again, a third class may hear a person's voice without distinguishing the words; many can hear only when spoken to slowly; while not a few hear sounds imperfectly, imagining very low ones to be quite loud, or else locate the sound in a direction different from its true one. Before the disease becomes permanent, some persons can hear very well upon making an effort, but as the effort involves fatigue, when continued for a length of time, the deafness returns

as soon as relaxation from the fatigue occurs. This peculiar deafness comes on at first at longer or shorter intervals, but ultimately becomes more permanent. One of the forms of tinnitus may be present, or a sense of weight in the affected ear, but these symptoms do not always exist.

A speculum examination will detect little or no opacity of the membrana tympani, or, it may be dull and opalescent or white, so much so that the handle of the malleus can not be distinguished. Frequently, this membrane will be considerably thickened, and more concave than usual. On attempting to inflate the tympanic cavity, the Eustachian tube will be found pervious; but from the morbid condition of its tympanic orifice and of the walls of the tympanum, instead of the normal crackling sound, the air will be heard to enter the tympanic cavity in short puffs, with a bubbling sound; with an unnaturally loud crackling; or, with a dull flapping noise.

The *treatment* consists in applying to the outer half of the external meatus a solution of Nitrate of Silver, thirty grains to the ounce of distilled water, and repeating this every second or third day; and if the membrana tympani be opaque a solution of the same salt, six grains to the ounce, may be applied to it every day. During the intervals between these applications, five or ten drops of Ether and Chloroform may be instilled into the ears, and repeated two or three times a day; or, a tincture may be made with these articles, of Cimicifuga, Gelseminum, Caulophyllum, Jeffersonia, etc., and be used in the same manner. If the application prove too strong it may be diluted with Glycerin, one-half, or to the strength required.

In addition to this, Tincture of Iodine, vesication, or counter-irritation, should be applied behind and below the ears, either daily, or on alternate days. And it will also be proper to apply stimulating washes to the throat and fauces, as well as to the faucial orifice of the Eustachian tube; being careful, however, to remove any congestion or thickening of the lining membrane of these parts, should it be present, by the treatment heretofore advised, previous to employing the stimulants.

Internally, alteratives should be administered, as, Compound Syrup of Turkey Corn, Compound Syrup of Stillingia, Compound Pills of Poke, Compound Tincture of Black Cohosh, Compound Tincture of Colchicum, Iodide of Ammonium, etc., together with such other measures as the condition of the general system would indicate. The bowels must be kept regular; the whole surface of the body should be bathed with a warm, stimulating and alkaline bath twice every week, and once in every two or three weeks a

Spirit Vapor bath should be taken. Patients should exercise as much as possible in the open air; should not suffer themselves to become too much heated by sitting near a fire nor by remaining in warm rooms, and should likewise attend to other matters of hygiene, as, diet, clothing, etc.

In obstinate cases the introduction of dilute vapors of Iodine, Bromide, etc., into the tympanic cavity, will frequently be found to act beneficially. (*See* page 1299.)

5. The *Ossicles* are liable to diseases the same as bones of other parts, as, absorption, ulceration, disconnection, caries, etc. "These little bones may also be dislocated one from another, or become totally disconnected, and they have been found within the mastoid cells, or even in the vestibule." The muscles and ligaments of the ossicula auditus may also be affected similarly to analogous tissues elsewhere. And, sometimes, false membranes are found in various parts of the tympanic cavity, stretching from one part to another, connecting distant parts, and these membranous bands often become so firm and unyielding as to prevent any movements of the bones to which they may be attached. As there are no positive symptoms by which these various morbid conditions may be detected, the *treatment* for them, has to be based upon general principles, consisting of constitutional measures, the use of vapors and other local means, and attention to hygienic rules; there being no established treatment for them.

6. The ossicles of the ear are united to each other by minute articulations which, notwithstanding their minuteness, possess a synovial membrane and a fibrous capsule, the same as other articulations. They are as already stated, subject to all the diseases of larger articulations, one of the most important of which, is *anchylosis*,—which occurs frequently, not only as a consequence of rheumatic, gouty, and syphilitic affections of the ear, but also as a complication of chronic inflammation of the internal ear.

The *symptoms* are, various kinds of tinnitus, or an entire absence of it, more or less deafness, and, rarely, pain. If, after having illuminated the auditory canal, the membrana tympani be gently struck with a blunt probe upon the point corresponding to the malleus, and the patient experiences a fugitive sensation as of feeble but positive distant sounds, the anchylosis is incomplete, and there is some hope. Upon a speculum examination the external

auditory canal will be found healthy, containing, perhaps, a little blackish and hard cerumen; the membrana tympani will be transparent, or present only nebulous tints; the handle of the malleus will project outwardly at its point of insertion, and, in some instances, this will be so marked, that the extremity of this ossicle will seem to have produced a hernia through the membrane. This membrane will not be thickened, nor present vessels at its surface, nor in its layers. If insufflation of the tube be attempted, the air will penetrate into the tympanic cavity without difficulty, making a dry noise with, perhaps, one or two small cracklings. But if the patient makes a strong expiration, the mouth and nose being closed, one or several loud and harsh sounds will be heard; when this sign is positively verified, there is undoubtedly an incomplete anchylosis. If the anchylosis be complete, neither the douche of air, nor the expiration will cause any crackling sound to be heard; the ossicles are then perfectly stiff and consolidated, and their joints ossified, remaining silent and immovable during the above-named examinations.

In the *diagnosis* we must ascertain the commemorative symptoms; the rheumatic, gouty, catarrhal, or syphilitic tendency of the patient or of his parents, will materially aid in doubtful cases. The character of the disease may be determined from *chronic catarrhal inflammation of the middle ear*, in which the membrana tympani preserves its concave form and loses its transparency, and the noises heard are mucus and not crackling. At a more advanced period of the inflammation the principal symptoms of the catarrh and of the anchylosis, are very difficult to distinguish. *Nervous deafness*, may be determined readily, by the entire absence of cerumen in the auditory canal, by the perfect transparency of the drum membrane, its integrity of form and situation, as well as of the ossicles, and by the absence of mucus, and, especially, crackling sounds. Beside, the erethism and the buzzing tinnitus are considerable, and these last are often synchronous with the arterial pulsations.

The *prognosis* is unfavorable, and the more so when treatment is instituted at a long period after the commencement of the disease, at which early stage the adhesions are still plastic and formed only by the hypertrophied or indurated mucous membrane. The chances for amelioration are greater when the anchylosis is incomplete, or when the adhesions of the articulations are not osseous nor fibro-cartilaginous.

As to the *pathological anatomy*, we will find in incomplete anchylosis a simple hypertrophy or thickening of the mucous membrane of the parts. This membrane serving as a periosteum to the ossicles,

its thickening will impede the motion of these little bones, without wholly suspending it; and hearing will not be completely abolished. More frequently there will be plastic effusions, under the form of induration, and of inflammatory origin.

Complete anchylosis presents four principal anatomical morbid changes, as, 1. A simple expansion of the hypertrophied articular membrane is prolonged over the base of the stapes, or over the head of the malleus, binding it fast to the incus, or over both at the same time. 2. A fibrous expansion over this same base, and strongly attaching the articular surface of the stapes to the petrous bone or the incus to the malleus. 3. An expansion of the articular membrane over the base of the stapes, and the head of the malleus, with scattered calcareous deposits over this base. 4. Osseous deposits embracing the fenestra ovalis and the stapes, consolidating them. These last two are more frequent among the gouty and syphilitic; the former, among rheumatics and those disposed to catarrhal attacks.

The base of the stapes is more frequently anchylosed; the other ossicles are not always exempt from it, but it is then merely a complication of little importance in the prognosis.

In consequence of the consolidation of the ossicles among themselves and to the promontory, certain curious changes occur in the chain of bones, and in the shape of the membrana tympani. In well-marked cases, the chain of ossicles is, so to speak, broken; the handle of the malleus is, as it were, luxated downward, drawing with it the short branch of the incus. The drum membrane follows this movement, and in place of presenting its external concave surface, appears as if divided into two lateral compartments or facets, obliquely directed from the center to the circumference, and forming a double inclined plane. The extremity of the long process of the malleus forms the apex and the edge of it, and the lateral sides or planes are represented by the two facets of the membrane, which is, as it were, cut and divided into two segments by the acute projection of the malleus. This curious pathological disposition, is important to verify, and is one of the most certain signs, not only of anchylosis, but also of adhesions of the drum membrane to the promontory through the intermedium of membranous bands.

The *treatment* must be local and general. Of the local means, those which have succeeded the best, are fumigations with Acetic Acid, or Spirit of Mindererus, at first passed into the external ear, and afterward through the Eustachian tube into the middle ear. In case, the original cause of the anchylosis, inflammation of the tympanum, is not subdued, cupping and counter-irritation to the

mastoid process, cauterization of the pharynx in case of persistent granulations, etc., are the proper means to pursue.

As to the general treatment, gout, rheumatism, syphilis, or catarrhal disease, must be combated by the appropriate remedies; and injections of Strychnia or Veratria be passed into the middle ear through the Eustachian tube, prepared and used as described on page 1249. In some cases, gaseous and fluid sulphurous douches will be of service.

7. Occasionally, *morbid growths and deposits* of various kinds occur in the tympanic cavity, which can not be detected during life, unless the membrana tympani be destroyed. Not only the soft tissues but even the bones may become involved. "In fact, when once disease seizes upon the parietes of the middle ear, it is impossible to say what amount of mischief it may not effect." (*Wilde.*)

8. The *Mastoid Cells* may become diseased by extension of morbid action from the tympanum, and which frequently accompanies or follows measles, scarlatina, small-pox, and scrofula. More generally it is the result of acute inflammation produced by cold, or, by the causes just named. These cells may have their delicate mucous lining membrane livid, red, thickened, and pulpy, similar to the morbid condition of the tympanic mucous membrane; the cells may be filled with purulent or muco-purulent, scrofulous, or tuberculous matters; the bones of the part may become soft, or carious, forming fistulous communications; and, especially in children, exfoliation of a part, or of the whole mastoid process may occur, particularly when the case is neglected. Unless the disease progresses toward the surface, causing a protuberance of the process the diagnosis will be obscure. If the accumulated matter finds a free exit through an aperture in the membrana tympani, or at some other safe location, the disease may not prove fatal; but if the matter be pent up, or be so lodged in the concavity of the process that it can not be discharged, a fatal result will sooner or later take place. Gentle percussion upon the process, an exploration of the tympanic cavity, and the presence of cerebral irritation, as great pain in the head, convulsions, rigors, restlessness, delirium, drowsiness, etc., together with the previous history of the case, as, a tendency to glandular swellings, pains in the ear, in the back of the head, and in the region of the mastoid process, coming on at different times, giddiness from time to time, occasional sharp pains on masticating or

while gaping, etc., will aid in the diagnosis. The walls of the meatus will commonly be red and giving out a discharge, while the membrana tympani will be found entire, but white and thickened. If the disease has not reached the brain or its membranes, there may be a chance for recovery; if it has affected these organs death will certainly ensue, notwithstanding all treatment.

The *treatment* consists in keeping the patient quiet, applying counter-irritation over the mastoid process, as the Compound Tar Plaster, and, after a discharge has been kept up for a length of time, change its location placing it between the shoulders, and so continue alternately from one point to the other, being very careful, however, not to let the discharge at one point wholly dry up, until a discharge has commenced at the other. If there be a bulging outward of the membrana tympani, from distension of the tympanic cavity by matter, it may become necessary to perforate this membrane. (See *Perforation of the Membrana Tympani*, page 1252.) If the mastoid process be more elevated than natural, the skin over it being discolored, with manifest fluctuation, it may become necessary to perforate this process. (See *Perforation of the Mastoid Process, and Note*, page 1253–4.)

The various symptoms that may present themselves will have to be treated on general principles, giving antiscrofulous agents to the strumous, tonics to the debilitated, chalybeates to the anemic, etc. The hygienic measures will principally be, regularity of bowels, attention to diet, bathing the body every three or four days, avoidance of fatigue and exposures, and confinement within the house.*

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* Toynbee states that if an aural discharge "arises from the dermoid meatus, the membrana tympani being entire, there is, as before stated, most probably irritation in the tympanic cavity or mastoid cells, of which irritation the discharge is the symptom. Unless there were simply some eczematous state of the meatus to account for the discharge, and unless the hearing power were perfect, such a case should be looked upon with suspicion, especially if attended with any symptoms of brain or cerebral irritation. Again, if the discharge issues from the tympanic cavity through a small or valvular opening, and it is requisite to blow the nose forcibly to clear out the tympanum, there probably is, or will be, some affection of the bone, from the accumulation of the discharge. If there is a large orifice in the membrana tympani, or that membrane is absent; if there is no ulceration of the mucous membrane of the tympanum; if there is some power of hearing remaining; and if, by pressing and tapping the region round the ear, no pain is felt; and if there are no other symptoms of disease in the ear or head, I think it may be assumed that there is no disease of the bone; and that by attention to daily syringing, and the other plans alluded to when speaking of the treatment of these affections of the ear, there is a fair prospect of the disease remaining confined to the mucous membrane of the ear. On the other hand, it becomes a duty to state that any negligence on the part of the patient, by which

DISEASES OF THE INTERNAL EAR.

That there may exist diseases of the internal ear, that is to say, of the vestibule, semilunar canals, cochlea, and the nervous expansions enclosed within these cavities, has been satisfactorily demonstrated by post-mortem investigations; yet it is not only difficult, but generally quite impossible to determine the presence or character of such diseases during the life of the patient. This is owing to the concealed situation of the ear, to our imperfect knowledge of these diseases, to a want of more certain modes of investigating them, and to the fact that they are often rendered still more obscure by the accompanying cerebral symptoms. And even, were we able to properly diagnosticate affections of the internal ear, our therapeutical resources would accomplish but little in the way of cure, being principally confined to counter-irritation over the mastoid process and nape of the neck, tonics, and alteratives.—Acute inflammatory affections of these parts, as well as of the external and middle ear, may frequently be promptly subdued by hypodermic injections of solutions of Sulphate or Muriate of Morphia, or other sedative, made at the temple, over the mastoid process, or below the ear just posterior to the ramus or angle of the inferior maxillary bone.

Nervous Deafness. Until recently, all cases of deafness,—in which, after as thorough an examination of the external and middle ear as the circumstances would allow, no appreciable lesion of the external ear, membrana tympani, Eustachian tube or middle ear could be detected,—were set down as cases of nervous deafness. But pathological anatomy has revealed the fact that the greater part of these so-called cases of nervous deafness, were due entirely to abnormal conditions of parts associated with the middle ear; also, that certain morbid changes may occur in the tympanum, with the ossicles and the fenestræ, which it is impossible for us to detect during life, either by catheterism of the Eustachian tube, or by speculum examination; the membrana tympani, in the latter case, being intact and presenting no unhealthy appearances. And, consequently, the cases of true nervous deafness have been very much diminished in number.

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the discharge should be allowed to collect so as to fill up the orifice in the membrana tympani—a blow on the ear, an attack of fever, or any severe illness might cause an irritation in the ear, which, if unattended to, might advance to the bone,"—and thence to the brain.

That the nervous apparatus of the organ of hearing may become diseased, does not admit of a doubt; but, unfortunately, we have no positive method of arriving at a correct diagnosis, nor even a reliable curative treatment for the disease, should we be so fortunate as to arrive at a proper diagnosis.

Now there can be no satisfactory reason given, why the soft and minutely ramified and subtilized labyrinthine nerve should not be as liable to derangements from certain causes as other nerves; why there should not be a hyperacusis from excessive sensibility of this nerve; a paracusis from imperfect nutrition of the nerve, as, for instance, in anemic conditions; or a complete cophosis from concussions, labyrinthine disease, paralysis, etc. And authors have admitted that nervous deafness may be *caused*, by concussion, as, from a fall on the head, a blow on the ear, violent and unexpected sounds, and a severe jar of the whole frame; by congestion; by exposure to cold; by compression of the nerve; by convulsions; by sympathy with gastro-intestinal, menstrual, and other derangements; by certain poisons, as that of scarlatina, measles, small-pox, typhus, gout, rheumatism, intermittent fever, syphilis, jaundice, etc.; by the influence of certain medicines in large doses, as quinia, and belladonna; by mental excitement, hysteria, and by physical debility.

There are no *symptoms* which may be referred to as peculiar to nervous deafness; more or less deafness may be present, with or without tinnitus in one of its many forms; headache; and, perhaps, opaque or nebulous spots on the membrana tympani; which symptoms, especially the deafness and tinnitus, will increase more or less rapidly; and all of which may be met with in almost every form of chronic aural disease.

As to the determination of nervous deafness, much will depend upon the history of the case, aided by a careful examination, and even then the diagnosis can not always be positive. If the patient, previous to the diminution or loss of hearing, had been exposed to one or more of the above-named causes; if, up to that time, the hearing had been normal, without any previous inflammation, pain, or discharge from the ear; if the loss of hearing manifested itself soon after the exposure; and if we can detect no evidence of disease in the external or middle ear, by the several methods of examation now pursued by aurists, we may have reason to consider that the case is one of nervous deafness, although, as above stated, we must remember that there may be actual disease of the middle ear which, from the concealed condition of the part, it is impossible for us to discover; and again, we may have a true nervous deafness associated with a lesion of the external or middle ear.

The *prognosis* of nervous deafness can not be said to be favorable; in the majority of bad cases but little influence can be effected by treatment; and even when certain conditions of the system which have occasioned the deafness, have been wholly removed, the deafness will still continue, because the original disease has so affected the labyrinthine nerve as to place it beyond the power of restoration by the means usually employed.

Treatment should always be attempted in these cases, when we are fully satisfied of their causes, with the hope that the removal of the cause may be followed by an improvement in hearing, or else so influence the auditory nerve as to allow an improvement by properly directed measures. Thus, if the patient be chlorotic or anemic, the usual means for overcoming these conditions should be resorted to; if there exists gastro-intestinal derangement from worms or other causes; if menstrual derangement is present, or jaundice, etc., we must remove these several states by appropriate measures; and so with other abnormal conditions. In cases, where the deafness results from certain poisons or taints received into the system, tonics and alteratives will be required; if it arises from concussion, convulsions, apoplexy, paralysis, etc., in which constitutional treatment will prove useless, revulsives and counter-irritants may be prescribed, as active cathartics, sudorifics, and Compound Tar Plaster to the mastoid process and to the nape of the neck, alternately continuing this counter-irritation for several months, or even longer if a degree of improvement be observed to follow; these measures being, however, modified to suit the strength and other conditions of the patient. The instillation of stimulating drops, oils, etc., into the external meatus must be positively prohibited, unless the practitioner himself prescribes them for actual disease of this part of the ear.—I may say here, that I have not, in my own practice, derived any benefit from electricity or galvanism, in this form of deafness. (*See formulæ for injections* on page 1245–50.)

The proper hygienical measures, adapted and regulated to suit the mental and physical condition of each patient, should also be rigidly pursued, as, exercise in the fresh air; regularity of bowels and kidneys; attention to the skin, clothing, diet, and hours of rest; and relief from all mental excitement, etc.

Persons who use tobacco in any form, as well as habitual drinkers, are subject to an affection of the ears which frequently results in an obstinate and even incurable deafness, and which is due to the morbid state of the constitution produced by the long-continued use

of these deleterious articles. There is no discharge from the ear, no accumulations of mucus in the tubes or middle ear, no thickening of the aural membranes; but there is a kind of numbness or torpor in the ear, with a peculiar sense of coolness in the same organ, but never any pain; a want of cerumen, a normal disposition of the membrana tympani and ossicles, no pathological vascularity of the membranes; an extreme dryness of the pharynx, nasal fossæ, tubes, and middle ear; such are the principal symptoms which characterize this singular affection. Both ears are generally attacked, though the symptoms may be observed at an earlier period in one than in the other, and in this one the deafness will be the greater. Without being very marked at the commencement, the deafness soon becomes annoying, and increases rapidly, with whistling or hissing tinnitus. This affection may be divided into three stages, as follows:

In the first stage the patient usually experiences suddenly and during the night, a whistling in both ears, intermittent, and having a somewhat metallic tinkling. During the day this morbid noise diminishes, increases after a meal, and especially after supper, and continues thus without interruption; at the same time the slightest sounds are painful to the ear. Conversation in a moderate tone is very fatiguing, and the patient closes his ears with his fingers or with cotton, not only in the street, but also at home, or when among his associates. This period lasts from a few days to two or three months, seldom longer.

The second stage now manifests itself; the patient rejoices in an apparent amelioration of his symptoms; the tinnitus diminishes or ceases altogether; the intolerance of loud and sharp sounds has also ceased—indeed, he now seeks loud noises, noisy conversations, and complains that persons speak too low to him. This state lasts but a short time, and sometimes is suddenly followed by the next stage.

In the short space of one night the third stage comes on; and the patient, to the surprise of his friends, becomes suddenly deaf, and which continues, unless timely assistance be procured, during life, obstinately resisting all treatment. The deafness may be complete, or the patient may be able to hear a watch applied upon the ear or between the teeth.

The *diagnosis* is easy, as the affection is invariably the result of a prolonged use of tobacco or alcoholic liquors. The throat and fauces will appear purplish red, and an innumerable quantity of small red, granular points will be seen, giving to the membranes an appearance of shagreen. The nasal fossæ present the same

aspect throughout their whole extent. If the patient, holding his mouth and nostrils closed, forces air into the tympanum, the physician can hear the air enter it, but without any mucous or crackling sounds; but tinnitus will now appear for the first time, or else be increased at the instant, and this increase of the morbid noise will last for several hours, or even days, disappearing only by a timely and appropriate treatment, or by yielding to the third stage of the disease, in which there is a partial or complete paralysis of the auditory nerve.

No obstructions of any kind will be found in the Eustachian tubes, and the membrana tympani will present a normal appearance. Even without this examination, a verification of the symptoms as they occur in the three stages of the disease, occurring as just named, will render it almost impossible to form an erroneous diagnosis.

The *prognosis,* is always unfavorable, as few patients will consent to give up their bad habits.

The *treatment* consists in the first place in prohibiting the use of tobacco and liquor, and unless the patient will renounce their employment, remedial measures will be useless.

The treatment will commence by the application of counter-irritants over the mastoid processes, and for this purpose the Compound Tar Plaster will be found very valuable. In some cases, previous to the application of this plaster, it has been recommended to cup the part, but this is not always necessary. At the same time an active cathartic should be administered, and which may be repeated every three or four days, according to its influence upon the patient, and his strength. The Compound Cathartic Pill will be found very valuable for this purpose, or, the Compound Pills of Podophyllin. In connection with these means, the patient should be placed upon a tonic and alterative treatment, as for instance, the following compound, which will be found very efficient: Take of Quassia, Sassafras Bark, Black Cohosh Root, each, two drachms, Swamp Milkweed three drachms, Prickly-ash Berries one drachm; mix. Pour on this Boiling Water eleven fluidounces, Boiling Vinegar five fluidounces; cover, and set the vessel containing the articles in a hot place to infuse for two hours. When cold, sweeten if desired, and give a tablespoonful for a dose, repeating it every two or three hours.

Local measures will also be required; the throat should be gargled two or three times a day, with a mixture composed of one drachm of common Salt dissolved in Water, Vinegar, of each, four fluidounces. The external and middle ear should also be fumigated,

in the first stage, with dilute Acetic Acid vapors, or vapors from a solution of Acetate of Ammonia, etc. In the second stage, and more especially, when the preceding treatment has effected an improvement in the mucous tissues, as ascertained by the normal appearance of the throat and fauces, if the deafness still continues, we will frequently succeed, even in hopeless cases, by injections with Strychnia, and especially Veratria, as named in the formulæ on page 1249.

CHRONIC DISEASES OF THE EYE.*

NORMAL APPEARANCE OF THE RETINA EXAMINED BY THE OPHTHALMOSCOPE.

When the eye is properly examined by the ophthalmoscope, the physician will at first see a a reddish or pink bottom in the form ot

*ANATOMY OF THE EYE.

Although it is presumed that the medical man is well acquainted with the anatomy of the eye, yet a brief description of it here may not be considered out of place.

The organs of sight, by which we are enabled to distinguish color, distance, the form and size of bodies around us, etc., are surrounded with other or secondary organs designed to move and to protect them, as well as to facilitate the free exercise of their important functions. These organs of protection and motion are termed *appendages of the eye*, and consist of the orbits, the eyebrows and the eyelids, the lachrymal apparatus, and the motor apparatus.

The ORBITS or *orbital cavities*, are two cavities of a quadrangular pyramidal form, situated, one on each side of the nose between the cranium and the face. Their osseous walls envelop and surround the ocular globes in such a manner that they are protected at all points, excepting at their anterior surface, from contact with external bodies. Their superior walls are the thinnest, and their apices give passage to the optic arteries and nerves, the latter being whitish cords specially designed to transmit to the brain the impressions produced upon the eyes by the objects presented to them.

The EYEBROWS (*supercilia*) are prominent curvilinear appendages, situated immediately above the orbits, and consist partly of bone, and partly of a thick skin, ornamented (according to the race and temperament) with more or less numerous and dark-colored, stiff and thick hairs, and lined with a fatty tissue, beneath which is found some red fleshy fibres which form a muscle, called the *superciliary muscle*, (*corrugator supercilia*), and which serves to contract or wrinkle the brow. This muscle serves materially in giving expression to the physiognomy, and to portray the violent passions of the mind.

The hairs overshadow the eyelids, and contribute to protect the eyes from various particles which might interfere with their functions; they also serve to convey the drops of sweat, which stream from the forehead, toward the sides of

a spot, a little diffused at first, but changing into a brilliant, clearly defined circle, about one-third or one-fourth of an inch in diameter.

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the face; they likewise, by their more or less dark tint, absorb the most powerful rays of light, and thus preserve the eye-globes from the too vivid action of the light.

The EYELIDS (*palpebræ*) are the thin, movable veils or curtains spread out in front of the eyes; there are two for each eye, a superior, and an inferior eyelid. The superior lids are the largest and more extensive; both lids are formed—1, by a thin layer of fine and delicate skin; 2, by a cellular tissue beneath the skin with very loose spaces or intervals; 3, by a muscular plane called the *orbicular muscle* (*orbicularis palpebrarum*), which serves to close the eye by bringing the eyelids in contact; 4, and beneath this, by a small layer of a substance analogous to parchment and called *tarsal fibro-cartilage.* This small layer of fibro-cartilaginous tissue, which extends from one angle of the eye to the other in the substance of the margin of the lid, is strengthened by muscular fibres designed to elevate the lid; its function is to keep the lid extended transversally and to favor its gliding over the eyeball; 5, finally, on its internal surface the eyelid is furnished with a delicate red mucous membrane called the *palpebral conjunctiva*, and so termed because it unites or joins the lids to the globe of the eye, spreading over and covering the anterior surface of this organ, and becoming modified in its structure. Its diseases occupy a very important position in ocular pathology. The groove or gutter-like cavities formed between the eyeball and lids, are termed the *oculo-palpebral sinuses*, of which the superior is much deeper than that of the inferior.

Each eyelid presents two margins, called the *tarsal*, the one of which is continuous with the skin, the other is free and cut obliquely from without inward. Each free border is bounded by two lips or edges, the anterior one being furnished with long, slender hairs called *eyelashes;* the posterior one being in direct contact with the surface of the eyeball, and furnished with a row of small pores which are the orifices of small grape-formed glandules called the *Meibomian Glands.** These glands are situated in the substance of the tarsal cartilages, about thirty or forty belonging to each superior eyelid, and twenty or thirty to each inferior one. They secrete a semitransparent, viscid fluid, which, becoming mixed with the unctuous and yellowish secretion of other glandules placed at the origin of the lashes, the *ciliary glands*, forms the sebaceous humor or gum of the eye which frequently glues the lids together. These little glands are frequently the seat of affections very difficult to eradicate.

The inner angle of each eye is called the *inner canthus;* the outer angle the *outer canthus.* So that with both eyes there are two inner, and two outer *canthi.*

The eyelids and the lashes with which they are furnished serve to cover and shade the eyeball during sleep, to protect it from contact with external objects, and to keep its surface moistened, by alternate movements of elevation and depression or shutting and opening, with the fluid furnished by the lachrymal apparatus.

The LACHRYMAL APPARATUS is composed of several parts, some intended to secrete the tears and convey them to the surface of the eye, and others, designed to take up this fluid and convey it into the nasal cavity. The first are, the lach-

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* The superior lid has from one hundred and four to one hundred and fifty lashes, and the inferior from fifty to seventy-five.

If the sight has fallen upon the entrance of the optic nerve or the papilla, a brilliant white circle will be seen, from the center of which

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rymal gland with its excretory ducts; and the second are, the lachrymal puncta and canals, the lachrymal sac, and the nasal duct.

The *lachrymal gland*, which has about the shape and size of an almond, is situated at the outer and superior part of the eyeball, between this organ and the orbit, being lodged in a depression at the outer angle of the orbit. Its excretory ducts are small, slender canals, about seven or eight in number, and open behind the upper eyelid through the upper and outer half of the conjunctiva, near its reflection on to the eyeball; they are designed to convey and discharge the tears, which are constantly forming in the lachrymal gland, upon the globe.—At the inner angle of the eye is a small reddish tubercle, of a pyramidal form called the *caruncula lachrymalis;* a few small hairs grow out of it. This small glandular body secretes a viscid mucous fluid which lubricates the lachrymal puncta, and thus facilitates the absorption of the lachrymal fluid.

The *lachrymal puncta* are the two minute round external openings of two small, narrow and curved tubes, the *lachrymal canals* or *ducts*, which are about a quarter of an inch in length, and are directed toward the inner angle of the eye where they terminate in the lachrymal sac. There are two lachrymal puncta to each eye, one upon the margin of the superior eyelid, the other upon that of the inferior, and toward the inner extremities of the lids; the canals (*canaliculi*) from these puncta converge, the superior one passing upward at first, and then bending at an acute angle and passing inward and downward to the lachrymal sac, and the inferior one at first passing downward, and then abruptly inward in almost a horizontal direction. Both of these canals unite or open at one and the same point in the lachrymal sac. The superior lachrymal canal is somewhat longer and smaller in diameter than the inferior; sometimes, these canals attain a diameter of $\frac{1}{50}$ of an inch. The puncta absorb the tears as soon as they are diffused over the surface of the eye.

The *lachrymal sac* is a small membranous pouch or bag, oval, about the size of a small horse-bean, and is situated in a deep groove formed on the inner side of the anterior orbital opening; it forms the upper extremity of the nasal duct.

The *nasal duct* is a cylindrical membranous canal formed in the bones of the face, passing from the lachrymal sac obliquely downward, backward, and somewhat outward to the inferior nasal meatus, and is designed to establish a direct communication between the lachrymal sac and the nasal fossæ. The length of the nasal duct is ordinarily from four to six lines, its width transversally from one and a half to two lines, and antero-posteriorly about $2\frac{2}{3}$ lines. Its middle part is narrower by about $\frac{1}{25}$ of an inch than at either extremity. The inferior or nasal orifice of this duct opens into the inferior meatus of the nose at a distance of three or four lines from the floor of the nasal fossæ; it is infundibuliform or oval, a disposition which renders the passage of a catheter very difficult.

These anatomical and physiological details may be summed up as follows: The tears are formed in the lachrymal glands and are conveyed to the eyes by the excretory ducts,—they are then diffused over the surface of the eyes by the eyelids; from thence, absorbed by the lachrymal puncta, they are carried by the lachrymal canals into the lachrymal sac and into the nasal canal. From this last, they finally pass into the nasal fossæ. Under the influence of lively emotions, or of severe sufferings, the tears are secreted in abundance; the narrow passages through which they have to pass not being capable of carrying them

two large vessels, an artery and a vein emerge and pass upward, branching upon the retina, and a similar set passing downward in

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off, become filled to overflowing and the tears run out over the surface of the cheeks. At the same time, there is an increased quantity of tears conveyed to the nasal fossæ. The use of tears is to facilitate the movements of the eyeballs in their orbits.

The MOTOR APPARATUS consists of six muscles which move the eyeball, four of which are the recti or straight muscles, and the other two the oblique. The straight muscle inserted into the sclerotic coat of the upper part of the eye at about three or four lines from the margin of the cornea, is called the *Rectus Superior* (*attolens*); it is the thinnest and narrowest of the recti muscles, and raises the globe of the eye upward. That inserted into the sclerotic coat of the under part of the eye at about two or three lines from the margin of the cornea, is called the *Rectus Inferior* (*depressor*), and pulls the eyeball downward.

That which is inserted at the external lateral portion of the eyeball, about two or three lines from the margin of the cornea, is named the *Rectus Externus* (*abductor*); it is the longest of the recti muscles, and moves the eyeball outward. That which is inserted at the internal lateral portion of the eyeball, about two or three lines from the margin of the cornea, is called the *Rectus Internus* (*adductor*); it is the thickest and shortest of the recti muscles, (a peculiarity which will explain the frequency of convergent strabismus), and moves the eye inwardly toward the nose.

All these muscles, as stated above, are inserted into the sclerotic coat of the eyeball, at a distance from the margin of the cornea of about three or four lines, and the breadth of their tendons at their points of insertion, are about four lines for the internal and external recti, and about three and a half lines for the superior and inferior recti; when acting separately, these muscles direct the eyeball, as already observed, upward, downward, outward, and inward, as expressed by their names; but when any two of them act conjointly, the eye is carried in the diagonal of their directions, as, upward and inward, upward and outward, downward and inward, or, downward and outward.

The oblique muscles are the rotatory muscles of the eyeball. They are, 1. The *Great* or *Superior Oblique* (*trochlearis*), a small round fusiform muscle, situated at the inner and upper part of the orbit; after passing through a cartilaginous pulley in which it readily slides, its tendon become wider, proceeds backward and outward beneath the superior rectus, and is inserted into the sclerotic coat at the outer and posterior part of the eyeball, between the Superior and External Recti muscles, about midway between the margin of the cornea and the entrance of the optic nerve. Its action is to rotate the eye so as to carry the pupil downward and outward.

2. The *Small* or *Inferior Oblique*, is a flat, thin, narrow muscle situated upon the inferior wall of the orbit, it passes outward and backward beneath the Inferior Rectus, and is inserted into the sclerotic coat of the outer and posterior part of the eyeball below the body of the External Rectus, at about two lines from the entrance of the optic nerve. Its action is to rotate the eye so as to carry the pupil upward and inward. When these two oblique muscles act together they retain the eyeball in front, and which, without their aid, would be drawn backward by the simultaneous contraction of the four recti muscles.

The muscles of the eye are animated by three nerves. The superior, inferior, and internal recti, as well as the inferior oblique, are under the influence of the

like manner. This brilliant white disc, has been compared to that of the full moon on a clear night; if examined in the inverted

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common motor oculi or third nerve. The external rectus receives a nervous supply from the external motor oculi or sixth nerve; and the superior oblique receives a special nerve, the pathetic or fourth nerve.

The EYEBALLS, or *Visual Organs proper*, are situated in the cavities of the orbits; they are held there by the muscles heretofore referred to, by the optic nerve, by an aponeurotic membrane called *orbito-ocular aponeurosis*, which sheathes the eye and its motor cords, by a mucous membrane, and by blood-vessels, upon which the phenomena of nutrition depend. These globes lie upon a fatty cushion, which gives a soft and elastic resting place to them. Their form is that of a spheroid, surmounted in front with a rounded prominence formed by the transparent cornea, and which gives to the antero-posterior diameter of the eye, called the *axis of the eye*, a predominance of $\frac{1}{25}$ to $\frac{1}{13}$ of an inch over the transverse and vertical diameters; these last two measure about $\frac{18}{20}$ of an inch.

The human eye is about the same size in all persons; the apparent difference being due to the size of the opening between the lids, and the depth at which the eyeball is seated in the cavity of the orbit. When normally situated, the two eyes have their axes parallel.—The essential constituents of each eyeball, are, membranous *coats* of different structure, with divers functions, and transparent humors, each having a special part in the phenomena of vision.

The eyeball is enveloped externally by a dense, compact, hard, and resisting coat, called the *Sclerotica*, or *opaque cornea*, which covers the posterior five-sixths of the eyeball, and presents on the anterior portion a circular aperture, which is occupied by a transparent membrane, called the *cornea* or *transparent cornea*. Upon removing the sclerotica we come to the second coat, termed the *Choroid*, a thin soft, and delicate membrane, remarkable for its dark color; this coat lines the internal surface of the sclerotica, and is prolonged in front behind the transparent cornea, under the form of a movable curtain, called the *Iris*, which is perforated by a circular aperture, susceptible of being enlarged or diminished in its diameter, and termed the *Pupil*.

By carefully removing the choroid membrane, the third coat of the eyeball is exposed, called the *Retina;* it is in contact with the internal surface of the choroid in the whole of the posterior part of the eyeball.—Besides these three superposed membranes, forming as it were the shell of the eyeball, this globe also contains three different humors, viz., in front, the *Aqueous humor*, behind that the *Crystalline lens*, and posterior to this the *Vitreous body*. We will now enter into a further examination of these several parts of the eye.

The SCLEROTICA is formed of strong, resisting fibres, running in an antero-posterior direction, and intermixed with other circular fibres of less resistance. It varies in thickness, being thin in front and gradually increasing in thickness as it advances posteriorly, where it acquires its maximum of resistance, being about $\frac{1}{20}$ of an inch in thickness. Ordinarily of a white color, it presents a bluish tint among children, which is due to its thinness at this age, so that the dark color of the subjacent choroid coat may be imperfectly seen through it. The same phenomenon is sometimes observed in the adult, but it is then indicative of a serious affection of the eye. On the anterior portion of its outer or external surface, the sclerotica is covered by a thin membrane, called the *Conjunctiva*, or mucous membrane of the eye, and which is a reflection of the palpebral conjunctiva over the fore part of the sclerotica and cornea; it is loosely attached to

image, its average apparent diameter is about three lines, being frequently, somewhat oval in its vertical diameter. Three concentric

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the sclerotica, is transparent, and but slightly vascular in health; by means of a lens it may readily be seen on the normal eye. When the eye is diseased, so that the small blood-vessels of its conjunctiva become engorged, they may then be seen with the naked eye, and the eye is then said to be red. Diseases of the conjunctiva of a vascular character are quite frequent, and sometimes reveal even a deeper seated affection of the visual organ.

The CORNEA or *transparent cornea*, which has been called the window of the organ of vision, is a very dense, exceedingly transparent membrane, deprived of blood-vessels, but furnished with numerous nerves which endow it with a very remarkable vitality, as manifested in the modifications of which it is susceptible under the influence of age, and by the facility with which its wounds heal. It is flatter, and its tissue is harder and more compact in old age than at any previous period of life. Its thickness is estimated at about $\frac{1}{30}$ of an inch at its center, and about $\frac{1}{25}$ of an inch at its circumference; and it forms the anterior sixth of the eyeball. Its longest or transverse diameter is about six lines. It forms the section of a spheroid having a diameter of seven lines and a half. The cornea is apparently a continuation of the sclerotica, but, in reality, it is a distinct organ which may be separated from the sclerotica, into the margin of which it is, as it were, enchased like a watch-glass in its case, its peripheral margin being overlapped, at the point of union, by the sclerotica more upon its outer or anterior surface, than upon its inner or posterior. The cornea is covered over its outer surface with the conjunctiva, but which is more firmly adherent than it is to the sclerotica, and which is so modified in its texture as to be reduced to an epithelial layer, not interfering with the important functions of the cornea which it defends and protects, and over the surface of which it facilitates the gliding of the eyelids.—The structure of this membrane is still a subject of controversy. Generally, however, it is considered as consisting of five very fine concentric layers, arranged somewhat like the peel of an onion, separated from each other by a diaphanous lymph, and kept apart by a very delicate areolar tissue.

The thin vitreous membrane forming the posterior layer of the cornea, is called the *membrane of Descemet;* it is shining, transparent, and perfectly homogeneous, has a certain stiffness and considerable fragility, and, when the cornea is removed from the eye, it has a great tendency to roll up upon itself; its transparency is not affected by any reagents; it is easily detached from the cornea by submitting this to the action of alkalis, or to prolonged boiling. In old persons, a kind of warty excrescences are often seen upon it.

The CHOROID makes a true camera obscura of the eye, in which those rays of light which do not co-operate with vision are absorbed. It is formed of three layers of different structures; the first or external, being a fine cellular tissue which connects it with the inner surface of the sclerotica; the second or middle, being essentially composed of arterial and venous vessels; the third or internal, is pigmentary, that is, it is covered with a blackish matter contained in a layer of small hexagonal cells, which, however, may be removed from the membrane by maceration in water. This black matter is called *pigmentum nigrum* or *pigmentum fuscum.* This pigment is identical with the coloring matter of the skin, is one of the most perfect absorbents of light, and its use is to prevent the rays of light entering, except through the crystalline lens, as well as to absorb the light after it has impinged on the retina. It is easily washed off from the membrane which

circles will be distinguished at this point, the external one, clear white, the middle one brownish, and the central one brilliant white.

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secretes it. The vascular layer of the choroid contains numerous vessels; the veins especially are very numerous, and are arranged in curves or whorls, hence their name *whorling vessels* (*venæ vorticosæ*). They are very close to the sclerotica. The third or pigmentary layer is connected with the retina. The pigment is abundant among brunettes and Africans; it is thinner and less dark among old persons, and disappears under the influence of certain pathological conditions. Albinos are deprived of it.

With the description of the choroid should be associated that of the iris, of the ciliary circle, and of the ciliary body.

The IRIS is a distinct, thin, flat, circular-shaped, and contractile membranous diaphragm, extending across a portion of the cavity of the eye, and designed to regulate the quantity of luminous rays necessary to the normal exercise of vision. It is that part of the eye by which we determine its color. The color being due in part to the vessels, and in part to the amount of pigment present. Its anterior surface, which seems formed of radiating fibres, is tomentose and velvety, and presents in different persons, different colors, and various degrees of brilliancy. Its posterior surface, called *uvea*, from its color being similar to that of a ripe grape, is apparently continuous with the choroid which furnishes it with a large amount of dark pigment. Its external margin or large circumference is set in a groove or plait formed by the ciliary circle. Externally, it corresponds to about the $\frac{1}{25}$ of an inch from the point where the insertion of the cornea and sclerotica appears to terminate. Its inner margin or small circumference forms the pupillary opening, or *Pupil.*

The iris is a membrane consisting of contractile muscular fibres and blood-vessels. Some of these fibres are circular, forming a kind sphincter, by which the pupil is contracted; others are radiating, and effect dilatation of the pupil. These phenomena of motility are under the influence of the nerve of the third pair; while the sympathetic nerve and the fifth pair control the phenomena of nutrition.

The *canal of Schlemm* (circular sinus) is situated at, and a little behind the point of union of the sclerotica and cornea; it is a minute triangular canal, probably vascular or venous, and is sometimes incompletely closed. In sections made perpendicularly it presents an oval, very narrow slit, without any trace of epithelium.

The CILIARY MUSCLE, or LIGAMENT, or *C. Circle*, (*tensor muscle of the choroid*), which has been for a long time considered as a prolongation of the cellular web of the choroid, is a true muscle in the form of a whitish or grayish ring; it is of a pulpy consistence, and is placed around the circumference of the iris, between the choroid, the cornea, and the sclerotica, which parts it serves to connect. It is the part where an infinity of small nervous filaments, called *ciliary nerves* are congregated previously to their distribution, and which are under the influence of the ophthalmic branch of the fifth pair, and of the common ocular motor nerve, from which the iris derives its sensibility and its mobility. This muscle is designed to play an important part in the act of adaptation of the eye to different distances.—This muscle consists of radiating and circular fibres, and its smooth fibres have their origin at the internal wall of the canal of Schlemm. A perpendicular cut of this muscle gives a triangular section of it, the base of which is formed by the ciliary body, and of the two sides one is directed toward the iris,

The retinal vessels appear under the form of bright scarlet or reddish striæ; the veins being of a darker color, (brownish or blue),

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and the other toward the sclerotica, while the apex responds to the canal of Schlemm.

The CILIARY BODY, also called the *Zone of Zinn*, is a blackish ring which surrounds the crystalline lens, in the manner of a crown; it is placed behind the iris and the ciliary circle. It bears a resemblance to the disk of a radiated flower, and is formed by the union of the *ciliary processes*, which are longitudinal, triangular, projecting folds of the choroid, placed side by side, being about sixty or eighty in number, arranged in a radiated manner, lodged in the depressions of the anterior face of the vitreous humor, and reaching to the circumference of the lens. These plaited folds are called the ciliary processes; and the whole of this structure, or the membrane thus plaited is called the ciliary body. It is about two lines broad, has a black pigment on the whole of its inner or posterior surface, and is very vascular; its uses are not known.

The third coat of the eye, the RETINA, is a very thin, transparent, soft, pulpy, pinkish-gray membrane, embracing the vitreous humor, and situated between it and the choroid to which it adheres by simple contact, without vascular or other continuity. It is considered as being an expansion of the optic nerve, commencing from its point of penetration through the sclerotica, a little above and within the visual axis. At this point the nerve appears constricted, and forms on the internal face of the retina a slight circular flattened prominence, called the *papilla of the optic nerve* or the *optic disc.* In the normal state, with the ophthalmoscope, this papilla may be seen in the form of a circle $\frac{2}{5}$ of an inch in diameter, glistening white, from the center of which passes several vessels which are directed above and below. These vessels are not seen on the yellow spot; they do not give off any branches at the surface of the papilla,—they divide only beyond this, and their ramifications, in the normal state, are not numerous.

The retina extends from its origin, at the optic nerve, to the commencement of the ciliary processes where it terminates by a finely-jagged or dentated margin, called the *ora serrata.* At this point, its nervous elements disappear, its vascular layer alone being prolonged to the periphery of the crystalline lens.

The *yellow spot*, (*macula lutea*), above referred to, is situated at a point corresponding to the antero-posterior axis of the eye, and $\frac{1}{5}$ of an inch on the external or temporal side of the entrance of the optic nerve. This spot is of a yellowish or saffron-color, which is brightest at the center, is circular or oval, about a line, or rather more, in diameter, and in its center is apparently a round hole equal in diameter to one-fourth of the spot. Generally, there are several small plaits or folds of the retina about this place; and one of these, which is very constant, extends from the optic nerve to this spot, which is seated near its termination. It is not a hole, but merely a depression, *fovea centralis;* also called the *foramen centrale* of Sœmmering, from the retina being thinner at this place. This spot is pale in children and old persons, but is bright during the middle period of life; the color diminishes when there is any obstruction to vision, and disappears altogether when the sight is lost.

The retina, a membrane so sensitive to the action of light, is not so to the impression of instruments, as has been well ascertained in operations in which it has been pricked without causing the least pain or sensation. It is composed of five different elementary layers, which, studying them from without inward, are as follows: 1. The most external or columnar layer, called *Jacob's membrane,*

somewhat larger in diameter than the arteries, and not so sharply defined.

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or *stratum bacillosum;* it consists of small, cylindrical, transparent, flexible, highly refractive, wand-like bodies, disposed perpendicularly to the surface of the retina, lying very close to each other, and having a length equal to the thickness of the membrane, from $\frac{1}{500}$ to $\frac{1}{350}$ of an inch. There are two kinds of these bodies, the small staff-like cylinders, having a thickness of from $\frac{1}{1270}$ to $\frac{1}{800}$ of an inch, bending at an acute, obtuse, or right-angle, or, in hook-form, or, forming a protuberance at their choroidal extremities; and the cones, which have the form of small round cells, fusiform or flask-shaped, the spaces between them being occupied by the cylindrical staffs.

2. The second layer is the *middle* or *granular*, (*stratum granulosum*); it is composed of small granular corpuscles, extended throughout an amorphous substance, analagous to the gray cerebral matter. This has been divided into two layers, the external granulous layer, and the internal.—3. The third layer is the *cellular*, (*stratum gangliosum*), consisting of nervous cellules or ganglionic corpuscles.—4. The *nervous* layer, (*stratum fibrillosum*), which is very thick and vascular, and consists of the primitive fibrils of the optic nerve spread out in a radiating direction from the entrance of the optic nerve to the sinuous anterior border of the retina. It is wanting, or nearly so, around the yellow spot, and in the fovea centralis.—5. The *amorphous* layer, (*stratum limitans*), which is the only one that passes in front of the retina, and which extends beyond the external or posterior circumference of the ciliary processes to reach the capsule of the crystalline lens, where it terminates circularly. It is the only layer through which the principal vessels of the retina are dispersed, and it, together with the preceding layer, are the only vascular layers of the retina; its anterior surface is applied against the vitreous humor.

The AQUEOUS HUMOR is a colorless, perfectly transparent fluid, placed between the cornea and the iris, (a space called the *Anterior Chamber of the Eye*), as well as between the iris and the crystalline lens, (a space called the *Posterior Chamber*); the iris forming a partition between these two chambers which, however, communicate with each other through the pupil. The posterior chamber is much smaller than the anterior. The depth of the whole aqueous humor from the posterior face of the cornea to the anterior face of the lens, is somewhat more than $\frac{1}{10}$ of an inch; the humor is small in quantity, not more than five or six grains in weight, and is composed of water, albumen, and chloride of sodium, which is quickly renewed after it has escaped from wounds, etc. It is supposed to be secreted by the iris, the posterior surface of the cornea, and the ciliary processes.

The CRYSTALLINE LENS, although termed a humor, is a solid transparent body of a soft, gelatinous substance, which surrounds a more solid and dense nucleus, and is set in a transparent membranous capsule, called the *capsule of the lens.* This capsule adheres to the sclerotica and to the choroid by a kind of ring called the ciliary body. The lens is small, biconvex, about $\frac{7}{20}$ of an inch in diameter, and half as much in thickness at its axes, and consists of concentric layers; its posterior surface is of greater convexity than its anterior. Its use is to concentrate the rays of light, so as to form a distinct image upon the retina. In old age it becomes slightly flattened on both surfaces, slightly opaque, more dense, and yellowish.

The VITREOUS HUMOR or BODY, is a soft, perfectly transparent, jelly-like mass,

The slightly dark ring surrounding the optic disc is due to an accumulation of choroidal pigment around the optic nerve, and the white ring inside of this is the sclerotica, which reaches a little further than the choroid toward the entrance of the optic nerve.

At the distance of about one-fifth of an inch from the external side of the papilla will be observed an obscurely, nearly circular spot, having a brilliant point at its center; this is the yellow spot, and corresponds to the posterior pole of the eye; and the point is the fovea centralis, formed by a depression of the retina, due to the absence of the nervous layer at this place,—no blood-vessels, retinal nor choroidal, are to be seen in or immediately around the yellow spot.

The vascular layer of the choroid gives a uniform red, or yellowish red field, over which the retinal vessels may be seen branching, being perceptible through the transparent retina. The color will vary according to the complexion of the individual, being brighter or more yellowish, in those who are fair, and darker, or more of a yellowish brown, in those who are dark. Blackish lines and streaks may also be seen at various parts, which are occasioned by the pigment of the choroid when this abounds in the eye of the person under examination.—Close to the inner side or entrance of the optic nerve, the color will be seen darker at one point, and which is supposed to be owing to the shadow of the semilunar fold of the retina.

EXAMINATION OF THE EYES.*

In the treatment of Diseases of the Eye, the same as in that of all other diseases, the first and most important point is to correctly determine the disease, and unless this be done, all treatment will

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which occupies the posterior part of the eyeball, from the posterior surface of the iris and crystalline lens to the retina, occupying the whole cavity formed by the retina. Its weight is from seventy-five to eighty-five grains, and it contains water, a little albumen, and some salts. It is secreted and enveloped by a delicate, transparent membrane called the *hyaloid*, which sends from its internal face numerous prolongations dividing the cavity of the vitreous humor into several apartments, like the sectors of an orange, the object of which appears to be to divide the mass of fluid so that concussions caused by walking, racing, jumping, etc., shall not occasion too strong undulations.

*In the selection and preparation of matter furnishing the preliminary remarks, history, description, symptoms, etc., of diseases of the eye, I am under great indebtedness to Donders, Græfe, Mackenzie, Martin, Wecker, Lawrence, etc.

be unavailable. It may therefore be proper to make a few remarks relative to the method to be pursued when examining the eye. In the first place, before touching the parts at all, the physician should carefully observe all the parts which present themselves to his view, the patient being seated near a window, so that the light from that window only may fall obliquely upon his eyes. The eyebrows should be glanced at, then the eyelids, noting their movements, whether slow or quick, equal or unequal, whether they open fully or remain half-closed, the condition of their margins, eyelashes, and their angles; then the globe of the eye, its size, flatness, projection, and movements, the correspondence of its axis with that of its fellow opposite, the general appearance of the white of the eye, as well as of the cornea, the condition of the pupil, and the color of the iris. The expression of countenance and movements of the patient should likewise be noted; whether from an intolerance of light he shades his eyes with his hands or holds his head down, etc. All these points having been noted, the physician may then proceed to a still closer examination. The principal points to be observed in these investigations of the several parts of the eye, may be briefly stated as follows:

1. *Eyebrows.* Recent injuries of the eyebrows, from blows or wounds, may result in amaurosis from concussion of the brain or retina, or injury to the ophthalmic nerve, or first division of the fifth pair. These should be enquired into, as well as the cause of any cicatrices present. Any tumors, eruptions, abscesses, etc., in the region of the eyebrows, should receive a proper investigation; as well as a falling of the hairs, or pediculi among them.

2. *Eyelids.* It should be observed whether they move freely, or whether there is any defective motion from thickening of their tissues, paralysis of their muscles, or partial closure of the lids from photobia. Wounds, tumors, cicatrices, warts, ecchymosis, cutaneous diseases of the lids, etc., require careful attention. Adhesions of the lids, or unnatural positions, as retraction, inversion, etc., may in most cases be readily observed. The tarsal borders may be inflamed, ulcerated, thickened, or may present more or less crusts, from dried matter discharged from ulcers, from diseased Meibomian glands, or from both; there may also be small tumors, or thickening of the borders of the eyelids, etc.

3. *Eyelashes.* These should always receive a close inspection; they may assume a wrong direction, their ends being turned inward so as to keep up constant irritation of the eyeball. A similar irritation may be produced by minute pale hairs, called "false," or vulgarly, "wild hairs," which are very difficult to recognize, unless

aided by a magnifying glass ; they will often be seen growing upon the caruncula lachrymalis, situated at the inner canthus of the eye. Pediculi among the lashes upon the edge of the lids, will, in many cases, increase or keep up an inflammation of the lid or eye. When disease of the lid has destroyed the hair-bulbs, a partial or complete absence of the eyelashes will be the result.

4. *Conjunctival surface of the Eyelids.* In order to examine the nner surface of the lids, it will become necessary to evert them, so that these surfaces may be thoroughly exposed; and, we may then observe the existence of any inflammation, granulations, tumors, or foreign particles. By placing a finger or two upon the external surface of the lower lid, and drawing it downward, while at the same time the patient is requested to look upward, the whole of its inner surface will be brought into view.

For the *upper lid* a different manœuver is required. With the finger and thumb of one hand, grasp the eyelashes growing from the middle of the lid, as well as a minute portion of the tarsal border of the lid, and draw the lid gently downward and away from contact with the eyeball; then, with the other hand, place a probe across the outer surface of the upper lid, about half an inch above its free margin,—request the patient to look downward, and at the same moment raise the edge of the lid upward, and slightly press the probe downward. The lid will suddenly become everted.

The looking downward on the part of the patient, the elevation of the edge of the lid, and the depression of its central part, by the physician, must all be done at the same instant, in order to readily accomplish the eversion. As the whole of the conjuntival surface of the lid is not exposed by this eversion, should a deeper examination of it be desirable, it may be done by the careful employment of a probe. If, however, the lining of the eyelids is known to be in a healthy state, there will be no necessity for everting them.

Small foreign bodies, which have passed beneath the upper lid, will generally be found near its tarsal border; they may be readily removed by a probe, or quill cut tooth-pick fashion.

5. *Angles or Canthi of the Eye.* Abrasions, ulcerations, tumors, etc., are met with at these parts. These may be detected at the outer canthus, by gently separating the lids from each other at this angle. To discover them at the inner canthus, a similar operation is required together with a slight eversion of the lids. And while making this exploration, the physician may also observe the condition of the *lachrymal sac*, *lachrymal papillæ*, *lachrymal puncta*, as well as of the *lachrymal discharge.*

6. *Eyeballs.* These may be unnaturally prominent, from tumors in the orbit, or, infiltration of the orbital cellular tissue; one or both may be misdirected, as in squinting ; it may be impossible to turn the ball in every direction, from paralysis of one or more of the oblique or recti muscles, or, there may be irregular movements of the ball. Gentle pressure must also be made upon the eyeballs to determine whether they are of natural consistency, too hard, or too soft.—We will then examine the condition of the parts at the anterior surface of the globe, as, the ocular conjunctiva, the sclerotica, the cornea, iris, pupil, chambers, and the aqueous humor; being careful not to irritate the eyes, by holding the lids apart for more then a few seconds at a time, during the examination.

Natural or artificial light, concentrated by means of a convex lens of three or four inches focus, and directed obliquely into the anterior segment of the eyeball, the patient being in a dark room, will be sufficient to detect abnormal conditions of the cornea, aqueous humor, iris, pupil, and crystalline lens, particularly the anterior surface of this latter body. By moving the lens gradually about, the focus of light may be successfully thrown upon the deeper-seated parts, and their conditions be carefully noted. In this way, the least imperfections of the eye, the most superficial erosions, the slightest disturbance of the aqueous humor, the least morbid alterations of the iris, its changes of color, may readily be observed.

The same method of examination will answer very well to ascertain the condition of the crystalline lens; though it will be better to previously dilate the pupil by dropping into the eye a drop or two of a solution of neutral sulphate of atropine one grain, distilled water three thousand grains. Or, daturine may be substituted for the atropine, in which case the effects will not continue for so long a time. In employing these agents, the patient should always be forewarned of the transient visual disturbance which they will produce. The crystalline lens thus being more fully exposed to view, the finest striæ upon its surface, the least derangement, and the slightest traces of opacity will present themselves with a perfect clearness.

But, in order to examine the condition of the lens, particularly its posterior portion, the vitreous humor, the retina, and the choroid, it will be necessary to employ an ophthalmoscope, because the magnifying lens used, as above recommended, will no longer be of utility.

The *ophthalmoscope*, now so well known to physicians, is the discovery of Helmholtz, a German oculist; since this ingenious instrument was made known by him, there have been various modifications and improvements made upon it, which it is unnecessary to name here. The instrument more generally preferred is that combining the concave reflecting mirror and the biconvex lens; in some cases, where less light is required, a plane reflecting mirror may be substituted for the concave.—The concave reflector, having a focus of ten inches, is perforated with a small hole in its center, and attached to a handle. The biconvex lens has a focus of about two and a half inches, and, although not usually fixed in a handle, it can be more readily and safely managed when it is so fixed. Some instruments have a ring behind the reflector, into which concave glasses may be placed, for the purpose of procuring a magnified upright image of the retina, as, the reflector used with the biconvex lens gives a distinct, but small and reversed image of the retina. If the reflector be employed without any lens, the retina is not seen so distinctly. The numbers more commonly used of these biconcave lenses, are ten and twelve.

To use the ophthalmoscope, the patient, having the pupil of the eye fully dilated by atropine or daturine, if it be not already dilated by disease, is seated sideways near a table, his left side being next the table; the room in which the examination is carried on being darkened. A lamp is placed upon the table near the patient's head, the flame being on a level with his eye, and near the ear; the light making an angle of about twenty degrees with the eye of the examiner; a piece of pasteboard being placed to one side of the lamp, so as to prevent its rays from falling upon the cornea or orbital region of the patient. Everything being thus prepared, the physician will seat himself in front of and facing his patient, and a little higher, so that his eyes will be slightly above those to be examined. Then, with one hand he will carry the reflector to his own eye, so that he can perceive the patient's eye through the central opening; the reflecting surface of the instrument being toward the patient's eye,—the patient looking toward the right ear of the physician, when the right eye is to be examined, and toward the left ear when the left eye is to be explored. The margin of the reflecting mirror should be rested against the eyebrow or superciliary arch all the time of the examination, while the handle may be gently moved in all directions, until the reflected light from the mirror has been thrown on the pupil of the patient.

At first, the examiner will bring the rays of light, passing from the lamp to the reflector, and again reflected from this latter, to a

focus upon the cheek, and as soon as a distinct inverted image of the flame is observed there, he may carefully move the reflector, so that this focus of light will be thrown upon the retina. He will then observe a diffused reddish, orange-red, or yellowish glare, or a disc or patch of white tinged with red—the former being the choroid seen through the transparent tissue of the retina, and the latter, the optic nerve or papilla. In order to obtain a more distinct appearance of the parts now brought into view, the physician, holding the reflector steady in one hand, will request the patient to direct his eye slightly upward and inward, or to one ear, as above stated. Then, with the biconvex lens in the other hand, held between the thumb and index-finger, (if not fixed in a handle), the physician, still looking through the central opening in the reflector, will place this lens in front of the patient's eye, moving it forward or backward, or from side to side, until a clear and distinct view of the bottom of the eye is obtained. I find the flame of a coal-oil lamp with a neutral blue chimney to modify the red and yellow rays, and give a more natural appearance to the parts under examination. Of course, if the crystalline lens be opaque, we can not expect to see the parts posterior to it; and, in some cases, as in adhesions between the capsule of the lens and the iris, only a small portion of the retina can be examined at a time, from the want of dilatability of the pupil. The ophthalmoscopic appearance of the normal retina has already been described on page 1333; the abnormal appearances will be described under their appropriate heads.

The distance at which the fundus of the eye is seen distinctly, depends on the state of refraction and accommodation of both physician and patient; hence, it will be better to hold the convex lens near the eye of the patient, at first, and, as soon as the illuminated retina is seen through the lens, this may be gradually moved away from the patient's eye toward the examiner's. This movement of the lens must be very slow, as soon as a white disk begins to appear on the dark-red or orange-colored fundus.

When the eye is examined without the convex lens, or with the concave lens, it is said to be "*observed in the direct, virtual, or erect image;*" when with the convex lens, it is "*observed in the indirect, actual, or inverted image.*" The direct image is formed on the retina, and may be observed by a Zehender's ophthalmoscope; the indirect image is found between the concave reflector and the biconvex lens, and may be seen with a Liebreich's small ophthalmoscope. (I will not name here the various kinds of ophthalmoscopes that have been presented to the profession, but will refer the reader to "Carter's

translation of Zander on the Ophthalmoscope," which gives every necessary information concerning the instrument and its uses.)

Some patience as well as perseverance is required in order to examine the eye successfully and satisfactorily with the ophthalmoscope.—It must always be borne in mind by the oculist, that the mere concentration of powerful light upon the retina, if continued, for more than a few seconds, does, of itself, place the part in an unnatural condition; while, again, there may be eyes so irritable and so intolerant of light, as not to allow of the use of the ophthalmoscope even for a moment. An intense glare of concentrated light thrown upon the retina for more than a few seconds, will be apt to produce irreparable mischief.

For the examination of the *vitreous humor*, we must lessen the brightness of the light, and remove it a little from the patient; the plane reflector is here much better than the convex. We may judge of the perfect transparency of this humor by the more or less brilliant reflection of the pupillary background; and, if we desire to assure ourself that there are no exudations, floating corpuscles, shreds, opaque spots, sparkling scales of cholesterin, or sanguinary clots, we will, after having had the patient to move his eyes rapidly in every direction, request him to suddenly hold them immovable. If any of these bodies are in the vitreous humor, they may be seen moving and slowly falling in the most dependent part of the ocular globe.

In some cases, these explorative methods can not be readily applied, the sensibility of the eye being such that the least light causes painful sensations, or else the central parts are opaque, and illumination of the internal posterior hemisphere of the ball is impossible. In the first instance, we must abstain from a thorough examination until all traces of photobia have disappeared; in the second, we may have recourse to the phosphenic examination, which gives positive information concerning the aptitude of the retina to perceive light.

In the use of the ophthalmoscope, the employment of atropia, daturia, or hyoscyamia, even when in very weak solution, will frequently give rise to considerable congestion of the vessels of the retina, which may be mistaken for a diseased state. And again, the dilatation of the pupil caused by the use of these agents, may continue for several days, much to the annoyance of the patient; and should the sight diminish after its application, this would be attributed wholly to the physician as a result of the examination. On this account, these mydriatic agents should be used as seldom as possible; beside which, if the patient be allowed to remain a

few minutes in the darkened room before commencing the examination, it will be found that the pupils will acquire, in a majority of cases, a sufficient degree of dilatation for examination with a moderate light. The less intense the light used in the examination, the less fatigue will it occasion the patient, and the more satisfactory will be the results of the observation. The plane reflector is suited best for all cases where a feeble light only can be used, or in examinations of the anterior hemisphere of the ball.

In all cases, the proper focus, both of the reflector and of the biconvex lens, will be obtained by gradually moving one or both of them backward and forward. In presbyopic and myopic eyes, great care is required in bringing the retina into focus.

Phosphenic Examination. The retina possesses a peculiar sensibility, in consequence of which the least excitation determines upon it a luminous sensation. Pressure upon the globe of the eye, with the finger, produces a sensation of light. This luminous appearance, in the form of rings, can be readily observed by any one, and has been called *phosphene* by M. Serre, of Uzès. Four principal phosphenes have been recognized, as follows:

1. *Frontal phosphene*, occasioned by pressure upon the eyeball below the eyebrows on the tract of the superior rectus muscle, and which gives rise to a luminous sensation, apparently toward the cheek.

2. *Jugal phosphene*, produced by pressure along the tract of the inferior rectus muscle, and which gives rise to a luminousness toward the orbitar arch.

3. *Temporal phosphene*, determined by pressure along the tract of the external rectus, the luminousness of which appears toward the root of the nose.

4. *Nasal phosphene*, determined by pressure along the internal rectus, the luminousness appearing toward the external angle of the orbit, in the temporal region.

These four phosphenes being determined, we may by intermediate pressure give rise to intermediate phosphenes, as, fronto-nasal, fronto-temporal, etc.

The form of these phosphenes is round, when the compressing body is of small diameter; when this is larger, as for instance, the pulp of the finger, it resembles a crescent. The frontal phosphene is the most brilliant, then the temporal, then the nasal, while the jugal has the least luminous intensity.—When a phosphenic examination is considered necessary, the patient must be placed in a dark

room, or with his back to the light, and close his eyes gently, as in sleep; the pressure should then be made as deeply toward the back of the orbit as can be done without inconvenience, the eye at the same time being directed in the contrary direction. The pressure should be slight, and may be made with the end of the forefinger, or any blunt rounded instrument; the various phosphenic regions, and their intermediate spaces should be thus examined. If all the phosphenes appear we may conclude that the excited points of the retina have preserved their sensibility. If one of them does not appear, we may be certain that the corresponding point is the seat of a lesion. The phosphenes may, however, be produced, and yet vision be considerably disturbed; in this case, we may conclude that the central portion of the retina is diseased, or else that the middle parts of the eye are opaque, or, that the case is a disease of accommodation. The means to form a differential diagnosis of these several pathological conditions, will be explained hereafter.

To complete the study of the means for determining the sensibility of the eye, I will refer to an *examination of the extent of the visual field.* The visual field is that space within which it is possible to see, without any change being made in the direction of the optical axis. In the normal state it is limited above by the orbitar margin, and inwardly by the nose; below and outwardly its limits are much less restricted.

The extent of the field of vision is variable among persons; we measure it in the following manner;—a leaf of paper having a very visible black point at its center, is placed against a wall at the height of the eye to be tested. The patient, having one eye bandaged, and sitting or standing so that the other eye shall be at a distance of twelve or eighteen inches from the paper, is requested to steadily fix this eye upon the black spot. This done, the physician will move along the paper or wall, and at various distances from the central black spot, a sufficiently voluminous, bright, but not brilliant object, and will successively mark the points at which the patient ceases to distinguish it. In this manner, the whole extent of the visual field is gone over, and its limits noted. In order to corroborate the first results, it will be well to repeat the trial several times, changing the direction of the optical axis and the distance of the objects each time.

As the limits of the visual field vary considerably with persons, we must consider material changes only, as indicative of a pathological condition. Very decided alterations in the distinctness and

extent of vision, ascertained by this method, will furnish valuable information in regard to the condition of the sensibility of the retina at the various points of its surface.

These means of investigation will be rendered still more complete by the knowledge which the touch will impart, in regard to the condition of the eyeball; the consistency and general sensibility of the eye may be detected by light pressure with the pulp of the fingers. And lastly, we must also take into account the constitution of the patient, its morbid tendencies, and his sensations, as, pain, itching, formication, smarting, intolerance of light, and feeble or defective vision, etc.

EXAMINATION OF THE EYE IN CHILDREN.

In very young children it is generally quite difficult to obtain a satisfactory view of the cornea and conjunctiva, from the resistance offered, and which results from a dread of the oculist, as well as from the pain produced by the action of light, etc. In such cases, it is useless to attempt either coaxing or intimidating measures; there is but one course to pursue in order to thoroughly and satisfactorily ascertain the condition of these parts.

The physician sitting in a chair, with a folded towel spread across his knees, has the nurse or an attendant holding the child, to sit opposite to him in such a manner that, as it is lowered backward to lie across the lap, its head will rest upon the towel between the physician's knees, where it is to be held firmly and steadily, as in a vice. The nurse now secures the hands and arms of the child, so that they can not be moved about to interfere with the physician's examination. The physician, having carefully wiped the eyelids dry with a soft linen rag, separates them in the following manner; covering the extremity of the index-finger with a piece of soft rag, it is to be applied to the center of the upper eyelid, upon its border, between the roots of the eyelashes and the eyeball; while at the same time the extremity of the thumb of the other hand, also covered with a rag, is to be applied to the border of the lower lid. This done, the lids are to be separated from each other by carefully sliding them in opposite directions, but without making the least pressure on the globe. By this means, all the anterior surface of the eyeball will be brought into view. Sometimes, however, the eye will be turned upward, so that the cornea can not be seen, but by waiting five or ten seconds, the eye will assume its normal position, or sufficiently so to insure a satisfactory

inspection of it. If it be necessary to evert the eyelids in order to examine the palpebral conjunctiva, this may readily be effected.—When the cornea alone is to be examined, the elevation of the upper lid will suffice, without disturbing the lower one. Prolonged examinations will require a spring speculum, especially adapted to the size of the opening between the lids.

DISEASES OF THE EYEBROWS.

1. *Discoloration of the hair* of the eyebrows occurring among persons in advanced years is not a disease, and can not be arrested; but that which is sometimes met with among young people is a true pathological condition, more commonly caused by excesses of all kinds, late hours, grief, acute mental emotions, etc. Sometimes it may be due to a cutaneous disease of the part. To cure this unsightly affection at at early age, all that is required is to withdraw the patient from those influences that facilitate its development. And, while awaiting the result of a regular course of living and a rigid attention to hygienic measures, which always exert a favorable reaction on the organism, colored cosmetics may be used to disguise the white appearance of the hairs.—If the discoloration be due to cutaneous disease, this must be removed by the proper treatment; but, in such cases, the discoloration of the hair generally remains permanently.

2. *Superciliary Alopecia* or a falling of the hairs of the eyebrows, is almost always a consequence of burns, deep wounds, herpetic diseases, or eruptive fevers, as small-pox, erysipelas, etc. Sometimes it may be caused by an obstinate syphilitic affection. Two conditions may present themselves; where the pileous bulbs have been ulcerated, then destroyed, and placed beyond the resources of art, or, where the bulbs are still existing, in which case we may arouse their torpid vitality by stimulating frictions and aromatic lotions. For this purpose we may employ one of the following preparations: 1. Take of Cologne two fluidounces, Tincture of Cantharides two fluidrachms, Oil of Rosemary, Oil of Lavender, of each, ten drops; mix.—2. Take of strong Alcohol four ounces, strong Aqua Amonia one ounce, Tincture of Arnica one ounce, Rain-water two ounces; mix.—3. Take of Tannin two parts, Quinine one part, Butter of Cacao thirty parts, Olive Oil fifteen parts, Aromatic Alcohol two parts; mix. 4. Take of Lobelia, Scullcap, St. John's Blos-

soms, each, one ounce, Prickly-ash Berries half an ounce, Alcohol half a pint, Castor Oil half a pint; mix.

If frictions with these produce no favorable result, all that can be done, will be to recommend the patient either to have artificial eyebrows, or have the parts properly colored.

3. *Wounds of the Eyebrows*, especially when their internal portion is involved, are frequently followed with a diminution and even loss of sight; the seriousness of a lesion so apparently benign, is due to contusion, pricking, or laceration of the suborbitar nerves. The treatment of wounds of this region is similar to that for wounds in general. If the wound is longitudinal and caused by a cutting instrument, the edges may be held together by sutures or adhesive strips; if it be contused, compresses with dilute Tincture of Arnica, or Camphor may be applied, holding the dressings in place by means of a moderately tight bandage around the head. The object in case of wounds, is to heal the wound without any subsequent deformity therefrom. Very severe contusions may require leeches and cold applications. A very excellent preparation for contusions, sprains, etc., and to remove ecchymosis, is prepared by dissolving one ounce of Hydrochlorate of Ammonia in half a pint of Water, and then adding to it, Tincture of Arnica half a pint. Fresh Solomon's Seal Root, grated, and applied, renewing it every thirty or forty minutes, will also be found efficient; the smarting and redness its application gives rise to will disappear after a while.

The sting of wasps, bees, spiders, etc., upon the eyebrows, or eyelids, must be treated by extracting the sting, if possible, and then applying cloths wet with weak Ley-water, with a solution of Hydrochlorate of Ammonia, or, with the same solution, having Tincture of Arnica added, as named above. If there be much pain and suffering, Laudanum, Solution of Morphia, or Tincture of Lobelia may be added to the application; and, if the system suffers much, a glass of Wine may be given occasionally, to which five or ten drops of Aqua Ammonia have been added. Any erysipelatous inflammation remaining may be treated by local applications, of Elder-flower Water, Infusion of Lobelia, Solomon's Seal, or Maidenhair; or, a Solution of one part of Perchloride of Iron in three parts of Distilled Water; apply it every two hours with a camel's-hair pencil.

4. *Cutaneous Diseases of the Eyebrows*, are generally those affections which have a manifest tendency to invade parts of the body

which are covered with hair. (*See* Integumentary Diseases, *Vesiculæ*, *Pustulæ*, *Parasitici*, etc.) In the superciliary region, the eruption sometimes presents the appearance of pustules of a yellowish color, containing a thick fluid which spreads, coagulates, and forms a hard, dark crust covering the eyebrows either partially or wholly, at other times, the eruption consists of small, agglomerated vesicles, which break and discharge a reddish serosity, which concretes and forms thin scales, less prominent than in the preceding instance. These two varieties of eruption are accompanied with considerable itching, and even a sense of burning and smarting, and may eventually, give rise to serious derangements of the function of vision.

At first, we may attempt the removal of these eruptions by local applications, but when they have existed for some time, it will be proper to add to the local treatment, such constitutional remedies as the character of the disease, the diathesis of the patient, or other circumstances connected with the disease, would indicate.

The first thing will be to remove the crusts, which may be readily accomplished after having softened them by means of emollient cataplasms, glycerin, oily unctions, etc. If the eruption is *pustular*, one of the following compounds may be used: 1. Take of Sulphate of Zinc, in very fine powder, one ounce, Sweet Gum or Styrax two ounces, Lard four ounces; mix together by heat, stirring all the time till cold. Apply it two or three times a day.—2. Take of Sulphate of Zinc three or four grains, Glycerin one ounce; mix. Apply three or four times a day by means of a hair pencil.—3. Take of Iodide of Sulphur two grains, Simple Cerate half a drachm; mix thoroughly together, and apply two or three times a day.—4. Take of Benzoin in fine powder, four grains, Sublimed Sulphur four grains, Calcined Alum two grains, Lard one drachm; mix all thoroughly together and scent with a few drops of oil of roses. Apply this two or three times a day.

If the eruption is *vesicular* alkaline lotions will be preferable, as, 1. Take of Slaked Lime eight parts, Supercarbonate of Soda two parts, Rousseau's Laudanum two parts, Lard thirty parts; mix.—2. Take of Hydrochlorate of Ammonia, Bicarbonate of Potassa, each, half a drachm, Tincture of Yellow Dock Root, half a pint; mix.—3. Take of Wood Soot thirty parts, Stramonium Ointment one hundred and twenty parts, Oil of Sweet Almonds four parts, Bicarbonate of Potassa one part; mix.

The internal remedies most applicable to these affections are preparations of sulphur, of alkalies, especially the iodides or bromides, as well as vegetable alteratives. (*See* Treatment of Integumentary Diseases, *Vesiculæ*, *Pustulæ*, *Parasitici*, etc.)

5. *Cysts of the Eyebrows* are small tumors varying in size from that of a pea to that of a pigeon's egg, and popularly called *wens*. Their location is more commonly at the outer angle of the eyebrow; they are, however, almost always situated a little higher or a little lower than the superciliary appendage itself. Sometimes, these cysts are hard to the touch, at other times they are soft and yielding. Some enclose a yellowish, viscid matter, others a white grumous material resembling small lumps of wheat flour. The treatment of these cysts is altogether surgical; but it is better not to remove them, until they have acquired a considerable size, or interfere with the functions of the eyelids. Not unfrequently, after having attained the size of a pea, their further development becomes arrested.

6. *Pediculi.* (*Phthiriasis.*) When lice exist in the eyebrows, they multiply with astonishing rapidity, and occasion severe itchings and more or less pain. They may be removed by frictions with one of the following preparations:

1. Equal parts of Cologne and Tincture of Larkspur Seed.—2. Take Oil of Sassafras, Oil of Cedar, Tincture of Larkspur Seed, Oil of Sweet Almonds, of each, one fluidrachm; mix.—3. Melt together Beef Marrow thirty parts, Oil of Sweet Almonds four parts, Balsam Peru two parts; stir the mixture thoroughly, remove from the fire and add Oil of Valerian (or Oil of Amber) two parts, Oil of Wormseed one part. Apply one of these preparations two or three times a day. (*See Integumentary Diseases*, page 1094.)

DISEASES OF THE EYELIDS.

1. *Erythema of the Eyelids*, is characterized by a slight superficial redness of the thin layer of skin forming their external surface. It is more generally caused by irritating frictions, strong heat, exposure to a burning sun, flow of tears, etc. Sometimes, it occurs with females at their menstrual period, and, also, precedes or accompanies some cases of pulmonary and gastro-intestinal inflammations, as well as certain cutaneous affections. During dentition, it is often met with among children, and is called "strophulus, red gum, or tooth rash." The disease ordinarily disappears soon, and without treatment. To facilitate its removal, it may be bathed occasionally with a warm infusion of bran, lobelia, bayberry, or elm bark, etc.

2. *Inflammation of the Edges of the Eyelids*, also called, *inflammation of the Meibomian and ciliary glands*, *scrofulous blepharitis*, *ophthalmia tarsi*, *tinea ciliaris*, *tinea palpebrarum*, *psorophthalmia*, etc., is almost always a chronic inflammation of the anatomical elements which concur in the structure of the free border of the eyelids,—a pustular eczema, impetigo, or *Eczema Tarsi*. The upper eyelid is more frequently attacked than the lower. It is met with both among children and adults, especially those of a strumous habit of body. When the disease is primary, it appears to be *caused* by exposure to the changes of the weather, to irritating vapors, impure air, uncleanliness, unwholesome food, scanty diet, intemperance, debilitated constitution, etc. Farmers, military men, traveling merchants, coachmen, army teamsters, etc., are more particularly disposed to it. The secondary form of the disease is caused by catarrhal ophthalmia, ophthalmia neonatorum or purulent ophthalmia of new-born children, scrofulous conjunctivitis, or it may occur as a sequela of some of the exanthematous febrile diseases.

Symptoms. At first there is a feeling of heat and prickings, or smarting, and nearly all patients complain of a sensation of roughness which they compare to that produced by grains of sand under the free border of the eyelids. Upon a close examination, the oculopalpebral membrane will present a net-work of very fine vessels, filled with blood, which give a uniform, red appearance to the eye, or else small opaline vesicles will be seen scattered irregularly here and there, from the free margin to the oculopalpebral sinus. These local morbid conditions are accompanied either with hypersecretion of a viscid matter more or less consistent and readily concreting, or, with an extreme dryness of the mucous membrane. At this stage of the disease, it will rapidly disappear by simple hygienic attentions; but if neglected, which is more commonly the case, it becomes more extended, invades the Meibomian glands, or the ciliary glands, which swell, and the free border of the lids attains a volume considerably more than normal.

This tumefaction of the palpebral margin, which is indicative of the second stage of the disease, is at first so irregular, that we can readily recognize the swoln glands by the touch, ranged by the side of each other like small beads. At a later period, if the inflammation still extends, these little protuberances disappear, the swelling becomes uniform, invades the substance of the tarsal cartilage, and the border of the eyelid becomes double and triple its natural volume. At the same time, the secretion of the inflamed glands flows more abundantly, and dries in the form of yellowish scales, which so agglutinate the eyelids during sleep, that the

patient can not open his eyes until he has softened the concretion by moistening it. Frequently, but not always, there is photobia, and a flow of tears, from the irritation present.

When the ciliary glands participate in the morbid process, they likewise secrete a thick matter, which mingling with the preceding, equally dries in the form of hard, bluish crusts, so strongly adherent, that they can not be detached without a drop or two of blood following, or without tearing out some of the eyelashes.

Sometimes the ciliary glands only are inflamed, the Meibomian remaining intact; in this case, there is redness of the marginal border of the eyelids, a morbid secretion, such as will presently be described, and an incessant itching which compels the patient to scratch the part. There is no intolerance of light, no weeping, no sensation of sand in the eye. Frequently, there will be an inverted condition of the lashes, which, being turned in upon the ball of the eye, increases the irritation, this is called *trichiasis;* or, slender, dwarfish hairs may be developed, which point directly upon the eyeball, causing considerable pain and irritation, and which are termed *false eyelashes, wild hairs, pseudo-cilia.* These are often so pale and fine as to escape detection, unless the physician uses a magnifying lens with the aid of oblique light. The itching which accompanies this disease is a pathognomonic symptom; the malady is sometimes called *tinea of the eyelids.* If it be neglected, or be improperly treated, very unpleasant results may occur, as loss of the eyelashes, and ectropium.

The third stage of this disease is characterized by the presence of ulcerations and small pustules or abscesses at the roots of the lashes. These ulcerations, resulting from the irritation produced by the efforts made each day upon the eyelashes to remove the concretion that agglutinates them, and by the constantly secreted acrid and corrosive matter, are sometimes deep, and are always very difficult to cure. They more frequently involve the partial loss of the lashes, which, at a later period, if the affection persists, give rise to a thick, reddish border, more or less large and callous, termed *tylosis.* This condition of the eyelids is often seen among old persons, and has received the name of *lippitudo* or *blear-eyed;* it is accompanied with a continual flow of tears, a more or less intense photobia, and sometimes with conjunctivitis, or corneitis, for the eyeball being no longer sheltered by its protecting curtain, becomes sensible to the least causes of inflammation.

The cure in this affection is usually slow and tedious, not only from the obstinacy of the disease itself, but also from the unwillingness or neglect of the patient in attending to the eyes properly.

When the hair-bulbs have become destroyed, and the Meibomian orifices obliterated, the *prognosis* is always unfavorable. This condition may be known by the skin covering them being smooth and shining, and by pressure upon them not causing any discharge.

The *treatment* in the early stage of the disease is very simple, keeping the eye cleansed by bathing it with tepid water, and, perhaps, employing likewise, emollient or astringent lotions or glyceroles. The eye may be steamed over vapor of Belladonna, Stramonium, or Lobelia; and a lotion of Rose-water may be applied to it, or a Solution of Borax one part in Water, or, still better, pure Glycerin, thirty parts. If there is intolerance of light the eyes may be shaded, or the patient be kept in a darkened room. At the same time, the skin, kidneys, and bowels, must be properly attended to, as well as the diet, and any faulty condition of the system must be promptly remedied by the required means.

It is rarely, however, that the oculist will have the case presented to his notice until the disease has reached its second stage, when it will require much care and patience, on his part, to effect a cure. He must first, satisfactorily ascertain the actual condition of the eyelids, the morbid changes of which they are the seat, and their extent; he will thus learn whether the disease be confined to the Meibomian glands, to the ciliary, or to both combined. He will also enquire at what period the disease first manifested itself, and what were the symptoms, as, smarting, prickings, burnings, itchings, etc.; and, having satisfied himself as to the seat of the disease, its stage, and its essential manifestations, he will then turn his investigation to the constitution of the patient.

In the second stage, when the borders of the eyelids are red and tumefied, and agglutinated together, with severe itchings, etc., the following plan of treatment will be found effectual. In the morning, when the eyelids stick together, no efforts whatever must be made to open them, until the dried matter has been softened, so that no pain nor loss of eyelashes will follow the separation of the lids. For this purpose, a soft piece of linen rag may be well moistened with an Infusion of Walnut Leaves, as hot as can be borne, and be gently and loosely laid upon the closed eyelids, renewing its application every three or four minutes, until the lids open readily. In place of the above infusion, hot water, milk, or, infusion of hops, poppies, etc., may be used.

The eyelids being opened, every particle of concreted matter upon them must be carefully removed, in order that our subsequent applications may come in direct contact with the diseased part; else, they will prove of no service. And which may be effected by softening

them as above, or, with equal parts of Glycerin and hot Water, and removing them with the finger nails, or, still better, with a horn or shell forceps. Should there be any inverted or false eyelashes, or should any of the lashes be found quite loose in their follicles, these must be carefully removed. These matters being accomplished, the patient is now ready for the application of curative agents. Among these agents, the following will be found to answer a better purpose than most of the preparations which have been recommended to the profession; they are not to be applied with a hair pencil, nor to the healthy parts of the lid, but directly upon the seat of the disease, over which they should be rubbed and pressed, so as to enter the orifices of the Meibomian and ciliary glands; and this should be done by the physician himself, or by some trustworthy person, and never be entrusted to the patient, who, as a general rule, will merely rub the preparation on the outside of the lids, and without previously removing the crusts.

1. Take of Laudanum four parts, Glycerin thirty parts; mix.—2. Take of Acetate of Morphia, one grain, Acetic Acid two drops, Glycerin half a drachm; mix.—3. Take of Borax two grains, Glycerin half a drachm; mix.—4. Take of Glycerin two drachms, Hydrocyanic Acid, offic., fifteen minims, Aconitina one grain; mix. These are to be applied when there is considerable tenderness, and irritability; and when this has been lessened, one of the following preparations may be substituted, viz.:

1. Compound Lotion of Golden Seal.—2. Compound Soda Lotion.—3. Compound Lotion of Zinc.—4. Compound Ointment of Oxide of Zinc.—5. To a saturated Solution of Hydrochlorate of Ammonia, half a fluidounce, add half a fluidounce of clear Rain-water, and from one to three fluidrachms of Tincture of Capsicum, according to the degree of smarting it produces. 6. Glycerate of Starch* one drachm, Iodide of Potash, (or of Ammonium), from two to four grains; mix.—7. Glycerin one drachm, Concentrated Nitric Acid two to four drops; mix.

Whichever of these preparations are used, it should be applied two, three, or four times a day, according to the effect produced, and the severity of the disease; always being very careful to

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* *Glycerate of Starch*, or Schacht's *Plasma*, is made by placing one drachm of finely-powdered Starch and fifteen drachms of pure Glycerin, in a porcelain capsule, and exposing them to the heat of a spirit-lamp until complete hydration of the starch has occurred, constantly stirring the mixture with a spatula, during the process. This has no fatty odor, keeps without becoming rancid, and instead of developing erythema, as fatty ointments frequently do, it cures it when present.

remove, each time, by the means stated above, every vestige of concreted matter upon the margins of the lids. In very obstinate cases, it will prove advantageous to wake the patient once or twice during the night, in order to remove the crusts and renew the application. When the patient is old enough, the lids may frequently be prevented from adhering together, by drawing down the lower eyelid, and carefully inserting along its inner surface, a piece of soft tissue-paper which has been moistened with Oil of Sweet Almonds, or Glycerin with which a small portion of Morphia has been combined; then allow the lid to return to its natural position, so as to hold the paper between the lid and the eyeball, the patient at the same time closing the eyes. The paper should be cut of the right size, so as to be long enough to reach from one corner of the eye to the other, and wide enough to have its upper edge lie between the lids when closed. Of course, after this has been applied the patient must keep his lids closed, for opening them will disarrange the paper and give rise to irritation; and, sometimes, from extreme irritability of the lids, it will be improper to use the paper.

In the third stage of the disease, when ulcerations exist, more energetic measures must be pursued. The affected eyes must be exposed to an eye-bath of tepid water, or infusion of Marsh Mallows, or Marsh Mallows and Poppy Leaves, etc.; after which one of the following preparations may be applied, repeating the application once, twice, or three times every day, according to the effect produced:

1. Take of Sulphate of Copper eight grains, Glycerin one drachm and a half; mix.—2. Take of Tincture of Iodine eight grains, Glycerin one drachm and a half; mix.—3. Take of Perchloride of Iron eight grains, Glycerin one drachm and a half; mix. 4. Take of Sulphate of Zinc four grains, Glycerin one drachm and a half; mix.—5. A light cauterization with a crayon of Sulphate of Copper, will be found preferable in most cases.—6. Or, the parts may be touched once every day or two with pure Nitric Acid. Dip the end of a small stick of pine wood in the acid, and then wipe off all superfluous acid with a piece of paper—the wood will absorb enough for use. With this gently touch the diseased part, or only a portion of it at a time, every day or two. The severe pain caused by it soon passes away, without leaving any inflammation. The lids should be kept perfectly clean, and the best wash is a Castile soap-suds, to which an equal quantity of good Brandy has been added; with this, the lids may be bathed three or four times a day.—It has been recommended in cases where the lids are much thickened and indurated, with ulceration of the roots of the eyelashes, to extract

these, previous to applying the caustics, as "those lashes which fall out by ulceration are never replaced, because the bulb which secretes the hair is destroyed; but when they are plucked out they are afterward restored." This will be found beneficial in some cases, but is by no means necessary in all.

When ophthalmia tarsi obstinately resists local treatment, it is almost always owing to some faulty condition of the constitution, and consequently it is always much better to associate with the local measures, an internal alterative and tonic. Various agents may be employed for this purpose, as, Compound Syrup of Yellow Dock with Iodide of Potassium; Compound Syrup of Sarsaparilla; Iodide of Ammonium; Bromide of Ammonium; or, the following: Take of Bromide of Ammonium one ounce, Water thirty fluidounces, dissolve, and add Solution of Perchloride of Iron one fluidounce; the dose is a teaspoonful three times a day. Another very excellent compound is composed of Fluid Extract of Black Cohosh two fluidounces, Fluid Extract of Cinchona one fluidounce, Fluid Extract of Blue Flag half a fluidounce; mix. Dose, half a drachm to a drachm, three times a day, or enough to fall short of nauseating the stomach, or acting on the bowels.

In addition, hygienical measures should be strictly observed, as, attention to the bowels, skin, and kidneys, a nourishing diet, exercise in the open air, protecting the eyes as much as possible from artificial light, from the glare of sunlight, and from fatigue or irritation by reading, writing, sewing, or any kind of occupation requiring close examination. The eyes should also be protected against the wind, dust, bright light, etc., by the use of neutral tint spectacles, or London smoke, or gridelin. Blue glasses may also be used, but green glasses should be prohibited.

Should the disease become incurable from obliteration of the glands, the only course left will be a palliative one, to remove irritation by fomentations, and some simple glycerate or ointment; the shining redness of the lids, the absence of lashes, and the blear-eyedness, will remain through life. (*See Eczema Palpebrarum*, page 1018.)

3. *Hordeolum and Furunculus of the Eyelids.* Hordeolum (*stye*) and Furunculus (*boil*) have common characters, and the differences that distinguish them from each other are so slight as not to require special descriptions. Boil may manifest itself on any part whatever of the cutaneous covering of the eyelid; stye, on the contrary, is always developed on its free margin. The first may

attain a considerable size; the second rarely exceeds the size of a grain of barley. They are both inflammatory tumors, occasioning more or less pain, and may equally, if the accompanying inflammation is intense, contribute to impede, or even momentarily suspend the movements of the eyelids. Both terminate by suppuration.

The *treatment* of furunculus is based on that of boils generally, by cataplasms of Elm Bark, Flaxseed or Hops and Lobelia, to hasten suppuration. Frequently, the progress of the tumor may be checked at an early period, by touching it with a saturated solution of Oxalic Acid, or with Oil of Turpentine, being careful not to allow any to enter the eye. A tendency to the formation of boils must be treated as named under their appropriate head. (*See Furunculus*, page 1035.)

Hordeolum or stye is frequent with lymphatic or strumous persons, who have a fine and delicate skin. It is often developed under the influence of a deranged condition of the stomach, and likewise among females shortly previous to the menstrual period, and it is not rare to see several appear successively, one after another, or all at the same time. Its progress is similar to that of furunculus, and more commonly requires no particular treatment. When treatment is necessary in obstinate cases, the same measures may be pursued as recommended for boils; being careful to regulate the stomach and bowels, and to attend to hygienic measures generally. Zeis who believes the disease to be located in the capsules and ciliary glands, advises plucking out the eyelashes at once at the part affected. This arrests or mitigates the disease. There is no objection to this course, as they will soon be reproduced.

4. *Carbuncle of the Eyelids, Anthrax Palpebrarum.* This is a rare disease. It presents itself in the form of a tumor similar to that of boil, but much harder and more voluminous, severe burning pain, and intolerable itching. The swelling is dark red or purple, and at its apex a grayish point may be observed, which is, at a later period, eliminated by the suppuration. We must as early as possible deeply incise the tumor, the same as with carbuncles elsewhere, and then apply emollient poultices, continuing them until the slough separates, and in other respects, both locally and constitutionally pursuing the usual treatment recommended for these tumors generally.—It has also been recommended to apply the vegetable caustic, or caustic potassa to the tumor, freely, until an eschar is fully formed. This will no doubt be found preferable in many cases; as

it is much safer for the patient; and, as a general rule, the cure is thereby effected more rapidly. (*See Carbuncle*, page 1037.)

5. *Malignant Pustule of the Eyelids.* This is a virulent disease of a gangrenous nature, which is frequent in certain countries, and among persons who are almost constantly in contact with animals, their hides, or carcasses, as, butchers, tanners, farriers, hostlers, shepherds, etc. It may also be caused by the bite of a fly, or of a gnat, or mosquito, that has previously been sucking the blood of an animal affected with anthrax, or glanders. It always runs through four distinct stages.

In the first stage the disease commences by a red spot, resembling a flea-bite, then the lid swells, becomes œdematous, with intolerable itchings and violent pains. The next morning, the red spot is replaced by a small brownish vesicle, which ruptures spontaneously, or by the patient's scratching, and beneath which appears a small black spot of the size of a lentil seed.

The second stage is marked by the induration of the parts surrounding this livid spot, by an increase of heat, of smarting, of swelling, and by the appearance of other vesicles, which on rupturing leave a blackish eschar which extends in every direction.

In the third and fourth stages, the tumefaction becomes more and more considerable, invades the neighboring tissues, and the fever increases, with great thirst, small and unequal pulse, and dry tongue. Finally, nausea supervenes, delirium, coma, stupor, and death. These four stages generally succeed each other with great rapidity. In some cases, the disease is spontaneously arrested after having attained the first or second stage, and is followed by a healthy inflammation, which favors the separation of the gangrenous parts, leaving a wound which readily heals; but although cured, it is almost always with a loss of substance of the eyelids, to a greater or less extent.

The *treatment* of this disease can be efficacious only in the first three stages; in the fourth it is rarely of service.

In the first stage, by bathing the parts with the following lotion as well as injecting a drop or two into the diseased tissue, the further progress of the disease may be effectually checked. Take of Perchloride of Iron fifteen parts, Citric Acid two parts, Distilled Water twelve parts; mix.

But the surest plan, is cauterization, either with caustic Potassa, Chloride of Zinc, Sulphate of Zinc, Sulphate of Copper, or the hot

iron. The other treatment, both local and constitutional, being the same as recommended for Carbuncle, which see.

6. *Cutaneous Diseases of the Eyelids.* The remarks under "Cutaneous Diseases of the Eyebrows" equally apply to the diseases now referred to. The most frequent are *impetigo* and *eczema*, and also a variety of *psoriasis* or *lepra*, characterized by small whitish scales which occasion farinaceous exfoliations. The angles of the eyes seem to be the particular seat of this ophthalmic psoriasis, which is chiefly developed among pale strumous persons with a fine white skin.

These affections will require the same treatment as when located in other parts. In several cases of obstinate eczematous disease, which resisted alkaline and other treatment, the following is stated to have been found especially useful: Take of Oil of Tobacco six drops, Sulphate of Zinc fifteen grains, Cucumber Ointment one ounce; mix. I should prefer, however, the following, which I have frequently and successfully used: Take Oil of Tobacco six drops, Ointment of Wood Soot one ounce; mix.

In cases of psoriasis, we may advantageously use lotions of cream, and then sprinkle the following powder upon the affected parts: Take of Camphor one grain, White Oxide of Zinc two grains, fine powder of Rice (rice flour) fifty grains; mix. (*See Integumentary Diseases.*)

Porrigo Larvalis, or *Crusta Lactea*, (*milk-scall*), frequently affects the eyelids of infants and young children, to whom it is peculiar. It commences with a pustular eruption which is soon replaced by thin or thick yellowish or greenish scabs or crusts, from beneath which issues a brownish matter; when these fall off, they leave a red and tender surface. In some cases, the conjunctiva becomes inflamed, and which may be followed by destruction of the eye. This disease, when attacking the eyelids, is nearly always an extension of the disease from the forehead and cheek. Its *treatment* is simple; the crusts must be softened by means of emollient or oily applications, and then detached, after which one of the following preparations may be applied, repeating this process three or four times a day:

1. Take of Sweet Gum, Tallow, each, equal parts; melt together and strain.—2. Take of Tallow one ounce, melt, and add to it Oxide of Zinc one drachm; keep stirring until nearly cold, and then add Glycerin one fluidrachm, Tincture of Camphor two fluidrachms; stir till cold.—3. Sometimes, the following paste applied upon the eyelids will be found effectual: Take of fine Wood Soot five

parts, Rice flour five parts, Water a sufficient quantity to form a paste; mix.

As to other means, and general treatment to be pursued, *see Porrigo Larvalis*, page 1026.

7. *Warts on the Eyelids*, (*Verruca*) are small tumors analogous to warts on other parts of the body; they may be attached to a pedicle, or rest upon a large base, and usually do not exceed in size that of a pea. If they do not interfere with the eyelids, nor disfigure the patient, it is best to let them alone. If, however, they become voluminous, or there are several of them, it is better to remove them. This may be done, when they are pediculated, by seizing the tumor with a forceps, and then snipping them off with a single cut of a curved scissors. If they have a large flat base, they may be removed by the ordinary method of excision, by covering them with chalk, in powder, or by the application of some of the agents named under the head of Warts, on page 1095. But, it must be remembered, that, sometimes, the application of acrid vegetable juices, or caustics, inflame and ulcerate the wart, which, ultimately becomes of a malignant or cancerous nature.

8. *Chalazion of the Eyelids*, *Tarsal Tumor*, *Fibrinous Tumor*, somewhat resembles hordeolum, but differs from it in not being situated on the edge, and in not pointing toward the edge; by some, it is viewed as a stye which, having failed to suppurate, has passed into a chronic state. It is generally seated in the substance of the tarsal cartilage, a short distance from the margin of the lid, and more commonly points toward the internal surface. The upper lid is more commonly the seat of this disease, though it may exist in either, or, in both at the same time, and, sometimes, there may be several in the same lid. Upon everting the lid the tumor will project, and the part of the conjunctiva covering it will be of a livid-red color.

The best *treatment*, is, to evert the lid, push a small lancet carefully into the tumor and divide it throughout its whole length; then press out the contents. If they do not readily pass out, introduce the sharp end of a probe and break up the structure of the tumor, and then re-apply firm pressure. Any derangement of the digestive organs should always be properly treated, as the disease frequently appears connected with such derangement.—The application of pure Nitric Acid to these tumors, by means of a

soft piece of wood moistened with it, will frequently be found an effectual remedy. Dip the wood in the acid, wipe off any superfluous acid on the wood with a piece of paper, apply it upon the tumor and hold it there until the patient complains of the smarting, say, from ten to thirty seconds. Repeat this every day or two.

9. *Cysts of the Eyelids*, or *Encysted Tumors*, are analogous to those met with in the eyebrows. They may be developed in any part throughout the whole extent of the palpebral surface, but more commonly on the ciliary border. They sometimes enclose a yellowish-colored serous fluid, sometimes a thick and brownish fluid, somewhat like blood; they may also contain a matter similar to tallow, or hard grains of wheat flour. These tumors progress slowly, and after having attained a certain size, seldom beyond that of a walnut, they remain stationary. Some are superficial and adhere only to the skin; others develop themselves at the expense of the subcutaneous cellular tissue; and some have their origin in the more deeply-seated parts, are adherent to the tarsus, or to the periosteum of the margin of the orbit, and have not the mobility which characterizes the first two varieties. These cysts are always indolent, and constitute a disagreeable deformity which interferes with the movements of the eyelids and the functions of the eye.

The most certain method of removing them is by dissecting out the entire cyst, if possible, for if any portion of it be allowed to remain the tumor will re-appear, or fungous growths may be developed. The ring-forceps of M. Desmarres, as improved by Wilde, will be found of great service in the extirpation of tumors from the lids. It fixes the lid firmly, and compresses the parts around the tumor, so as to prevent any great amount of hemorrhage. When it can be safely done, the incision should be made through the palpebral conjunctiva; otherwise, through the external integument of the lid.

10. *Nævus Maternus*, or *Erectile Tumors of the Eyelids* are superficial or deep-seated sanguinary tumors upon the lids, of varied form and size, existing from birth or soon after, or else, but rarely, appearing at an advanced age. Some are arterial, others are venous, and again, others are constituted by a capillary net-work of both arterial and venous formation. The arterial (or active) tumors (aneurism by anastomosis) are of a vermillion red, and pulsate

synchronously with the pulse at the wrist. The venous (or passive) tumors have a livid tint, and a soft consistency. The third variety may be known by its brownish color, and by the resistance of its contents; and one of their distinctive characters is to diminish in size, and even wholly disappear under the influence of prolonged pressure.

These tumors frequently remain stationary; but sometimes they progress rapidly and acquire a large size; the skin then becoming excessively distended, may ulcerate, and if the tumor be arterial, serious hemorrhages may occur.

The various methods of *treatment* recommended for the removal of these tumors have for their object, either their destruction at once, obliteration of their vessels, or their extirpation. These methods are, pressure, vaccination, acupuncture, galvano-puncture, ligation, cauterization, and excision, which I shall not dwell upon here, as they belong to general surgery.

By enclosing the whole substance of the lid in a ring-forceps, having at the same time emptied the tumor of as much of its blood as possible by pressure, and then isolating it completely from its parent vessels by compression of the ring-forceps, we may cut up its tissue subcutaneously with a cataract needle, and carefully inject into it a solution of Tannin, of Perchloride of Iron, or of Iodine and Tannin combined. After a minute or so, relax the pressure of the ring-forceps, and allow the current of blood to return and come in contact with the injected fluid. This plan will frequently succeed. Some oculists recommend a seton of silk to be passed through the tumor, which has been previously saturated with solution of Perchloride of Iron.

11. *Œdema of the Eyelids* may accompany general dropsy, or it may arise from various causes, as, contusions, erysipelas, tumors, osseous disease, polypus, Bright's disease, etc., in which cases, the removal of the original affection will be followed by a disappearance of the œdema. Sometimes, however, it is due to debility or a strumous habit. In which case, tonics and alteratives internally, with gentle stimulants locally, and in obstinate cases, counter-irritation to the back of the neck, or behind the ears, will be found suffiecint to remove the swelling.

12. *Cancer of the Eyelids, Cancroid, Epithelial Cancer, or Epithelioma* commences either by a very small elevation or tubercle, more frequently on the lower lid, and toward one of the angles, or else

by a small wound, which soon becomes covered with a scab, inducing the belief that it is cured; soon after, however, the scab is detached or torn off by the patient, renews itself, then cicatrices again, and so on. At a later period, the indurated tubercle, which at first is not painful, and does not cause discoloration of the skin covering it, except some varicose vessels pervading it,—ulcerates; or, the skin beneath the scab ulcerates. The ulceration enlarges, its surface becomes hard, thick, and smooth; its borders callous, knotty, irregular, and of a pale-red color, and the discharge from the ulcer has in all respects a healthy appearance. With some, there is but little pain, unless, from the ulceration, nerves are exposed; with others, the ulcerative stage is attended with acute lancinating pains. The progress of the ulcerative process is very slow; it may be arrested, and even partly heal, and then commence anew. The surrounding skin is rarely swoln or discolored, and the adjacent lymphatic glands remain unaffected. If allowed to advance, the ulceration affects all the neighboring tissues, so that ultimately the orbit, the eyeball and the nose, form an extensive reddish ulcer, bleeding readily, and discharging an abundance of a sanious matter. At this epoch, the most alarming symptoms manifest themselves, as, emaciation, hectic fever, yellow tinge of the skin and puffiness, or serous infiltrations; and ultimately the patient dies from the effects of the disease upon the organism. This disease is rarely, if at all, met with among children, but almost always during the middle period of life, and often among females who have passed their critical period.

Ths *treatment* of this disease is divided into external and internal, and although it frequently fails to effect permanent cures, the disease appearing every few years, after having been apparently cured, yet it, at least, aids in prolonging the patient's life for a term of years, by arresting the progress of the ulceration, and preserving the adjacent tissues from its influence for a longer or shorter period.

The *internal treatment* consists of constitutional measures, as the administration of alteratives, preparations of iodine, etc.

The *external treatment* consists in the extirpation of the affected parts with the knife, removing, at the same time, some of the surrounding healthy tissues. But, the better plan, to my mind is the application of caustics, as Sulphate of Zinc, Chloride of Zinc, etc., as advised for Cancer. (*See* page 490.)

When the disease is past cure, palliative treatment is all that can be pursued; calming pains by anodynes, both internally and locally; mitigating the character of the sanious and purulent secretion by covering the ulcerated surfaces with Geranium in powder, or other

astringents; with a mixture of two parts finely-powdered Golden Seal, and one part of Perchloride of Iron; with powdered Bol Armenia; or, with a mixture of equal parts of powdered Peruvian Bark, Precipitated Carbonate of Iron, and Rosin.—Carbolic Acid half a drachm added to Glycerin one ounce, are stated to have been found a valuable local application in the early stages of this disease.

13. *Entropium.* This is a morbid condition characterized by an *inversion* of the free border of the eyelids, so that their edges are turned inward against the ocular conjunctiva, which is constantly irritated by the friction of the eyelashes upon it. Both eyelids may be affected simultaneously, but, more commonly, it exists in only one. Entropium may be total or partial, according as a part or the whole of the lid is involved. Its more frequent seat is toward the external angle of the eye.

This disease has numerous *causes.* It may be produced by a partial destruction of the palpebral conjunctiva, from whence follows a contraction of this membrane, which results in a more or less complete rolling inward of the free margin of the eyelid; it may, likewise, follow an abscess, long-continued inflammation, improper use of caustics, and injuries to the eyeball or palpebral conjunctiva, by lime, acids, etc. It may also be produced under the influence of a spasmodic condition of the orbicular muscles, or of an obstinate ophthalmia, as, for instance, ophthalmia tarsi, in the upper eyelid especially, when the tarsus becomes relaxed, distorted, and turned inward, drawing the lashes along with it. This variety has been called *tarsal entropium.* That from injuries is termed *traumatic entropium. Senile entropium* occurs among old persons, in whom the skin of the eyelid having become relaxed, or extended relatively more considerably than the mucous membrane, this has a tendency to draw the cutaneous surface toward itself and thus occasion an inversion.—A tumor which compresses the ciliary margin of the eyelid, or improper compression upon the eyeball, may also give rise to entropium.

In many instances, the tendency of the lid to invert may be overcome by the application of contractile collodion to the skin of the lid, or by means of a bit of firm wire, so "twisted and bent, as to fit on the back of the head by its middle, and press by its rounded extremities against the orbital portion of the lower eyelid"—(this being the affected one). *T. W. Jones.*

But, it is rarely that anything short of an operation will answer in the chronic form. The operation consists in removing a suitable

portion of the skin of the lid, and then accurately uniting the wound with sutures. Great care being taken to remove enough of the skin, or the disease will still continue to a greater or less extent; and if too much be excised, another difficulty may be produced, viz., Ectropium. An entropium forceps, scissors, and two or three small suture needles are all that is required in the operation.

Dr. Pagenstecher, of Wiesbaden, recommends very highly a compound operation for the cure of severe cases of entropium and trichiasis, consisting of a combination of Gaillard's operation for entropium and the operation of blepharophimosis.

14. *Ectropium*, or *Eversion of the Eyelids*, is exactly the reverse of the preceding affection, the eyelids being turned outwardly instead of inwardly. The lower lid is more frequently affected than the upper, and it may be either total or partial. In the latter case, its seat is usually toward the external angle of the eye; sometimes both eyelids are affected, and this pathological condition has the name of *lagophthalmus*, or *hare's eye*, in which the lids are never perfectly closed during sleep, a portion of the eyeball being always exposed. This is generally considered by authors in a separate chapter, being in several respects somewhat different from ectropium, as it may exist without any eversion whatever, but as its treatment is about the same, I insert it here.

Ectropium presents three different degrees: 1st, the margin of the eyelid may be simply removed from the eyeball; 2nd, extension of the tarsus so as to expose all the internal mucous membrane of the lid to view; and 3rd, complete eversion of the eyelid so as to place the whole of its conjunctival surface externally.

The symptoms which accompany this affection are, a constant flow of tears, irritation of the conjunctiva which, exposed unceasingly to the contact of air and foreign particles, swells, ulcerates, becomes fungous or granulous, hypertrophied, and terminates by assuming the appearance of cartilage; the tarsus is then fixed on the cheek in the form of a crescent. Left to itself, ectropium will ultimately result in a loss of sight, owing to the repeated inflammations which follow each other, and which are owing to the fact that the ocular globe is constantly deprived of the protection of its lids.

The most frequent *causes* of this infirmity are, chronic inflammations of the conjunctiva, purulent ophthalmia, vicious cicatrices, wounds, abscesses, burns, paralysis of the orbicular muscle, and caries and necrosis of the orbitar walls.

The *treatment* of ectropium is usually of a surgical nature; and

there are as many methods of operation as there are causes capable of producing the affection. In some instances, a light cauterization will be sufficient; in others, it will be necessary to excise a portion of the mucous membrane; and when the everted eyelid can not be made to cover the eyeball, as a last resource, the whole of the cicatrice is removed, and replaced by a flap of healthy skin borrowed from the neighboring parts, as, from the temple or cheek—this operation is termed *blepharoplastic*. It was first performed by the elder Gräfe, a German oculist, at the commencement of this century; since which, it has been perfected and performed by many surgeons, and in different ways. Most of the cases of ectropium depend upon certain conditions existing within the lid, and may be cured without excision, by using measures to overcome the affection of the lids occasioning the infirmity, and the frequent and long-continued application of astringents, as, Sulphate of Copper, Sulphate of Zinc, Perchloride of Iron, etc.,—which must be carefully applied only to that portion of the palpebral conjunctiva which is not involved in the eversion. Cases, in which the conjuctiva protruded most enormously, have been cured in this way by a patient and persevering treatment.

15. *Anchyloblepharon*, and *Symblepharon*. Following burns, wounds, and ulcerations, the margins of the eyelids may become adherent to each other, the eyeball remaining free; or, there may be adhesions between them and the ball. The first variety of adhesion is called *anchyloblepharon*, and is distinguished into *mediate*, where the adhesion is through the medium of a false membrane, or *immediate*, where the adhesion is direct without any intervening substance. It may also be *total*, involving the whole margin of the lids, except at the inner angle, or it may be *partial*, in which the adhesion is generally toward the outer angle. It may likewise be congenital, and frequently with an imperfect development of the eyeball. The second variety of adhesion is called *symblepharon*, in which the conjunctival surface of one or both eyelids adheres to that of the conjunctiva. Like the preceding it may be *mediate* or *immediate*, *total*, or *partial*. The *treatment* of these two pathological conditions of the eyelids is surgical, and consists in separating the adhesions by the knife, by ligature, or both. The operation requires care, together with subsequent measures to prevent re-adhesions taking place.

16. *Blepharophimosis* is a contraction of the eyelids due to contraction of the orbicular muscles. Patients who are subject to it, appear to have the eye smaller, deeper in the orbit, and present a singular physiognomy, especially when the eyeball can hardly be seen from occlusion of the lids. It is more commonly a congenital affection, and demands the aid of surgery.

17. *Ptosis*, *Blepharoptosis*, palsy, or falling down of the upper lid, so as to interfere with vision. This disease may be congenital; may arise from an extension and relaxation of the skin of the eyelid; or, may be produced by paralysis, or injury of the levator palpebræ muscle. The paralysis is generally due to pressure upon the nerve of the third pair by tumors, or sanguineous, serous, or other effusion.

The *treatment*, when due to paralysis, will be to remove the cause by proper treatment, aided by the application of stimulants, electricity, solutions of strychnia, etc., to the affected lid, and its vicinity. If these fail, and there are no contra-indications, an attempt at relief may be made by surgical measures.

18. *Epicanthus*, a slight congenital deformity, occasionally seen in children, consisting of a crescentic fold of redundant skin, at the inner corner of each eye, extending from the root of the nose, and partly or wholly concealing the caruncula lachrymalis. Generally, as the bridge of the nose enlarges in after life, this fold of skin disappears. When this deformity is so great as to prevent the eyelids from being separated sufficiently apart to allow vision, it has been proposed to pinch up and remove a vertical fold of skin on the median line between the two eyebrows, and bring the wound accurately together by hare-lip suture.

19. *Trichiasis* and *Distichiasis*. The first is an irregular manner of growing, an inversion of, the eyelashes, in which they are turned against the eyeball. The second is the term applied to a supplementary row of abnormal eyelashes, or *false*, or *wild hairs*, as they are sometimes called, *pseudo-cilia;* more generally, they are the natural lashes, whose bulbs have become displaced. They are sometimes so very pale and fine as to require the aid of a lens to bring them into view, the lid being everted during the examination. These affections give rise to much irritation of the eye,

severe pain, intolerance of light, opacity and ulceration of the cornea. They are frequently present in entropium. Inverted eyelashes are the result of wounds, injuries from caustic substances, tinea ciliaris, chronic conjunctivitis, etc.

The *treatment* consists in carefully extracting the diseased lashes; using a forceps which will hold them firmly without cutting them, and extracting them slowly in a straight direction, so as to remove their roots. If plucked out with a sudden jerk, or in a wrong direction, they will break off, leaving a short end protruding from the margin of the lid, which will give rise to an increased irritation of the eye. Dr. Jas. Hunter states, "The best forceps are those made without teeth; the holding part being merely rough polished, so as not to cut the hairs. When the eyelashes are exquisitely fine, and slip through even the best made forceps, I have found it an infallible plan to damp their points with a saturated solution of shell-lac in alcohol, and to grasp the hairs for a second or two before pulling them." Usually, after this operation has been repeated two or three times, the lashes assume their normal condition.—If the inverted hairs still continue to appear, notwithstanding their repeated extraction, it will then be better to destroy the bulbs, which may be accomplished by a surgical operation, but more commonly, by introducing into the orifice, left immediately after the extraction of a lash, and carrying down to its bottom, a very small splinter of pine or other soft wood, which is moistened with pure Nitric Acid; this will occasion a sense of pain for a few moments only; should it be too severe the part may be bathed with some alkaline solution. If this operation fails, then a resort to surgical means will become necessary.

20. *Nictitation* may become morbidly frequent, and may depend upon an absence of the eyelashes and a state of permanent irritation of the marginal border of the eyelids, or it may be due to a spasmodic affection, producing a visible quivering of the lids, analogous to the twitchings observed in other parts of the body, especially of the mouth and nose. The twitchings are always noticed by other persons, and are quite annoying to the patient. If they be due to foreign particles in the eye, or a single everted eyelash, the removal of these will effect the cure. If occasioned by conjunctivitis, the removal of this inflammation, and protection of the eye from too intense light, by colored spectacles will answer. Sometimes the affection is incurable. At other times it may be removed under the influence of baths, quinia, and counter irritation; or,

by vermifuges, when intestinal irritation from worms is present. All internal stimulants must be avoided, as well as causes of mental excitement. *Twitching* or *Quivering* of the eyelids, also called "Life-blood," and *Blepharospasm*, or spasmodic closure of the lids, are analogous affections, requiring similar treatment. Sometimes tonics and antispasmodics, as Citrate of Iron, Valerianate of Quinia, Alcoholic Extract of Black Cohosh, with counter-irritation to nape of neck or behind the ears, and exposure of the lids to anodyne vapors, will be found useful, when aided by a rigid attention to hygienic measures—as well as by means to remove the cause, when this is ascertained.

21. *Tylosis*, or *Callosity of the Eyelids.* The eyelids frequently become thickened, indurated and knotty, from ophthalmia tarsi, and from excessive use of alcoholic liquors. It is a very difficult affection to cure. When connected with a strumous habit of body, in addition to local applications for the removal of the inflammatory and indurated condition of the eyelids, the appropriate constitutional measures must be pursued. If the affection is brought on by intemperance, *tylosis arthritica*, it is generally incurable; the only chance exists in restoring the biliary and digestive apparatus to a normal condition, and, at the same time, to overcome the morbid inflammatory action in the lids by local applications.

22. *Contusions*, *Ecchymosis*, *Burns*, *Scalds*, *Poisoned Wounds*, *Incised and Lacerated Wounds*, *Erythema*, *and Syphilitic Ulceration* or *Eruptions* of the lids, require the same treatment as described under Diseases of the Eyebrows, or, that is applicable to the same affections occurring in other parts of the body; requiring, however, more care in the use of local applications or in operations, on account of the peculiarities of the organ.—*Vitiligo* of the eyelids, yellowish or ochre-colored patches, of irregular shape, slightly elevated, and generally appearing on both sides of the face symmetrically. They are seated in the cutis, and appear chiefly in the loose skin of the lids, often spreading to the sides of the nose and cheeks. The treatment consists in measures directed to correct the faulty condition of the biliary and digestive apparatus, and fomenting the eyelids with vinegar and water. A permanent cure may be effected, without leaving a scar, by carefully excising them. (*See Pityriasis Versicolor*, page 1089.)—*Sycosis*, or a fig-like appearance of the lids from swelling of their ciliary margins and numerous pustules or

tubercles, is a very obstinate and annoying disease. The cure consists in an attention to the biliary and digestive apparatus, with caustics, as, Sulphate of Copper, to the tumor, and warm fomentations if too much irritation be produced. When the tubercles are few I prefer touching them every day or two with a stick of soft wood moistened with pure Nitric Acid. When there are many, or the disease is obstinate, the remedies recommended for Sycosis under Cutaneous Diseases may be used. (*See* page 1084.)—*Molluscum* or *Albuminous Tumor*, or *Glandiform Tumor*, is usually met with in children, and occasionally occurs among adults. Small, roundish tumors, varying in size from that of a pin head to that of a horse-bean, white, smooth, and shining, imbedded in the skin and subcutaneous cellular tissue of the eyelids, as well as in other parts of the face; sometimes their surface is rough and tuberculated. After a time, a small opening is formed at their apex, from which issues a milky fluid, especially on pressure, and which is of a contagious nature, reproducing the disease in those parts with which it comes in contact. I have cured these tumors by the application to them, every day or two, of a soft piece of wood dampened with Nitric Acid; this, however, will require two or three months to effect a cure. (*See Chalazion*, page 1365). If this fails, the tumor should be split open with a lancet, and its contents be forced out by pressure with the thumb-nails, or otherwise. If the patient be strumous, constitutional treatment should be adhered to for some months.—*Phylctenulæ* or small watery vesicles of the ciliary margin of the lids, and *Milium*, a small white tumor, about the size of a pin's head, containing a suet-like substance, also situated on the margin of the lids, generally occur in elderly persons. When these become troublesome, they may be removed by opening them with a lancet, or snipping off their prominent part with scissors, and then pressing out their contents. If the internal surface of the cyst, after being emptied, is touched with Nitric Acid, or Nitrate of Silver, it will render them less liable to re-appear.

DISEASES OF THE LACHRYMAL APPARATUS.

The lachrymal apparatus is composed of anatomical elements having various functions, some designed to secrete tears, and others to carry them off. These different parts, the lachrymal gland, the lachrymal puncta and canals, the lachrymal sac, and the nasal duct, frequently become the seat of diseases rather difficult to cure, and which become greatly aggravated by rude, or improper manipulations.

1. *Lachrymal Xeroma*, or *Xerophthalmia*, is a condition in which there is a suppression of the secretion of tears, and may be due to a deficiency of nervous power in the lachrymal gland, or to an injured state of the ducts. It is more common among old persons than young, and is frequently an attendant on amaurosis, in which disease, a return of the secretion is to be considered a favorable indication, as the vision generally commences to improve. When due to want of nervous energy, sternutatories, and gentle stimulants, with internal *treatment* addressed to the nervous system will be proper. As it is more commonly a symptom of some affection, the treatment should be more especially directed to this. The eyeball, when dry, may be frequently moistened with a solution of Albumen one drachm, common Salt thirty-six grains, Water thirteen ounces; this should be applied tepid.

2. *Epiphora*, or an excessive secretion of tears, like the preceding, is usually a symptom instead of a disease, and, likewise, requires a *treatment* directed to the disease of which the overdischarge of tears is merely a symptom. The eye should, at the same time, be properly protected from irritating influences, as cold, dampness, high winds, dust, etc. Epiphora may be due to scrofulous ophthalmia, disordered digestion, intestinal worms, teething, etc.; it is more common among young persons than old, and is often cured, when there is no apparent cause for its presence, by the administration of an emetic or two, attention to the bowels, kidneys, and skin.

3. *Stillicidium Lachrymarum* differs from epiphora in this respect; stillicidium is due to some morbid condition of the organs destined to remove the tears after they have been secreted; epiphora is due to an overaction of the tear glands themselves, secreting this fluid in abnormal profusion. The cause of the difficulty must be detected, and properly treated.

4. *Chronic Inflammation of the Lachrymal Gland*, is generally met with among strumous constitutions. The gland is enlarged, with sometimes an œdematous swelling of the upper eyelid; pain is rarely present, but usually a sense of fullness above the eyeball, which can not be moved with the same freedom as the other; sometimes the globe will be displaced downward and inward. Pressure made between the eyeball and the outer extremity of the superior

margin of the orbit, will occasion a profuse discharge of tears. If the disease be allowed to progress, it may terminate in suppuration. The *treatment* consists in constitutional remedies, nourishing diet, and a proper attention to hygieine, together with mild counter-irritants to the temple, and in front of the ear, aided by local applications, to the gland, of a weak solution of Iodide of Ammonium, say three to six grains to one ounce of Water. If the eye becomes endangered, the gland should be extirpated.

5. *Fistula of the Lachrymal Gland*, or *True Lachrymal Fistula*, consists in a minute callous opening, located toward the outer extremity of the upper eyelid, through which tears trickle. This may be the result of an abscess of the lachrymal gland, it may also follow an ulceration, a burn, or any traumatic lesion of the upper lid. The disease is rare, and of difficult cure. Unless exceedingly troublesome, it should not be meddled with. Cures have been made in a few days, by passing a red-hot knitting-needle into the fistula, about a quarter of an inch deep, and turning it round on its axis several times. Caustics may also excite a sufficient degree of inflammation to effect a closure of the fistulous opening; a small probe may be coated with Nitrate of Silver or Sulphate of Copper, and passed into the opening at different times, each time with a rotatory motion. Or, Nitric Acid on a probe made of soft wood.

6. *Enlargements of* and *Tumors in* or *near the Lachrymal Gland*, as well as *Obstruction of its Excretory Canals* are not common affections, and belong more especially to the department of surgery, which alone can afford relief in these cases. When the obstruction is caused by mucus, this may be removed by the careful introduction of fine probes and injections. When the puncta are obstructed by a displaced hair, a foreign body, or a stony concretion, these may be extracted.

7 *Atony or Relaxation of the Puncta Lachrymalia and Canaliculi.* The lachrymal points and canals although wide open, and free throughout their whole extent, sometimes lose the faculty of absorbing the tears, from which arises a *stillicidium lachrymarum*, and a dryness of the corresponding nostril. This disease may be due to erysipelatous inflammation of the eyelids; to ophthalmia,

the result of exanthema; to the improper or too frequently repeated introduction of probes or injections into these minute canals; and, sometimes, it is associated with certain paralysis of the muscles of the face.

The *treatment* consists in the application of astringents or stimulants to restore tone to the debilitated walls of these organs. One of the following agents may be applied to the relaxed puncta, and also be dropped into the eye at its nasal angle, the patient lying upon his back during the application and for some minutes afterward. 1. Sulphate of Zinc one grain, Plantain Water one fluidounce; mix. 2. Sulphate of Copper one grain, Water one fluidonce; mix. 3. Perchloride of Iron one grain, Water one fluidounce; mix. 4. Tincture of Nux Vomica one drop, Water six to ten drops; mix.

8. *Chronic Inflammation of the Excreting Lachrymal Organs, Lachrymal Tumor*, or *Chronic Dacryocystitis*. This is a very common affection of the excreting lachrymal organs, and is due to a chronic irritation of the mucous membrane which lines the lachrymal passages. Under the influence of this condition, the membrane thickens and swells, and, as it is surrounded only by resisting osseous walls, the tumefaction tends inward, increases gradually, and ultimately obstructs the nasal canal. The tears, consequently, accumulating in the superior part, that is, the sac, distend it and form a tumor there, which, at a later period, if the mucous membrane is inflamed, becomes an abscess, which opening outwardly produces a fistula. Such is the more common mechanism of the formation of the tumor and of *fistula lachrymalis*, which are only one and the same disease at two different periods.

In some cases, however, the sac only is inflamed, and the mechanism is still more simple; but in others the fistula is more complicated, being associated with fungosities, a polypus, osseous denudations, caries, necrosis, etc., which constitute so many varieties of a great importance as far as choice of treatment is concerned.

The *causes* of this affection are numerous. Sometimes, it is due to an exanthematous disease, as, small-pox, scarlatina, measles, etc. At other times, it is a consequence of obstinate palpebral conjunctivitis, of inflammation of the bones and of the periosteum, of calculous concretions formed in the lachrymal sac, which, the same as a foreign body, irritate the mucous membrane, which swells and obstructs the canal. And again, lachrymal tumors are also de-

veloped by obstruction of the inferior orifice of the nasal canal by a foreign body arrested in the nostril.

This disease is more commonly connected with a strumous or scrofulous constitution; and, not unfrequently with syphilis. Its symptoms are aggravated by exposures to cold and moisture.

At the commencement of the disease, the *symptoms* are rarely observed by the patient; who, for a long time experiences only a slight watering of the eye, which increases and diminishes by intervals, and is more marked in winter than in summer. The action of bright light, wind, or dust increases the intensity of this phenomenon, which soon becomes accompanied with a little dryness of the nostril, corresponding with the side of the disease, more frequently the left, as lachrymal tumor is rarely observed on the right side. After a longer or shorter time, the skin and subjacent tissues become slightly swoln and doughy, and upon compressing them with the pulp of the finger, a transparent or whitish liquid will be seen to regurgitate through the lachrymal puncta, which is the lachrymal fluid changed in its composition by its mixture with the pathological secretion of the mucous membrane lining the sac. At this period the lachrymal tumor is fully formed, and many patients may be met with who have not even at this stage applied for medical aid.

The tumor, once formed, gradually increases in size, until it reaches that of a small bean; upon compressing it, it disappears by discharging, either through the nose or the lachrymal puncta, a fluid which is often ropy like the white of egg. Having reached this stage, the disease may remain stationary for several years, or even during life, becoming thoroughly cured, as may often be observed among young subjects. In the majority of cases, however, it does not subside, or become arrested, but advances in its progress. The secretion becomes purulent, and if it can not be completely evacuated externally, a more or less intense inflammation comes on, the skin reddens, then becomes thinner, and ulcerates, and the tumor spontaneously evacuates it contents through this opening. These inflammatory attacks being repeated several times, at length terminate by establishing one or several fistulous passages, from which a purulent matter constantly escapes, irritating the neighboring parts, rendering the margins of the cutaneous orifice hard and callous, and may even occasion necrosis or caries of the bones which form the walls of the sac and of the nasal canal.

The progress of this disease is essentially chronic. Left to itself, it has but little tendency to become cured; however, it sometimes becomes cured spontaneously by the complete development of the

osseous passage, at the period of puberty, when the nasal canal being enlarged, the tears flow off through their natural channel. Under all other circumstances, the disease persists, and sometimes becomes intractable to the most energetic and rational medication.

Differential Diagnosis. It must be observed that lachrymal tumor consists in a greater or less distension of the sac, accompanied with dryness of the corresponding nostril, watering of the eyes, a change in the character of the tears, as well as in the color of the skin in this region, itchings and obstructions in the inner canthus, and, finally, in the production of a tumor which, under pressure, yields a muco-purulent fluid, which passes either through the lachrymal puncta or through the nasal fossa.

In some cases, pressure will not cause a regurgitation, although the finger experiences the sensation of an accumulated fluid in the sac; the disease is then termed *encysted dropsy of the lachrymal sac*, or *mucocele*, which must not be confounded with the disease under consideration.

Under some circumstances it may be difficult to determine a lachrymal tumor from a *fistula;* but, it must be remembered that, while in the tumor there is a discharge upon pressure, in fistula there is none whatever. There are fistulas which, at first sight, may be mistaken for a tumor, these are *capillary fistulas*, so named because of the narrowness of their canals; in this case, there is a tumor and fistula at the same time, and the association of these two degrees of the same affection renders the disease very annoying, for the tumor is constantly filling, and the patient is obliged to evacuate its contents, very frequently during the day, by repeated pressure.

Lachrymal tumor may be confounded with the commencement of an *abscess* external to the sac, for inflammation of the surrounding tissues, equally produces swelling, redness, abnormal injection of the eyelids and of the ocular conjunctiva, a more abundant secretion of tears, and dryness of the nostril. In such cases, we inject some warm water through the nasal canal, and if the injected liquid flows through the lachrymal puncta, we may conclude that the sac is free and is not the seat of the disease. We may also compress the sac, and ascertain whether any fluid passes through the puncta. These two tests will clear all doubts, and establish the diagnosis. If we recognize an *external abscess*, it must be punctured as soon as possible, being careful not to carry the puncture too deep lest the lachrymal sac be involved.

Cysts seated in front of the sac have also given rise to errors in diagnosis. To remove all uncertainty, we must refer to the antecedents, and it will be found that these cysts are always formed

without watering of the eyes, a phenomenon which is constant in affections of the lachrymal sac. Beside, cysts are always indolent, while in most cases a slight irritation accompanies lachrymal tumors. Injection through the nasal canal will also show whether the lachrymal passages are free, pressure with the finger will not cause any fluid to regurgitate through the lachrymal puncta, and, neither the characteristic mobility of cysts, nor the variations of size which are constant in diseases of the sac, are met with. The differential characters are summed up in the following table:

LACHRYMAL TUMOR.	CYSTS IN THE REGION OF THE SAC.
It always commences with watering of the eyes, accompanied with dryness of the nostril, and often presents a slight inflammation; pressure gives issue to a fluid; an injection does not penetrate into the lachrymal passages, the tumor is fixed and frequently changes its volume at different times.	There is never any watering of the eyes, any dryness of the nostril, nor inflammation; pressure does not occasion a discharge of fluid; an injection readily passes into the lachrymal passages, and the tumor is often moveable and does not vary in size at different times.

Fibrous tumors, and *exostoses*, may readily be distinguished, when in this region, from lachrymal tumor.

Finally, there are *small fistulas* resulting from an abscess developed at the internal angle of the eye, which have been allowed to rupture spontaneously, and subsequently been neglected. The patients state truly, that, at the commencement there was watering of the eyes, but if we carefully interrogate them, they will acknowledge that this weeping ceased as soon as the abscess ruptured. The weeping, in these cases, is due to the extension of the inflammation to the lining mucous membrane of the lachrymal puncta and canals, and when this has disappeared, the organs resume their functions and the weeping ceases. It is useful to probe the fistulous passage, and if the probe enters deeply, we may conclude that the sac is intact; and to be more certain, we may inject into the part.

Many medical men, in the *treatment* of this affection, commence at once by operative measures; each one employing the method which is the most familiar to him. This practice rarely effects happy results, and should be condemned and abandoned to its just value. I am fully convinced that the local affection can only be made to disappear by energetically combating the cause, and that constitutional medication has a larger share in the cure than the numberless surgical operations which encumber the most scientific treatises. Consequently, when we have diagnosed a lachrymal tumor or fistula, we should observe the temperament and constitution of the patient, and ascertain the relations which exist between

the local affection and any vicious diathesis with which his system may be tainted.

The treatment will be medical or surgical, according to the period of the disease; the medical being local and general. The *local medication* consists in frictions over the region of the sac and the side of the nose with resolvent ointments, such as, Ointment of Iodide of Ammonium (five parts to thirty parts of Lard); or, of Iodide of Cadmium (same proportions); Compound Ointment of Iodine, etc. Before applying these ointments, the sac should always be carefully emptied. Another very fine local application is composed of Hydrochlorate of Ammonia three grains, Chloride of Gold and Soda two grains, Water one fluidounce; mix. This may be applied to the nasal angle of the eye by a camel's-hair pencil, or, it may be poured in, the patient lying upon his back. If the lachrymal lacus be kept filled with this fluid for a few minutes each time it is used, the lachrymal sac having been previously emptied, some of it will be taken up by the puncta and carried into the sac, and thus be brought into direct contact with the diseased mucous membrane. Of course, previous to these applications, any active inflammation present, must first be lessened by appropriate measures. In connection with these applications, fumigations should be directed into the nasal fossa of the diseased side, and renewed several times a day; they act directly on the mucous membrane, diminish its inflammatory condition, render the accumulated fluids less consistent, and facilitate the passage of the tears. For this purpose I would recommend infusion of St. John's Wort, Marigold Flowers, Arnica Leaves, Lobelia, Sage, Rosemary, Figwort, etc. The infusion may be made in a large vessel having a very small funnel-shaped, open extremity, which may be passed into the nostril of the side corresponding to the tumor, and the part be fumigated for ten or fifteen minutes, after which the patient is to blow his nose. In place of carrying the small extremity of the vessel into the nostril, a very small elastic tube may have one end fitted upon the open extremity of the vessel, while the other is placed within the nostril. The fumigation being finished, the patient should snuff up into his nostril a small quantity of the fluid from the herbs, or else, a decoction of Walnut Leaves, Figwort Leaves, Pine Buds, or, a very dilute Solution of Chlorinated Soda.

Fomentations should also be applied to the eye, every night; and some one of the lotions applied to it two or three times a day, that are recommended in the treatment of Chronic Conjunctivitis. Ointments of solutions of lead, nitrate of silver, mercurials, etc., are of no value, and should be banished from our practice. The

same may be said of injections into the lachrymal puncta by means of Anel's syringe, they will be found useless, often injurious, aggravating the mischief by its mechanical irritation. Dixon states that the "remedy he has found most servicable is a little oval blister, about half an inch long, placed directly over the sac or tumor. This may be repeated every fortnight or so, according to the state of the skin, and the plan, to be efficacious, must be persevered in for several months." He also recommends astringent solutions to be dropped into the puncta, as, for instance, of Tannic Acid. An infusion of equal parts of Golden Seal and Geranium, will be found valuable.

The *general* or *constitutional medication* consists in the administration of those agents which are adapted to the particular taint present, as scrofulous, syphilitic, etc. Thus, the various preparations of Iodine or Bromine, as, Iodide of Potassium, Iodide of Ammonium, Bromide of Ammonium, Alterative or Scrofulous Syrups, etc., as advised under the heads of Scrofula, Syphilis, etc. Anemia will require chalybeates, as Iodide of Iron, Bromide of Iron, etc. Hygiene must be rigidly enforced, good nourishing diet, but to a moderate extent, exercise in open air, regularity of bowels, neutralizing acidity of stomach, and especial attentions to the skin, etc.

If the above treatment fails to effect the desired cure, after a persevering trial of it for ten or twelve months, it will then be proper by surgical measures to endeavor to restore the obstructed lachrymal passages to their normal condition. As there are many plans advised for this purpose, the reader is referred to treatises upon the surgical treatment of the eye, which is not within the scope of the present work.*

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* Relative to these affections of the lachrymal organs, Dr. Jas. Dixon, of London, in his late work on Diseases of the Eye, makes the following remarks:

"When a patient applies to us, complaining of habitual watering of the eyes, we must first notice whether there is any displacement of the puncta. In the healthy state, these little apertures face toward the globe, and are in contact with its conjunctival surface, so that to bring them into view it is necessary to draw the margin of the tarsus slightly away from the eyeball. If, in consequence of *Chronic Ophthalmia*, the conjunctival lining of the lids has become considerably thickened, the edge of the tarsus will be sufficiently everted to cause the openings of the puncta to face upward, or even forward; and in that case they can no longer act as capillary tubes in taking up the tears, which, in consequence, trickle over the edge of the lower tarsus. Or the puncta still retaining their natural position, may have become so completely obliterated, in consequence of long-continued inflammation, that we may be unable to trace their original position.

"If, however, the puncta appear to be free, and in their natural situation, and yet no tears can be made to regurgitate through their openings, when the finger is pressed upon the sac, just below the tendon of the orbicularis muscle, we may

9. *Mucocele*, or *Dropsy of the Lachrymal Sac*, is characterized by a swelling of the lachrymal sac, of variable size, sometimes livid,

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suspect some obstruction to exist in the canals themselves. To test this, a fine probe (punctum probe) must be passed along them. This is a manipulation in which the greatest care and gentleness are required, on account of the delicacy of their lining membrane, any rupture or abrasion of which would be followed by stricture, or, if the membrane were extensively torn, complete closure of the canal might ensue. The student must bear in mind the abrupt turn which the canal makes at a short distance from the punctum. In passing a probe into the lower one, for instance, *the instrument should be allowed to pass almost vertically downward for about half a line, and then turned inward toward the nose, in which direction it will pass—provided it meets with no obstruction—until it strikes against the inner wall of the lachrymal sac.* In practiced hands, a fine probe without a bulb may be used with advantage when the canal is very narrow, but the beginner should never trust himself to employ any but a bulbous-ended instrument; and even this, as I have said, must be carried forward in the most guarded and delicate manner. It was formerly recommended to carry on the probe through the lachrymal sac and nasal duct into the nose, so as to dilate any stricture that may exist in those parts; but the instrument employed is, of necessity, so slender, that it can not be guided with any certainty or precision through so long a passage; and injury to the lining membrane of the sac is almost certain to follow such fruitless attempts. If the obstruction in the sac or nasal duct be complete, and the canals and puncta be free, firm pressure of the finger just below the tendon of the orbicularis muscle, will cause the contents of the sac to escape at the puncta; but if the passage into the nose, although narrowed, be pervious, steady pressure in a direction downward, and a little backward, will commonly overcome the resistance of the stricture; the firm swelling caused by the distended sac then suddenly yields, and the fluid passes into the nostril.

"In the same way that chronic thickening of the conjunctiva will induce constriction of the punctum, just so will a similar condition of the lining membrane of the nostril cause obstruction or closure of the *outlet* of the nasal duct. Various attempts have, therefore, been made to dilate, from below, strictures of the duct and sac, by introducing sounds from the nostril; and tubes have been passed in through the same channel with the object of injecting astringent or stimulating fluids into the cavity of the distended and inflamed sac; but these attempts have ended in disappointment.

"I have already partly described the appearance of that distension of the sac which is attended with chronic inflammation of its lining membrane. The fluid which escapes from the puncta, when the sac is pressed, may assume the various appearances of tears, thickened with clear mucus, tears mixed with little curdy flakes of a yellowish or creamy color, or a fluid which seems to consist almost wholly of pus.

"If care be taken by the patient frequently to empty the sac into the nostril by pressure, the disease may remain for years almost stationary; under some catarrhal attack, however, or from some other cause, it may happen that this chronic affection of the sac suddenly changes its character; pain is felt in the part; the lids become red and puffy—sometimes to such an extent as to assume an erysipelatous appearance, and wholly to prevent the patient from separating the tarsi. In this state the swoln sac feels hard and unyielding, and even slight pressure over it causes extreme pain.

also hard or soft, but more generally elastic, not painful at first, though it may ultimately become very sensitive to the touch. When

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"If allowed to run on, this inflammation ends in suppuration within the sac; the abscess discharges its contents by bursting just below the tendon of the orbicularis muscle, and the opening in the skin sometimes remains fistulous, allowing the tears which may pass through the puncta into the sac to escape on to the surface of the cheek, thus constituting a true *fistula lachrymalis*. When all inflammation has passed away, and the redness and swelling which attended the bursting of the abscess have disappeared, the fistula narrows to such a small aperture that, were it not for the tears which slowly distil from it, the opening would hardly be perceptible. It is about the size of a pin-hole, and except that it does not project above the surface of the skin, almost resembles one of the puncta themselves.

"The *Treatment* of Distension of the Lachrymal Sac, from chronic thickening of its lining membrane or stricture of the nasal duct, is very tedious. Injections of various fluids, either through the puncta or through the nasal duct, were formerly highly recommended, but have now fallen into disuse. The introduction of a *style*, to be permanently worn in the canal, is a step which should never be resorted to so long as any probability remains of restoring the passage by milder measures. . . . . (See *Blister, etc., above, in text.*)

"When Acute Inflammation of the Sac comes on in the manner I have described, the best application is warm water dressing. Poultices are apt to irritate the skin of the lids, especially in children. Continued warmth and moisture are sometimes so effectual that, within twenty-four hours, not only do the redness and swelling of the lids wholly disappear, but the swoln membrane of the sac is so much relieved, that gentle pressure suffices to empty its contents into the nose, and the case returns to its chronic condition. If the swelling continues unchanged, it must then be freely opened, and treated like a common abscess.

"Endless varieties of surgical treatment have been devised for curing the chronic distension of the sac, or the stricture of its duct; pads, adjusted by means of springs or screws; catgut, introduced into the nasal duct through an incision in the anterior wall of the sac, strings of greater thickness being used as the canal would admit of their passage; metal tubes, which were intended to be healed in and quietly to occupy the sac and duct, but which Nature, with her dislike to foreign bodies, always rebelled against, and dislodged either upward or downward; styles, which should allow of the tears passing along them and so reaching the nostril;—all these contrivances have been tried, and with the exception of the last, pretty generally abandoned. The chief objection to the style (apart from its unsightly appearance) is that it requires management and care such as very few patients indeed can, or will, bestow upon it. They neglect to remove and cleanse it regularly, and when it sets up some irritation, as it occasionally will do, they probably remove it altogether, and are unable to replace it. These and other reasons had induced me many years ago to abandon its use.

"Mr. Bowman (*Med. Chir. Trans.* 1851, p. 338), has devised a very simple and useful operation, which, in many instances, suffices to cure troublesome Epiphora, while, at the same time, it affords a new and ready access to any obstruction that may exist in the course of the lachrymal canal. If, in consequence of chronic ophthalmia, or from any other cause, the lower *punctum lachrymale* has become displaced, so that instead of facing toward the globe, it is directed up-

pressed upon, no discharge of fluid occurs. This disease may continue for years without occasioning much inconvenience. The *treatment* consists in opening the tumor, thoroughly emptying it of its contents; and then, having examined the part and ascertained the cause of the mucocele, to treat it accordingly.

10. *Eversion of the Puncta Lachrymalis*, in which the puncta are displaced outwardly, so that they can no longer absorb the tears, may be present with ectropium, or other causes that will give rise to a thickening of the conjunctiva, or to its relaxation. A continuance of this affection may ultimately lead to a closure of these little

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ward or forward, the tears will run over the edge of the tarsus. In such cases a small probe is to be passed along the whole course of the *canaliculus*, and held steady there, while a fine, sharp-pointed knife is run along the upper surface of the probe as far as the caruncle, so as completely to lay open the canaliculus, and thus, as it were, carry its orifice backward to the point where the tears accumulate. This little operation requires much care and nicety, and is facilitated by using a probe grooved to within a short distance of the end, so as to prevent the point of the knife slipping to one side. (A small, narrow-bladed knife should be used.) For several days after the incision has been made, a probe must be passed along its track, to prevent the lips of the wound growing together.

"If a stricture exists in the lachrymo-nasal canal, it may be reached through the now enlarged orifice of the *canaliculus*, through which a probe of suitable size *is to be passed till its point is felt to strike against the inner wall of the sac. The probe is then raised into a nearly vertical position, and its point is very carefully carried forward until it meets with the stricture, through which it is to be passed until its point reaches the floor of the nostril.* The frequency with which the probe is to be used depends upon the nature of the stricture.

"I would especially warn those who, from this slight sketch of the operation, may imagine that it is easy of performance, and that the subsequent cure of stricture in the lachrymo-nasal duct is to follow almost as a matter of course, to be very careful how they attempt either one or the other manipulation. The passage of an instrument through a stricture in the lachrymo-nasal duct demands even more care and skill than the passage of an instrument through a stricture in the urethra; and those who have seen much practice will bear me out in saying that by far the greater part of obstinate and dangerous cases of the latter kind are due to bad surgery, rather than to original disease. The student must bear in mind that the walls of the lachrymal sac and nasal canal are composed of extremely brittle and fragile bones, and that the rough introduction of a probe may either break some of these, or tear away the delicate and vascular membrane which covers them. Beside, as the canal is a bony tube, all thickening of its lining membrane must take place concentrically; and therefore any undue violence, by setting up inflammation, is sure to increase, instead of lessening, the cause of the stricture. Even when all possible care and skill have been employed, cases of stricture of the lachrymal passages are often extremely tedious; for they may be complicated with great dilatation of the sac; caries of the surrounding bones; or false passages, resulting from former errors of treatment."

orifices. The puncta may be kept open by the introduction of fine probes, until the disease occasioning the eversion has been overcome by proper treatment. If this should fail, prompt relief may be given, by the operation of Mr. Bowman, referred to *in the Note on* page 1385.

DISEASE OF THE NERVES OF THE EYE; MUSCLES.

1. *Strabismus* or *Squinting*,* is the existence of a want of harmony between the two visual axes, and more generally occasioned

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* "Most persons are disposed to search for the essential or most common causes of strabismus, in the external influences; my opinion is wholly of an opposite character,—external causes have but a slight influence, the true cause is internal. In most cases, strabismus is only a symptom, and is associated as a consequence, with an anomaly of refraction. Among these anomalies, hypermetropia should be placed in the first rank.

"The first scientific ideas relative to hypermetropia are found in the work of M. Ruete. It has been recognised since, especially in its higher degrees of development, by MM. Stellwag Von Carion, and Græfe; as to the weak degrees, being concealed by the accommodation, they pass unperceived. We know that hypermetropia is that state of refraction in which the rays of light, parallel previous to their entering the eye, form a focus behind the retina. Among persons affected with it, the antero-posterior diameter of the eye is too short relatively to the focal length of its dioptric apparatus. With young persons, the accommodation annuls the latent hypermetropia either wholly or in part. If it is only in part, the entire inferiority of the absolute refractive power is composed of two parts, the one apparent, the other latent. Latent hypermetropia is concealed by the accommodation, even when a convex glass renders the accommodative effort, in a trial of distant vision, useless; we then determine it by atropine placed in the eye, which paralyses the accommodative faculty.

"In thus studying the state of refraction with different persons, and in a clinical point of view, we recognize that this disease is extremely frequent. Our statistics show that it is much more common than myopia. But this same clinical investigation, has revealed to us, as effects resulting from it, several symptoms much more worthy of attention, and which show that it is the productive cause of two maladies not yet fully understood, viz., asthenopia and convergent strabismus.

"Ordinary asthenopia, *hebetudo visus*, depends, in fact, upon hypermetropia; in extreme and exceptional cases, we encounter, beside, muscular asthenopia. Now, according to our statistic researches, among twenty cases of asthenopia, nineteen were hypermetropic. It is, therefore, difficult, not to observe in hypermetropia the material, anatomical condition, the cause of the functional disorder, asthenopia.

"From considerations which will be presently made known, we have been led to think that convergent strabismus was also associated, more or less directly, with these nineteen cases. We have analysed two hundred and eighty cases, in which the anatomical, optical, and mechanical conditions were determined as fully as possible; the extent and the limits of the movements of each eye were measured and separately specified; the latitude of accommodation and the

by certain abnormal conditions of refraction. When the affected eye is turned outwardly, it is termed *strabismus divergens*, and is

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acuteness of vision were also ascertained; the age, and the period of commencement, the conditions presented by the subject, the complications, the preceding treatment, and the hereditary characters were carefully noted. We have thus found that among a hundred cases of convergent strabismus, seventy-seven had hypermetropia. And in the same manner have we been enabled to ascertain that in divergent strabismus, myopia occurs twice in every three cases.

"The comparison of these results certainly authorizes us to believe that anomalies of refraction are the original and more positive causes of convergent or divergent strabismus. As to the other causes, we must attribute them at first to the paralyses and the other primitive lesions of innervation. However, paralysis having existed a certain time, a muscle may be kept in the state of elongation or of relative relaxation, and this state may, consequently, be preserved, after the paralysis is cured.

"Specks on the cornea are also said to have determined strabismus; this being a material condition which provokes a change in the axis of vision. We do not share in this opinion. In rare cases, we see the consequences of an inflammation of the cornea extend by contiguity even to the muscles. But in the greater part of cases, specks on the cornea have been conditions favoring the origin of strabismus in cases of hypermetropia.

"We may now ask what mechanical relation is there between hypermetropia and its consecutive effect, strabismus. This truly requires an explanation. When an emmetropic eye looks at a distance, the axis of the cornea which we have been accustomed to consider, in this instance, as parallel, are not so at all; they very manifestly present a *divergence* of nearly ten degrees. Thus, in ordinary cases, the visual line, or the line which joins the optic center or the second nodal point to the center of the yellow spot, makes, with the axis of the cornea, an angle of five degrees, this last outwardly. This is a fact which has been found in an undoubted manner by MM. Senff, Helmholtz, and Knapp, and which has been established by myself in many cases. Such is the physiological condition. But it is not thus with myopes and hypermetropes.

"With the myopic subject this angle is much smalier. In some cases, there is a coincidence of the visual line and the axis of the cornea; in the higher degrees of myopia, the axis of the cornea is inside. We readily ascertain the cause of this in the distension which the deep-seated membranes undergo, a distension known by the name of 'posterior staphyloma.' The displacement of the optic nerve and of the yellow spot having occurred from without inward, the visual line may consequently be brought to coincide with the axis of the cornea, and may even pass beyond it. It follows from thence that, while looking at distant objects, the myope must present the appearance of convergent strabismus. In consequence of inverse conditions the hypermetrope, on the contrary, will present the appearance of divergent strabismus.—Now, we have just stated that hypermetropia was the cause of convergent strabismus; here is an apparent contradiction, which it is necessary to remove.

"In looking indifferently at distant objects, when no effort is made, the hypermetrope presents, to a close observer, a state of apparently divergent strabismus. But if the accommodative faculty is called into action in order to see them more distinctly, as the accommodation is confined within certain limits to the convergence, this condition of divergent strabismus must diminish in like propor-

almost always due to myopia; when it turns inwardly, it is called *strabismus convergens*, and is mostly due to hypermetropia. This

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tion. We do not wish to state that the accommodation is measured exactly by the convergence, or this by the accommodation; but there nevertheless exists between them a connection and a certain degree of dependency. We may form an idea of it, by conceiving that, for the slight degrees of convergence, the accommodation will call into action about a half or one-third, for instance, of its whole power. The hypermetrope, with whom the accommodative power is more or less deficient, may have this defect relieved by means of the convergence. According to that, all hypermetropic persons would be inclined to converge, which is not the case.

"And why does it not occur more often? Because there is still a cause which must be taken into account, and of which we have not yet spoken. Convergence, by changing the direction of the visual lines, gives rise to double images, and we all have a horror of double images. The question then, is placed thus: there is a struggle between the accommodative force, the need of having distinct images, and the no less imperious necessity of having them simple. More commonly the accommodation is sacrificed; sometimes, however, simple binocular vision is sacrificed. This is what occurs, especially when there exists a notable difference in the two eyes, either in the degree of the anomaly of refraction, or in that of the acuteness of vision. In these cases, the least distinct image is unhesitatingly sacrificed. Then the convergence is fearlessly called to the assistance of the deficient accommodation, and a convergent strabismus is the consequence. This difference of acuteness or this amblyopia is often observed as an effect of astigmatism, or of weakness of the retina. Then the strabismus is developed while the deviating eye becomes more and more obscured.

"Although convergent strabismus must recognize hypermetropia as its principal cause, one apparently very singular fact should be referred to here; and which is, that in the higher degrees of this anomaly, strabismus is not met with. It is, however, easy to explain this apparent paradox;—thus, in these cases, the convergence itself is powerless to correct the anomaly, and to bring a sufficient degree of accommodation. The degrees of one-fifteenth to one-tenth of hypermetropia are those which give rise to most instances of strabismus. Then, indeed, the strabismus takes place to overcome the hypermetropia. We will also observe that, when strabismus is developed somewhat late, the hypermetropia is not very considerable.

"Such then is the more general circumstance to which we must attribute the production of convergent strabismus. Aside from the other etiological circumstances that have been named heretofore, we will not meet with more than two auxiliary conditions which, in some cases of hypermetropia, contribute to produce this affection. The first, is a certain inordinately natural facility to converge, a disposition which is connected with the insufficiency of action of the external rectus muscle. The second, belongs to external causes, the most frequent of which is a too great habitual lateral convergence, like that to which infants are subjected when the brilliancy of the light is all the time on the same side. Binocular vision does not exist in these cases, and one of the eyes may be turned inward without producing double images. But still, these causes, as has been remarked, do not produce strabismus, unless there is hypermetropia.

"Generally, strabismus is not hereditary, but hypermetropia is. But we must not forget that this does not inevitably involve strabismus,—strabismus is the

latter variety of squinting is by far the more common, and its frequency may be explained by the facility with which the eye can be

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exception. In families where hypermetropia is very common, we will not fail to meet some cases of strabismus; they will be met with among those in whom one or several of the auxiliary conditions mentioned exist.

"Convergent strabismus due to hypermetropia assumes a particular form. It is ordinarily developed about the fifth or eighth year, when the eye commences to observe and to examine with more care; it is at first connected with fixation or looking steadily, and becomes constant at a further advanced period; double images, undoubtedly, are not complained of, because at the commencement it is only by looking steadily at an object that the deviation is developed, and that the second retinal image of the same object is considerably removed from the yellow spot. More frequently strabismus is simple and concomitant; however, in the healthy eye, the inward movement also goes too far, which is explained by the habit of holding the object looked at on the side of the deviating eye. By covering the properly-directed eye, the deviating eye, at first, still looks at the object, although the acuteness of its vision may already be diminished. At a later period, this eye is no longer fixed upon the object, but receives images on the remaining normal internal part of the retina; while, by the mental suppression of images on the yellow spot and on the external part of the retina, these parts have lost, in a great measure, their sensibility; and then the sensibility is not re-established. In this respect, an operation has no effect; however, the retina, when examined by the ophthalmoscope shows no change, and the cornea has not changed its form.

"When convergent strabismus is developed in any other manner, or presents different symptoms, we have a right to suppose that such cases are due to causes not connected with hypermetropia, as spasms, and especially paralyses, and inflammations,—but, as already stated, these cases are relatively very rare.

"*Treatment.* If, as statistics have demonstrated, hypermetropia is the most frequent cause of strabismus, our attention should first be directed to the prevention of strabismus by neutralizing the hypermetropia. For this purpose we must commence at an early period, and not permit the muscle to undergo the effects of a prolonged nutrition while it remains in a state of contraction. But if we are called upon when the affection has become chronic and the muscle contracted, the indication is, to operate. After which, neutralization of the hypermetropia by the employment of suitable convex glasses ought to immediately follow, in order to prevent a renewal of the strabismus. Very often, after a well-performed operation, we observe that the direction of the eye is perfect, while the accommodation is in a state of rest. But as soon as the person looks with attention at a near object, endeavoring to see it distinctly, the eye which sees the least clearly will deviate more or less inwardly. There is then still an effort of convergence associating itself with the effort of accommodation. This effort sometimes exists to as great an extent as it was before the operation. But the principal deviation, existing constantly, will no longer permit an extended movement, and certainly will not permit us to readily ascertain it. Now it is this effort which has saved the properly-directed eye from asthenopia.

"*Divergent Strabismus.* In cases of divergent strabismus our statistics show a proportion of two-thirds which may be charged to myopia. This proportion, like that relative to hypermetropia, clearly shows that, in its general etiology, strabismus must be attributed, as a consequence, to an anomaly of refraction. Persons

turned inwardly rather than outwardly, and by the size and power of the internal rectus muscle. Beside external or divergent, and internal or convergent strabismus, there are also several other varieties, as, *frontal*, or *sursumvergens*, in which the eye is turned directly upward, *jugal*, or *deorsumvergens*, in which it is turned directly downward; and *mixed* or *oblique*, in which the deviation occurs upwardly and inwardly, upwardly and outwardly, downward and inward, or downward and outward. Some persons have

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having myopia in a high degree do not easily move their eyes. We will readily comprehend the reason of this, if we will remember the two following circumstances: 1st. A high degree of myopia is anatomically characterized by an absolute and considerable elongation of the antero-posterior axis of the globe, which we have sometimes known to attain even three times the demi-length of the normal eye. 2d. The center of motion of the globe (being on the optical axis, with both the myope and hypermetrope, at a point where, according to the researches of Donders and Doyer, the part situated in front is to the part situated behind the center of motion, as 15 is to 11) is at a distance from the posterior pole. This change of relative position of the center readily explains why myopes can not cause their eyeballs to execute any considerable movements; they can not, as a general rule, make them converge, and some can not turn them outwardly at all; their mobility in both directions is then very limited.

"Let us now look at these considerations laid down in the above remarks: That in the emmetropic eye, the macula lutea is generally found outside of the axis of the cornea, but that, on the contrary, with the myopic eye, in consequence of the distension of the deep-seated membranes, the macula is found removed either nearer the axis of the cornea, on this axis, or inside of it. It follows from this, that, for short distances, a double inconvenience interferes with the vision of the myope. On one side, he finds himself, for these short distances, in a state of considerable relative divergence, and in an equally abnormal difficulty to make this divergence cease. This relative divergent strabismus, very common among myopes, becomes, in some cases, an absolute strabismus; the two visual lines then no longer bear at the same time upon distant objects. The more obtuse eye, obedient to the natural tendency of the muscles, is turned outwardly, leaving the field of vision free to the other, and aiding, moreover, by that means, the relaxation of its accommodation. The double images incommode but very little; from the first, images of distant objects are not distinct in the myopic eye, and, beside, the *relative* divergent strabismus, having been in existence for a long time, has habituated the eye, as it were, to suppress the perception of double images. This physiological mechanism is especially observed in those circumstances where two very unequally myopic eyes are met with, or else an emmetropic eye associated with a considerably myopic one. In such cases, and for vision at great distances, a single eye serves; the binocular association giving rise to the tendency to divergent strabismus from the state of parallelism or of convergence, will by that means increase the accommodation and render vision so much more imperfect. Relative divergent strabismus then instinctively extends to the absolute form, in order to escape this inconvenience.—These developments very evidently show that, considered in its more general point of view, strabismus is not a primitive condition, but only a symptom. In three-fourths of the cases met with, it is the effect of an abnormal condition of refraction." (*Donders.*)

what is called an *intermittent* strabismus, which occurs when they bring small objects rather close to their eyes. These latter varieties are rare.

All the above forms of strabismus are simple; but there are also cases of *double strabismus* met with. Simple strabismus is a deviation of one eye only; double strabismus is one in which both eyes are affected.

Double strabismus is very readily recognized, when the deviation of both eyes is of equal degree, but, when one eye is more distorted than its congener, the diagnosis frequently becomes embarrassing. In such a case, we must carefully examine the extent of the movements of each eye, separately, the other eye being kept closed in the meanwhile; the patient should also be requested to look at us while we observe the relation of the optical axis with that of the orbital. In this position, these two axes make equal angles in the healthy state, and unequal angles when there is a deviation. The vision of an eye that squints is always weaker than that of the normal eye, especially when the strabismus has existed for many years. And, in double strabismus convergens, it is not uncommon for the eyes to be myopic, or even amaurotic.

There are cases in which the strabismus sometimes affects one eye, and then the other, the patient using the eye remaining in the normal position; this is termed *alternating strabismus*, but the most common cases are those in which the squinting is *non-alternating*, being constantly confined to the same eye; and in either case, being generally due to hypermetropia.

"We are readily able to detect non-alternating, as well as alternating strabismus, by desiring the patient to look steadily, with either of his eyes, at any object straight before him, while with our hand we hide the object from his other eye, but keep the hand sufficiently raised toward the temple to allow us to watch the movements of the eye which is thus shaded. Whether the strabismus is alternating or non-alternating, the shaded eye is distorted. If, in a such case, we close both eyes, and then suddenly raise the upper eyelid of either while the other remains closed, the one which is opened is seen to be distorted. If both eyes are suddenly opened, the pupil of the worse eye is discovered to be more distorted than that of the better eye. If, on trying these experiments, the eye which is shaded, or either of them on being opened suddenly, showed no obliquity, we would pronounce that eye to be sound, and assure the patient that the distortion of its fellow might be cured without operation, simply by exercising the squinting eye, with the other bandaged." (*Mackenzie.*)

The *causes* of strabismus are very numerous. The affection is seldom congenital, but is more frequently developed in infancy, a period of life in which the movements of the eyes being uncertain, they readily contract vicious directions. Indeed, infants sometimes become affected with strabismus after having been for some time in the care of a nurse who squints. The disease is frequently perpetuated in whole families for several successive generations, being the result of imitation. Hence, infants should not be allowed the society of persons or children who squint. Convulsions, which are so common among children from the influence of dentition, or of intestinal worms, may also determine strabismus; also cerebral affections, as, meningitis, encephalitis, tubercles, effusions, etc., all of which are capable of abnormally affecting the relative power of the motor organs of the eye, either in augmenting it by contraction, or in destroying it by paralysis. Ulcerations of the cornea, opacities of the lens, injuries, cataract, and certain forms of artificial pupil, are frequent causes of strabismus, as they require the patient to make prolonged efforts in order to observe objects around him, and force him to deviate his eyes so that the rays of light may penetrate through the still transparent parts. A suppurative inflammation of the orbit giving rise to adhesion, or compression of a tumor seated within the orbital cavity, may also occasion an abnormal direction of the eye. But the most common causes occasioning strabismus, are a hypermetropic or myopic condition of the eyes. (*See Note on* page 1387.)

There are different degrees of this affection. In true strabismus, the inner portion of the cornea is carried a little too much inwardly, yet a considerable portion of the white of the eye, between the caruncula lachrymalis and the cornea may be seen. This slight deviation of the eye is sometimes difficult to detect, but we may readily recognize it, by having the patient to look first at a near object, then at a distant one. Then, while he is attentively looking as directed, place an opaque body, as the hand, before one of his eyes; if the uncovered eye is the affected one, it will be seen to oscillate and execute some movements for the purpose of perceiving the object he is looking at. In what has been called *paralytic strabismus*, the white of the eye almost wholly disappears in the direction of the deviation. In what has been termed *optical strabismus*, the cornea wholly disappears under the eyelids.

Between these three degrees, however, there exist intermediary degrees, which give to the physiognomy a particular expression more or less painful. In all cases, certain symptoms accompany strabismus; thus, at first, patients frequently experience *diplopia* or

double sight, an annoying symptom which eventually disappears, the affected eye becoming weak and wholly inactive in the exercise of vision. At the same time, the healthy eye, compelled to supply the place of its fellow, soon becomes fatigued, and only able to sustain a slightly prolonged exercise. In some cases, vision is indistinct or hazy with the deviated eye, and which may be due to compression of the eyeball by the contracted muscle, to lack of exercise of the retina of the deviating eye, etc. This may be determined from myopia by means of a concave glass. If the patient is myopic, the glass will improve his sight, if, on the contrary, there is a commencing insensibility of the retina, the glass will be of no service in modifying his visual sensations.

The *treatment* of strabismus depends upon its character, and its degree of development. The most simple, and at the same time the most ancient curative method, consists in exercising the strabismic eye by itself. The healthy eye is covered with a bandage, and the affected eye is compelled to look at objects placed at a distance on the side opposite to the deviation. This exercise is performed several hours every day before a glass, so that the patient can observe the progress he is making toward a cure. After having pursued this ocular exercise for some time, he is then to endeavor to read a few moments, having the book placed in a direction opposite to that of the squint. The result of these prolonged manœuvers is to give more length to the shortened muscular tissue, and to gradually bring the eye in its normal direction. Unfortunately, this treatment requires great patience, and long perseverance, and most frequently fails in effecting any good result.

There are also other expedients; a German writer has advised the application of a patch of black silk upon the end of the nose, when the strabismus is divergent, and to the external and superior part of the cheek, when it is convergent, being careful to change the position of the patch every day, that the new sensation it determines may induce the patient to steadily look at it. By covering the normal eye, while this course is being practised, a more rapid and certain success may be had.

Goggles of various forms have also been used, in some cases with success. The best form is that in which the glass of an ordinary spectacles is replaced by a hard, caoutchouc shell, perforated at its center by a very small orifice, through which the light is to reach the eye; a piece of black silk is placed around the frame, so as to completely cover the orbit and prevent the least ray of light from entering the eye from that direction. This can be held in

place by an elastic band, passing from it around the head. If one eye is affected, the orifice in the rubber shell should be closed; if both eyes are distorted, both will require to be open. These means are only applicable to children, and have the objection of occasioning too much heat around the eyes.

If the patient be of adult age, we prefer spectacles with round glasses, a little larger than usual, so as to entirely cover the eyes, and so made that their centers correspond with the points which the two pupils ought to normally occupy. The glass on the healthy side is blackened throughout its whole extent by a dull opaque varnish, and that on the side of the affected eye is blackened vertically on only one half of it, and over the part which corresponds with the deviation. Around the eye-part of the spectacles black silk must be placed, as in the instance preceding.

There is a method preferable to this for adults, and which is the employment of prismatic concave lens, and which have, for the first time, been used successfully by M. Kurke, a German oculist. Indeed, the prismatic concave lens, of which the thicker edge is placed on the side toward which the eye should be directed, causes the image formed on the retina of the squinting eye to be shifted, or brought into such a position as to produce a diplopia very annoying to the patient, who, in order to relieve himself of it, is obliged to bring the relaxed muscle into a state of contraction, thus gradually effecting a cure, by persevering in the effort. One essential condition in applying this treatment, is to render the diplopia troublesome, and to so approximate it with simple vision, that an insensible effort of the eye will establish vision in its normal conditions. The angles of these lenses vary by degrees and half degrees. The use of them should always be commenced by a lens of a very obtuse degree; then, after eight or ten days, this is to be replaced by another one, which should be less obtuse by a half degree, and in this manner continue until glasses have been reached having parallel foci, when the patient will have his sight completely rectified. This mode of treating strabismus by means of graduated prismatic lenses, has in many instances given the most complete results. All other instruments for the same object are greatly inferior in value. A more prompt mode of effecting the cure of strabismus, is by means of an operation termed *Myotomy*, or, *Strabotomy*. It was first attempted in 1839, upon a child seven years of age, affected with convergent strabismus; it proved a complete success, and made a great noise throughout the scientific world. Since then, it has been repeated upon a great many patients, and with various results, sometimes fortunate and sometimes unfortu-

nate, so that some physicians, always ready to criticise and censure, and satisfied in being able to find a sufficient motive to banish it from their practice, do not hesitate to condemn it.

The object of the operation is to divide the muscle which causes the strabismus, and it has proved so generally successful, that the various other means of curing strabismus, are rarely if ever employed; which is to be regretted, as certain degrees of strabismus may be cured by a persevering use of them without an operation. Briefly, it is performed as follows: For convergent strabismus, the patient being seated, the eyelids are separated, and the globe is drawn toward the side opposite that of the deviation, then, after having raised a fold of conjunctiva with a mouse-toothed forceps, the portion of the conjunctiva raised being that over the lower edge of the internal rectus muscle, immediately over its insertion, and about two lines from the cornea, it is cut with a small scissors, so as to bring the muscle into view; a crotchet or probe-pointed knife is then passed under the muscle, and its section effected by scissors, or by the cutting edge of the probe-pointed knife. The operation with a fine, uniformly-rounded hook, and narrow, long, probe-pointed and sharp scissors, is generally preferred. The operation finished, the patient is requested to alternately open and close his eyes, so that we may observe whether parallelism is established. The consecutive treatment consists only of cooling lotions, as severe symptoms never occur; daily exercise of binocular vision with the stereoscope, in conjunction with glasses to correct any existing hypermetropia or myopia. When the strabismus is due to myopia or hypermetropia, the proper glasses to correct these defects must be worn, or the squint will return.—When the eye deviates to an extent of three lines or more, from the axis of vision, an operation may have to be performed on the internal recti muscles of both eyes.

It has been objected that myotomy often occasions strabismus in a contrary direction, with diplopia; this objection is not without some grounds; but, beside there being means by which to remedy this inconvenience, we may avoid it by attention, and by surrounding one's self with all the conditions indispensable to the safety and success of the operation.

In optical, fixed, and paralytic strabismus, and among old persons, the operation is never undertaken; the greatest success is obtained among those whose ages are between four and forty years. Persons who have very projecting eyes should not be operated upon, for it is with them that strabismus in a contrary direction is

produced with the greatest facility. When the strabismus is double, myotomy practised upon the eye having the greatest deviation, almost always suffices to straighten both eyes.

In divergent strabismus, the external muscle requires to be divided, the steps of the operation being similar to those already named for the convergent deviation. And in order to obtain a good result, especially in extreme cases, it is often necessary to force the eye to preserve an inversion for several days after the operation, so as to give the external muscle a chance to form its reunion with the eyeball at a point situated more posteriorly. This is done by putting a suture through a fold of conjunctiva at a short distance from the inner margin of the cornea, and carrying it through the skin at the inner angle. The eye should be kept as still as possible, until after three or four days, the suture cuts itself out, and the external muscle has formed the desired reunion. Concave glasses for the myopia, and exercises of binocular vision with the stereoscope, should likewise be practised subsequently.

Dr. James Dixon says: "The use of the ophthalmoscope should always be resorted to before an operation is performed. For some years past I have examined in this way nearly all the cases of strabismus which have come before me, and have detected a great variety of morbid changes in the deep tissues. In some instances, these changes were so considerable as to put all hope of improving vision quite out of the question, and yet no external sign of disease existed, except the faulty position of the eye. In most cases of single strabismus, there was marked impairment of sight in the squinting eye, and the ophthalmoscope showed the optic nerve to be smaller than natural, and of an oval form, the long axis of the oval being more or less transverse. I believe, therefore, that, in the large majority of cases of confirmed squint, the malposition of the eye is the result of morbid changes in the optic nerve itself."

Those who desire fuller details relative to strabismus and its treatment, are referred to Donder's work on the "Pathogeny of Squint," translated by E. P. Wright, M. D.; "Lecons sur le strabisme et la diplopie," etc., by F. Giraud Teulon; Wecker's "Etudes Ophthalmologique," etc.

The difference between strabismus and *luscitas* is, that in the latter affection the distorted eye is immovably fixed, so that it can not be directed upon an object when the healthy eye is closed, unless the head be rotated. It may be due to palsy, injuries, cerebral affections, tumors in the orbit, etc. The *treatment* will be that indicated for the cause of the difficulty. It is not always curable.

2. *Diplopia* or double vision may exist with two eyes, or with but one. If the former, when one eye is closed, the other will see objects single; this is due to misdirection of the two eyes, as in strabismus, paralysis of one or more muscles of the eyeball, morbid growths in the orbit which displace the globe, etc. Diplopy with a single eye is due to some defect in the dioptric apparatus,—a derangement in the refractive power,—it may also be due to partial opacity of the cornea, the lens, or its capsule, in which case, it can not be remedied until its cause is removed. In the other cases, the eyes should be bandaged and kept in a state of rest for some days or weeks, while general hygienic measures should be attended to. If these fail, the prismatic lenses, referred to under strabismus may be used, arranging them in such a manner as to shift the place of the image on one or on both retinæ, thereby causing the objects to appear single. When the diplopy accompanies paralysis, or cerebral diseases, the cure of these will be followed by normal vision. Convalescents from severe febrile diseases, and those who study and overexert their eyes, are subject to double vision.

3. *Oscillation* of the eyeball, is a constant somewhat rotatory movement of the eyeball, to and fro on its antero-posterior axis, and is due to clonic convulsions of the oblique muscles. *Nystagmus* is a movement of the eyeball from side to side, round its vertical axis, and is due to clonic convulsions of the recti muscles. These irregular movements may accompany amaurosis, cataract, albinism, nervous affections, chorea, disease of the brain, etc., and especially in congenital cases. No successful treatment is yet known.

4. *Paralysis of the muscles of the eyeball* or *ophthalmoplegia.* The muscles of the eye are excited by three pairs of motory nerves, which are distributed as follows: The *third pair* to the levator palpebræ, the internal rectus, the superior and inferior recti, the inferior oblique, and, through the medium of the ophthalmic ganglion, to the circular fibres of the iris; the *fourth pair* to the superior oblique muscle; and the *sixth pair* to the external rectus.

This being the case, it would seem rational to study the paralysis of each of these nervous pairs in an especial paragraph, but as these affections are due to similar causes, as they manifest themselves by nearly similar symptoms, and as they require identical means of treatment, it will be better to condense their history in one and the same article, at the same time, however, noting those characters and

symptoms which establish important differences between them as far as diagnosis is concerned.

The *causes* of paralysis of the motor organs of the eye, are chiefly cerebral affections, rheumatism, or syphilis. With the first-named cause, the paralysis is always accompanied with numerous symptoms which attract the attention of the physician and serve to indicate its etiology; so that he may be led to attribute the paralytic affection to a vascular congestion, to a serous or purulent effusion, or to the presence of a cyst, tubercles, or tumors which compress the nervous filaments at their origin or at some part of their tract. With the second-named cause, the rheumatic nature of the disease may be deduced from previous exposures to cold and dampness, or to an anterior rheumatism affecting any part of the system. With regard to the third-named cause, the presence of an exostosis, gummatous tumors, cutaneous eruptions, glandular enlargements, or any primary or secondary syphilitic symptoms whatever, will materially enlighten the physician.—Other causes may also exist, as, lead poisoning, alterations in the blood, facial neuralgia, etc., all of which may give rise to paralysis of the nerves of the eye, and especially the third and the sixth pairs; in all these instances, aside from the paralysis, symptoms will be found which will reveal the true cause of the disease.

The *symptoms* of paralysis of the nerves of the eye, may be briefly summed up as follows:

1. *Paralysis of the third pair.* Hanging down of the upper eyelid; loss of the movements of the eyeball, upward, downward, and inward; a divergent strabismus, due to the activity of the external rectus muscle; mydriasis, or dilatation and immobility of the pupil; and diplopia, when the patient attempts to look in a direction opposite to the deviation of the eye. If to these symptoms, there is added an abnormal prominence of the eyeball at its inner part, we may affirm that the disease has its seat in the origin of the nerve. In cases where this prominence is very apparent, all the muscles of the eye are paralyzed, and the disease is called *ophthalmotopsis.*

2. *Paralysis of the fourth pair.* Diplopy characterised by the superposition of the two images, one being placed *above* the other, a diplopy which disappears when the patient leans his head to the side opposite to that of the paralyzed muscle. At the same time, when the patient carries his head alternately to the right and left, fixing his attention upon an object, it will be observed that the affected eye does not follow the movements of circumrotation of its fellow, but remains immovable.

3. *Paralysis of the sixth pair.* Fixed convergent strabismus (*lus-*

citas); diplopia; and difficulty or impossibility of turning the eye outward.

It will be seen that *diplopia* is a common symptom to each of these affections, but there is some difference in the character of this symptom, which will serve to indicate which nervous pair is paralyzed.—In paralysis of the third pair, the double vision is *crossed*, that is the image formed in the right eye is seen to the left, a feature readily appreciated by placing before the patient's eyes two glasses of different colors. Beside, the image formed in the strabismic eye appears confused and much less distinct.—In paralysis of the fourth pair, the diplopy is *superposed*, that is the upper image is formed by the healthy eye and the lower one by the affected eye.—In paralysis of the sixth pair, the diplopia is *homonymous*, that is the two images appear on the side of the eye where they are formed. If, for instance, we suppose that the left eye is affected, and consequently squints toward the inner angle, the image furnished by the diseased eye will be to the left of the one furnished by the healthy eye.

These differential characters are extremely important. It may be necessary to observe that the diplopia exists usually in the earlier stages of the paralysis, and after a certain time, patient's having acquired the habit of employing only the healthy eye, it completely disappears.

The *treatment* of these paralyses consists of all the curative means applicable to the treatment of their causes, as, counter-irritants, stimulants, laxatives, specific agents, etc. In addition to which local measures may frequently be pursued with success.

Thus, in paralysis of the third pair, with hanging of the eyelid, and paralytic divergent strabismus, we may apply stimulating preparations about the eyebrows and lids, as camphor liniments, aromatic vapor douches, sulphur vapor douches, ointment of veratria, aconitina, or of arnica; croton oil liniment to the temples, and in front of the ear, and when the paralysis is obstinate, strychnia may be applied to a denuded surface near the eye, and electro-magnetism be used.

Against the divergent strabismus, cauterization of the sclerotic conjunctiva with the fused nitrate of silver, upon the point corresponding to the paralyzed muscle, has been recommended. It may be repeated several times; and the eye should be exercised as named under strabismus. Dieffenbach and other eminent oculists have successfully pursued this course. It is especially indicated in those cases which are not due to some cerebral affection.

Mydriasis may be relieved by local stimulants applied in the

neighborhood of the eye, as Veratria, Aconitina, etc.; or a solution of Morphia, or of Calabar bean may be dropped into the eye. In some cases benefit will be derived by wearing dark opaque spectacles, having a small orifice in the center of each glass. Concave glasses are generally preferred.

Similar treatment will be required for paralysis of the fourth and sixth pairs of nerves.

5. *Neuralgia of the eyes.* The varieties of neuralgia more frequently met with, are, 1, *Frontal* or *supra-orbital* neuralgia; 2, *Infra-orbital neuralgia;* and, 3, *Ciliary neuralgia.* The *first* is characterized by a pain which commences at the supra-orbital foramen and extends to the eyebrows, forehead, upper eyelid, and root of the nose. The *second* is equally manifested by pain, but which emanates from the infra-orbital foramen, involving the lower eyelid, the ala of the nose, the cheek, and the inferior lip.

In each of these affections the conjunctiva of the eye corresponding to the side attacked, will be injected and red during the painful periods, and this injection will be accompanied by epiphora, photobia, and violent contractions of the lids; more frequently these maladies are intermittent.

The *treatment* will be the same in each, and consists of antiperiodics, narcotics, and in severe and obstinate cases, counter-irritants either behind or in front of the ear. The same internal agents may be given as described in the treatment of the following neuralgia.—Hypodermic injections of a solution of Muriate of Morphia will be found exceedingly beneficial in most cases.

Ciliary neuralgia has considerable analogy with the two preceding affections. Like them, it is remittent or intermittent, and often manifests itself after an exposure of the face to a current of cold air. In other instances, it results from an internal congestion of the eye, as, of the retina, and is then observed among persons who fatigue their eyes by prolonged reading, or who use too powerful glasses. It may likewise be due to twitchings of the ciliary nerves, the result of old adhesions of the iris.

This neuralgia is characterized by an exaggerated nictitation, a profuse epiphora, an intense photobia, and a violent contraction of the iris. At the same time, when the patients close the eyelids, sparkling luminous bodies appear to dance or flicker before their eyes, and, at intervals, they experience agonizing pains with tension and a smarting, burning pain in the interior of the eyeball. Some-

times the affection extends to the supra-orbital and infra-orbital nerves, occasioning a compound neuralgia.

Ciliary neuralgia is usually very obstinate, but if it be energetically treated from the commencement, it may disappear without being followed with any serious disturbance of the visual faculties. When it is allowed to become of long standing, it is very difficult to eradicate, discouraging both the patient and physician, and may lead to paralysis of the retina.

The *treatment* consists in keeping the bowels regular, attending to the skin, regulating the diet, exercise, etc., employing means to combat struma, anemia, or other conditions of the system, and also using internally antiperiodics and narcotics; in most cases counter-irritation will be necessary. The agents which may be employed internally, are the same as those laid down for Neuralgia, on page 306; and the Compound Tar Plaster should be worn behind the ear of the affected side, and be kept discharging for some time. Hypodermic injections in the temporal regions should not be forgotten.

Among the agents which have been found useful in these forms of neuralgia, are the following: 1. Take of Valerianate of Quinia fifteen grains; Extract of Belladonna, Extract of Hyoscyamus, three grains; mix, and divide into twenty pills, of which one may be taken every hour or two, according to their effect.

2. Take of Strychnia three-fourths of a grain; Sulphate of Quinia thirty grains; Extract of Aconite nine grains; Syrup of Morphia, a sufficient quantity to form into a pill-mass. Divide into twenty pills, of which one may be taken every four hours.

3. Valerianate of Iron one drachm; Extract of Belladonna forty-six grains; Extract of Aconite half a drachm; Simple Syrup, a sufficient quantity to form into a pill-mass. Divide into fifty pills, of which one may be taken every three or four hours. For anemic patients.

4. The following has been very strongly recommended: Take of Extract of Hyoscyamus half a drachm; Sulphate of Morphia a grain and a half; Strychnia a grain and a half; powdered Allspice half a drachm; Sulphate of Zinc fifteen grains; Simple Syrup, a sufficient quantity to form a pill-mass. Divide into forty pills. Dose, one pill every night and morning.

DISEASES OF THE EYEBALL.

EXTERNAL OPHTHALMIA.

1. *Chronic Inflammation of the Conjunctiva*, or *Chronic Conjunctivitis.* When any form of acute conjunctivitis is not cured, either from inefficient treatment, or from a continuance of the causes which gave rise to it, it will pass into a chronic condition, and will be attended with similar symptoms to those of the acute stage, but of much less intensity.

Inflammation of the conjunctiva presents a vermillion red or blood-shot appearance of the whole surface of the eye, or only a part of it; the color being deeper according to the intensity of the inflammation; the blood-vessels become enlarged, and tortuous, presenting the appearance of a finely-penciled *vascular net-work*, the color of which is deeper toward the orbit, but becoming more or less shaded as it approaches the cornea. Spots of extravasated blood are often seen under the conjunctiva. Increased mucous secretion generally attends the disease; and the pain accompanying is as though some rough substance, as sand, were under the eyelids, and which is generally worse in the morning, and does not extend to the head.

Chronic catarrhal conjunctivitis manifests itself under several forms, depending upon the character of the acute form and the various circumstances surrounding the patient. More generally the vessels of the conjunctiva seem to be in a state of complete atony; they increase in size, and extend in tortuous ramifications even to the circumference of the cornea; the eye readily weeps, secretes a more or less quantity of mucus, and becomes the seat of itchings or smartings, which are sometimes very severe. And these symptoms will often continue for months or even years, notwithstanding the most rational treatment. In some cases the eyes are red, weak, and irritable, the blood-vessels enlarged, and full of red blood, with more or less photobia, and a mucous, or muco-purulent secretion; the lids may be puffy and tumefied.

The *treatment* consists in the application of agents which will give tone and energy to the vascular and nervous vessels, arouse the absorbents, and thereby remove the chronic inflammation. Various agents have been employed for this purpose, the most efficacious among which are the following: Compound Myrrh Lotion; Com-

pound Lotion of Golden Seal; Compound Ointment of Oxide of Zinc; Compound Soda Lotion; Compound Lotion of Zinc; Lotion of Golden Seal and Aconite. One of these preparations must be dropped into the affected eye, three or four times daily,—a drop or two at a time.

Sulphate of Copper, as well as Sulphate of Iron, have also been found very excellent agents, in solution, to drop into the eye; either of them may be prepared by the solution of a grain and a half, or two grains of the sulphate to an ounce of water. Another collyrium, which has been used with considerable success is composed of Lapis Divinus* a grain and a half, Rock Candy one drachm, Tincture of Arnica two drachms, Distilled Water one ounce; mix.

In obstinate cases, counter-irritation to the temples, in front of, and behind the ears, alternately, will be found of much benefit.

The general health should be attended to, meeting anemia, rheumatic diathesis, struma, debility, syphilis, or any other conditions of the system, by appropriate treatment; and, also, removing the patient from the causes which produced the disease, the persistence of which is intimately associated with its chronicity. Change of air is frequently very beneficial.

If the disease be violent, the light should be excluded from both eyes; and it will be proper to carefully examine the palpebral conjunctiva daily, for the purpose of ascertaining whether they be rough and sarcomatous. If so, they will require the treatment named under *Granular Conjunctivitis.*

2. *Chronic Phylctenular Conjunctivitis*, or *Scrofulous Ophthalmia.* This disease appears to more especially involve the *cornea* than the conjunctiva; and, although termed "scrofulous," yet it will often be met with among patients who have no indications of such a taint, but who are anemic, or labor under some form of debility, etc. Children are more especially liable to it. It has been termed *Scrofulous* or *Ulcerative Corneitis.*

The *symptoms* resemble those present in the acute stage; epiphora, photobia, the eyelids being spasmodically closed, the eyebrows depressed, the cheeks drawn up, and the child holds his hands over the eyes to protect them from the light. On separating the lids, a

*Lapis Divinus is made by melting together, in a crucible, one ounce, each, of sulphate of copper, alum, and nitrate of potassa, and then adding to the melted mass a drachm and a half of powdered camphor. This is soluble in water; half a drachm dissolved in an ounce of water is employed as a collyrium to conjunctival vegetations.

flow of hot tears occurs, the edges of the eyelids will be found red and tumid, there will not be much vascular injection of the conjunctiva, although a few pinkish-colored vessels will be seen scattered around. Upon the cornea will be observed one or more slightly-elevated whitish points or phylctenulæ, a small, cloudy speck, or, more generally in the chronic form of the disease, one or more minute ulcers. And from this phylctenula or ulcer, may be traced a fasciculus of fine, pinkish-colored ulcers, extending toward the circumference of the cornea. The cornea sometimes becomes hazy, with vessels traversing it in different directions; and softening, or a deposit of pus, may occur within its substance. Perforation of the cornea may result from the ulceration.

If the phylctenula recedes without bursting, the exudation of lymph which formed a sphere around the (now absorbed) pus, forms a round, smooth, slightly-elevated speck, which is opaque at its center, the opacity diminishing as the circumference is approached, and which speck is called *albugo*. If the phylctenula ruptures and forms an ulcer, the opaque cicatrix left by the ulcer is called *leucoma*. Protrusion of the iris (*myocephalon*), hernia of the cornea, iritis, etc., may be occasioned by this phylctenular disease.—It is often a very obstinate affection, and is very apt to return from slight exposure to the exciting causes, or from inattention. If ulcers exist, *leucoma* will undoubtedly remain; and, if the child be very young, and the speck be rather superficial, it may gradually be absorbed, so that, in adult age, vision will be restored.—Young persons who have once had an attack of this disease, are liable to amaurosis, glaucoma, etc., in after years.

The *treatment* of the acute form of this disease is rendered more difficult, owing to the opposition of the child to an examination of the affected eye as well as to the application of local remedies; and it will be found quite as difficult in the chronic stage, from the same causes. If we can secure the child's confidence and examine the eye with his consent, it will answer a much better purpose; but, if he is very obstinate, forcible means must be resorted to, by holding his head firmly between our knees, while making the examination, an attendant, at the same time, securing his hands.

Various methods have been advised for the cure of this disease, some of which have proved successful, while others are worse than useless. The treatment which has answered every purpose in my hands is the following: Take of Golden Seal two parts, Witch Hazel Leaves one part; make a strong decoction, and drop it into the affected eye, six or eight times a day. At the same time, drop into the eye, two or three times a day, a solution composed of Chlo-

ride of Gold and Soda three grains; Muriate of Ammonia six grains, Water one fluidounce. The whole surface of the body should be bathed daily with a warm, weak, alkaline water; the bowels should be kept regular; all acid and greasy diet must be avoided, and means be taken to neutralize acidity of the stomach; beside which, internal means must be adopted to allay irritability, strengthen the digestive power, improve the quality of the blood, and combat any peculiar constitutional abnormality that may be present. If the case be very obstinate, a powerful stimulating liniment may be applied to the back and sides of the neck, and upon the back as low down as between the shoulder-blades, every night; and, during the day, a sinapism to the back of the ear, and over the temple. This treatment, which I now publish for the first time, has never disappointed me.

Blisters, scarification of the conjunctiva, venesection or leeching, mercurial ointments, lotions of nitrate of silver, sulphate of zinc, lead, etc., should be wholly discarded in the treatment of this disease; although, sometimes, in case of vascularity and superficial ulceration, it has been recommended to divide the vascular ramifications, and to lightly touch the edges of the ulcers with the end of a well-polished pencil of Sulphate of Copper. And if the ulceration is central, threatening perforation of the cornea, the pupil should be kept dilated by a solution of Belladonna dropped into it; if, on the contrary, the ulceration is at the periphery of the cornea, the pupil should be kept contracted, in order to prevent prolapsus of the iris, and which may be effected by a few drops of a solution of Opium instilled into the eye, or a solution of the Calabar bean.

If, during treatment, any undue irritation should be manifested, lotions of Belladonna, Gelseminum, etc., may be dropped in the eye; or, it may be exposed to warm vapors from infusion of poppy leaves, lobelia leaves, hops, etc. The child must not be confined in a dark room; the eye may be protected by a thin, dark, silk shade. Local applications of the Compound Tincture of Myrrh, or of Tincture of Capsicum, have been recommended in this and the subsequent affection; but I have very seldom had occasion to employ them. When there is much pain in or about the eye, I apply cool or tepid water to the eye, stimulating applications to the temples, behind the ear, to the nape of the neck, etc., similar to the local course advised under the treatment of Chronic Sclerotitis. In obstinate cases, or in scrofulous persons, the mixture of Quinia, Black Cohosh, and Aconite, may be given internally with much advantage.

Any plastic deposit beneath the superficial layers of the cornea,

or on the conjunctiva, remaining as a result of phlctenular conjunctivitis, may be removed, after several months of treatment, applying upon the part where the exudation exists, by means of a camel's-hair pencil, a drop of Oil of Turpentine, or, of equal parts of Oil of Turpentine and sweet Oil of Almonds. This may be applied every day, or every other day.

3. *Chronic Granular Conjunctivitis, Granular Conjunctiva*, or *Granular Lids* (*Trachoma*). This morbid condition of the conjunctiva of the eyelids, and of the palpebral sinuses, is very apt to follow a long-continued conjunctivitis, especially those forms termed Purulent, and Catarrhal Ophthalmia. The affected conjunctiva presents a red, thickened, fleshy, rough and uneven appearance; and this lining membrane of the upper eyelid is more liable to the granulated condition, than the lower one. The disease rarely attacks the ocular conjunctiva.

Chronic granulations principally prevail among the poor, and those who are exposed to many privations; though the wealthy are by no means exempt from them. They are more frequently observed between the ages of fifteen and thirty-five, and very rarely previous to the eighth year of age, and after the fiftieth. Impure air, assembling of many persons in the same locality, imperfect or innutritious diet, exposures to dust, and contagion, are the principal causes. The disease is always of slow cure, requiring many months to effect it, if at all; and, in those cases where the patients are anemic, scrofulous, or cachectic, the disease will prove extremely intractable to treatment.

Although the term *granulation* has been applied to the peculiar condition of the palpebral conjunctiva under consideration, yet it must be remembered that the prominences observed are not true granulations, no ulceration of the conjunctiva having previously existed; but are merely the mucous follicles or papillæ of the membrane enlarged or hypertrophied from inflammation; or else, are "not an organized exudation, but a neoplasm due to a repullulation and to a division of the nuclei of the cellules of the cellular tissue* composing the conjunctiva." (*Wecker.*)

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*"Two well marked kinds of granulations occur in practice. They may be scattered, buff-colored, translucent, hard granules the size of a pin head. These often produce a peculiar corneitis by their friction on the cornea; or the same result may ensue in another way. The granulations disappear, exudation matter is effused into the conjunctival tissue, and this by its contraction gradually bends in the lid to such a degree as often to occasion entropium, with all its

The disease must not be confounded with those minute phlyctenulæ which present themselves just within the margins of the eyelids, with more or less elevated yellowish points, arranged in a row, and which phlyctenulæ contain a grayish matter; these require to be excised or snipped to effect a cure. (*See* page 1375.)

Granulated lids are apt to be accompanied with epiphora, increased mucous discharge from the diseased conjunctiva, and irritation of the cornea with more or less vascularity and nebulousness; and, in long continued cases, pannus, epithelial thickening of the cornea, and opacity, and even ulceration. These conditions of the cornea are partly owing to the inflammation occasioning the granulation, and partly to the irritation produced by the granular lid, the roughness of which acts as a foreign body in passing over the surface of the eye. Wecker does not believe that the term "granulations," should be applied to enlarged or hypertrophied papillæ, but only to those formations that are a production of neoplastic tissue. He distinguishes three forms of granulation, all of which may be well examined by means of a magnifying lens and the employment of oblique light. These three forms are:

"1. *Simple Granulations.* We have these, when we observe the production of granules of neoplastic tissue, without the mucous membrane being inflamed. The conjunctiva is slightly injected, and the granulations are developed in the form of grayish, dispersed grains, and somewhat resembling cooked tapioca, the patient not being aware of the changes going on in his conjunctiva. Simple granulations are much more frequently observed when they are not of too old a date, and when they form upon the mucous membrane of the cul-de-sac, especially near the angles of the eye, slightly-elevated lenticular specks of a dirty-gray color; but we also meet with some cases in which the development of the granulations is very considerable, and in which, upon everting the superior lid, they form round semi-transparent grains, which look like pedicles to the orbitar margin of the tarsus, without the mucous membrane manifesting any marked inflammatory reaction. This mode of appearance is far from being frequent; on the contrary, when the granules have once acquired a certain development, the

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baneful consequences to the cornea. This form of granular conjunctivitis is the "conjunctivitis trachomatosa" of German authors. Or the granulations may be highly vascular and florid-red, bleeding at the least touch, large, closely-packed together, and assuming an angular contour from their mutual contact. This fungoid species of granulations occurs most frequently in Egyptian ophthalmia. The trachomatous variety of granulations is excessively difficult to cure radically." (*Laurence and Moon.*)

mucous membrane becomes inflamed, the papillæ commence to swell, to become more prominent, and then we have the second or mixed form of granulations.

"2. *Mixed Granulations.* Characterized by being formed partly of neoplastic tissue, and partly of swoln papillæ. It is not necessary that mixed granulations follow the simple form, that is to say, that the neoplastic formation alone must exist for sometime, and that at a later period the reactive inflammation of the mucous membrane must give rise to the swelling of the papillæ, and thus produce mixed granulations. It is much more frequently the case that a somewhat intense inflammatory action accompanies the development of the neoplastic tissue from its commencement, which favors the growth of hypertrophied papillæ, and which, being intermingled with the granulations, form what we term *mixed granulations.* On the other hand, we must not suppose that simple granulations must absolutely become transformed into mixed granulations.

"Some cases will be observed in which all the simple granulations, after having persisted some time, produce a slow inflammatory reaction, which, nevertheless, is not apt to produce papillary swelling, but which is sufficient for the resorption of the neoplastic tissue. When simple granulations are developed in great abundance, when the inflammatory reaction is active, and the papillæ acquire a great development, when mixed granulations are formed, and when the infiltration through the morbid tissue invades the deep-seated layers of the mucous membrane, we will have, after a short time, the third form of granulations.

"3. *Diffused Granulations.* Here a general infiltration seems to have invaded the mucous membrane; the granulations have lost their round, clearly circumscribed form; they are rather diffuse and are scarcely distinguished from a lighter color of the papillæ, which last form tubercles or rows of elevations with large pedicles, and are lost in the degenerated mucous membrane. Gradually the granulations lose their grayish color and become redder; the papillæ, in becoming covered with a thick layer of epithelium, acquire a grayish or brownish red color, so that at last it becomes almost impossible to determine whether the elevations on the conjunctiva are granulations or swoln papillæ. Microscopic examination can not clear up the question, because at this period the neoplastic tissue of granulations is transformed into the gelatinous mass heretofore named, a mass which seems as if infiltrated into the tissue of the mucous membrane. The papillæ have likewise changed, in consequence of their swelling and the serous infiltra-

tion, in their normal structure, and this gelatinous mass, not being limited, appears to be propagated into the tissues of the swoln papillæ.

"There are two signs that enable us distinguish these *diffused granulations* from a simple state of hypertrophy of the papillæ, signs that we have described with regard to purulent ophthalmia; 1. The cicatrices which result from an abundant production of granulations soon characterize this state by their presence; 2, the appearance of the cornea,—a more or less marked pannus will be observed, and will demonstrate the difference between the chronic state of purulence and that of diffuse granulations.

"Quite often the secretion will be much less abundant than it is in cases of chronic purulent ophthalmia. Beside, the papillary hypertrophy that accompanies purulent ophthalmia tends, from the relaxation of the mucous membrane and of the submucous tissue, to stretch the lids, and to the formation of an ectropion, while the contrary happens in diffused granulations, in which the production of cicatrices contracts the palpebral cleft, curves the tarsus, and causes an entropion with inversion of the cilia.

"*Complications.*—As a consequence of the profuse development of granulations, corneal complications often supervene. The pressure and the friction made by the granulations upon the cornea provoke alterations in this membrane, with a vascular development that we term *pannus.* This pannus almost always occupies the superior part of the cornea, so that upon seeing this limited vascularization, we may be certain of having a case of granulations without having yet examined the cornea. Opacification of the cornea is produced by an exudation between the epithelium and the transparent layer of Bowman. It disappears as soon as the injurious action from the friction of the granulations is removed. This pannus differs from that which is caused by the production of granulations on the cornea itself.

"In certain cases, the bulbar conjunctiva becomes invaded by the development of granulations which form small, grayish, non-vascularized protuberances, but surrounded by minute vessels. These granules become even developed upon the conjunctival limb; still later, we meet them on the cornea, where they present themselves under the form of small grayish infiltrations, between which the branches of the vessels run. The pannus due to this morbid production differs from the first in this respect. At a later period the surface of the cornea becomes very irregular and presents many small facettes; neither is the pannus so thoroughly limited to the superior part of the cornea, it may invade the whole of this mem-

brane. A considerable exudation is made between the epithelial layer and the membrane of Bowman, and many vessels pass from the conjunctiva upon the cornea. In consequence of this morbid transformation, the cornea soon loses its anterior consistence and becomes incapable of resisting the intra-ocular pressure; it yields and assumes a greater degree of curvature. This is a very grievous modification, for, should we be able to cure the granulations and cause the pannus to disappear, we can not remedy the amblyopia and the excessive myopia resulting from it.

"As soon as the purulence becomes associated with chronic granulations, ulcers and abscesses of the cornea may supervene, occasioning a perforation of this membrane, with all its terrible consequences, such as have been heretofore enumerated under purulent ophthalmia.—The pannus resulting from the friction of the granulations and the chronic irritation produced thereby, when it has become considerably developed and has reached over the whole extent of the cornea, seems to protect this membrane from the dangers which the purulent condition of the mucous membrane ordinarily induces against it.

"The *prognosis* will depend upon the amount and the extent of the neoplastic tissue deposited in the conjunctiva. Beside which, it will be dependant upon the period at which the patient places himself under treatment, and the hygienic conditions which he imposes upon himself. It is obvious that if the production of the granulations has not been very abundant, the patient may be cured after a certain interval, without the aid of treatment; on the other hand, if the production of the neoplastic tissue has been very abundant, if the infiltration through this tissue extends to the deep-seated parts of the mucous membrane, it will not be possible, even with the most careful treatment, for us to re-establish a normal state, because a certain part of the conjunctival tissue that has furnished the morbid production will be irrevocably lost. We will cure the disease more readily when it is submitted to treatment shortly after its commencement.

"The corneal complications, such as pannus, are especially to be dreaded when they are due to a production of granulations on this membrane, for a simple pannus on the superior part of the cornea becomes dissipated as soon as we cause the granulations to disappear and remove the friction they exert upon the ocular globe. It is not thus when the neoplastic production is in the cornea, a production which facilitates a softening of the corneal tissue, and which it is impossible to remedy. This membrane will then have lost forever its normal curvature, and a very considerable ambly-

opia due to the conicity of the cornea will persist, even after the mucous membrane returns to a normal condition. Beside the great danger presented by this complication, ulcers may be formed upon the cornea while the granulations are in the way of propagation, and a perforation, followed by a more or less complete loss of vision may be the result.

"As soon as we encounter a conjunctiva covered with granulations, with but little tendency of the mucous membrane to purulency, we should always be reserved in our prognosis. For we have to deal with a disease that is excessively slow to cure, and which, during the treatment, may present phases of purulence very pernicious for the cornea, so that we are never wholly certain what turn the disease may definitely take." (*Wecker.*)

In the *treatment* of granular conjunctiva great care must be taken to turn the affected lid (especially the superior) outwardly as much as possible when making our applications to it, so that they may come in contact with the whole of the affected surface; and, also, to retain the lid in this everted position for a minute or two after the application has been made. This is a very important measure, and to a neglect of which many oculists owe their failures in the treatment of this obstinate malady.

I generally make use of one of the Sulphate of Copper pencils, named in the note below,* moistening it and applying it thoroughly and carefully over all the granulated surface of the lid, and then immediately washing the part acted upon with cold water, by means

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* I employ Sulphate of Copper with much advantage in the treatment of various affections of the eyes, in the form of pencils, made differently, thus:

1. Mix together pulverized Sulphate of Copper two parts, ordinary Potass Alum, pulverized, one part; place them in a porcelain vessel, and gradually melt them together. Pour the fused mass into a cylindrical mould of bronze or copper, in order to prevent the precipitation of metallic copper, the moulds having a diameter of about one-fourth of an inch.

2. Take of Sulphate of Copper one scruple, Alum half a scruple, White Sugar, Tragacanth, each, five grains. They must all be finely powdered. By means of a little water, form into pencils. This forms a mild caustic; in some cases the alum may be omitted.

3. Take of pulverized Sulphate of Copper four parts, pulverized Borax one part, mix, and briskly triturate together; the water of crystallization given out, unites them into a plastic mass, readily moulded into pencils.

4. Take of Nitrate of Silver one part, Nitrate of Potassa one or two parts, according to the strength desired. Mix, fuse together, and pour into silvered moulds. N. B. In all cases where these caustics are applied, after allowing them to exert an action upon the surfaces for a few seconds, the copper caustics should be washed off by means of a camel's-hair pencil and cool water, and a solution of Chloride of Sodium for the Nitrate of Silver caustics, thus neutralizing any excess of action.

of a camel's-hair pencil. In making this application, we must be careful not to injure any of the conjunctival tissue, lest we give rise to permanent cicatrices; the object is simply to excite, to develop a degree of vascularization or inflammation that will cause an absorption of the granulations. These local applications must not be made too frequently, but at certain intervals, every one, two, or three days, according to the effect produced by them; thus, when the irritation of one application has subsided, then make another, and so on—being careful never to overexcite the parts. During the intervals between these applications, the lids may be touched once or twice a day, with a strong solution of Salt; a weak solution of Perchloride of Iron; or, in some excessively irritable cases, with a weak solution of Sulphate of Morphia.

As a general rule, pannus, or opacities of the cornea, due to friction of the granulations upon the cornea, will disappear, as the granulations are removed; if the pannus should remain, it must be treated by pure Nitric Acid, as named hereafter. Should a low grade of inflammation become developed around the margin of the cornea, involving one or more of the coats of the eye, or, should an ulcer appear, decidedly the best treatment is to touch the parts two or three times a day with the preparation of Golden Seal, Tincture of Capsicum, Glycerin and Water, named under the treatment of Purulent Ophthalmia.—Other corneal difficulties that may remain after the disappearance of the granulations, must be treated as named under their respective heads.—Chronic granulations, under the best plans of treatment require many months for a cure; and, frequent relapses during the progress of the treatment are by no means uncommon, and should not discourage the patient nor the oculist. Their causes are not always easily determined.

In former years I made a successful employment of the following preparation, and have omitted its use of late merely because of the difficulty experienced in obtaining it: Through a stout piece of limb of Tag Alder (*Alnus Rubra*) bore lengthwise a hole about three-fourths of an inch in diameter, fill this with finely-powdered salt, and close it tightly at each end with a plug of hard wood. Place this into hot ashes, where it can remain three or four days, or until the limb is almost all charred, then remove it, split it open, take out the roll of salt, powder it very finely, and keep it in a well-closed vial. To use it, place some of it in a quill or other tube, raise the eyelid, and blow the powder beneath it. This may be repeated once or twice every day. Salt, if well prepared in this manner, is worth fifty cents per ounce.—Dr. Hays, of Philadelphia, recommends the use of Iodide of Zinc as a local application.

The solutions and powder of acetate of lead, and solution of nitrate of silver, ought never, in my opinion, to be used in this disease,—notwithstanding some oculists speak very much in praise of them.—Dr. James Dixon has found considerable benefit from undiluted Liquor Potassa, carefully applied to the palpebral granulations every three or four days.—Granulations of the lids may frequently be removed by the following ointment rubbed upon the affected parts two or three times a day: Take of finely-powdered Myrrh four grains, finely-powdered Elaterium two grains, Tallow one ounce; mix, and rub thoroughly together. I have used this with much success.

Finely-powdered Tannin is likewise an excellent application to granulations in many instances; or, a solution of Perchloride of Iron, or, of Chloride of Zinc. A concentrated solution of Chromic Acid has also been successfully applied, holding the lid from the eyeball until all the pain arising from its application has ceased, an indication that the acid has become inert and will not act upon the ocular conjunctiva. Whenever an application gives rise to inflammation, it must not be repeated until the inflammation caused by it has subsided, else the granulations will be apt to multiply.

Any undue irritation or inflammation of the conjunctiva, or of the eye, must be allayed by a solution of Morphia, or of Belladonna in Glycerin, which may be applied to the eye as often as required. Hypodermic injections of solution of Muriate of Morphia, in the temporal region will often be beneficial.

In addition to local measures, great attention must be paid to the general health of the patient, giving him tonics, chalybeates, antistrumous remedies, etc., according to the indications, having him protect himself from changes of weather, dust, smoke of all kinds, noxious vapors; regulating his diet, keeping the bowels, kidneys, and skin in as healthy a condition as possible, and allowing him a pure and bracing air.

4. *Chronic Ophthalmia.* This vague term may be applied to the several varieties of conjunctivitis, which have passed into a chronic form, and which is characterized by more or less redness about the edges and corners of the lids; tumefaction of the caruncula and semilunar fold of the conjunctiva; enlargement of the vessels of the conjunctiva, which presents a slightly villous appearance; watering of the eyes, especially when facing a cold wind; itching and pricking of the eyes by artificial light, with more or less of an iridescent halo observed around the flame of a lamp or candle by the affected eye;

and sticking together of the eyelids in the morning. One or several of these symptoms may be present, from a scarcely perceptible degree, to one of considerable severity.

In treating this disease the same measures may be pursued as advised under Chronic Conjunctivitis, page 1403. Artificial light should not be employed to read, write, or work by, unless the irritating effect of the light be modified by a pale neutral-blue chimney or shade. The excretory lachrymal apparatus should be carefully examined, when watering of the eyes is present, pressing upon the sac, and observing whether the discharged fluid is mucous, muco-purulent, or merely consists of tears. The lids should likewise be examined to ascertain whether any false hairs exist; the presence of these is frequently the sole cause of the intractability of many cases of chronic ophthalmia.

5. *Chronic Inflammation of the Sclerotica*, or *Chronic Sclerotitis.* Inflammation of the sclerotica presents a carmine or pink-colored appearance, under the conjunctiva, in a radiated or zonular form, the injected vessels being very minute, the color being deeper around the circumference of the cornea and gradually becoming lighter as it approaches the orbital periphery of the eye. No spots of extravasated blood are to be seen; there is no morbid discharge from the conjunctiva, and the pain is deep-seated and throbbing, and is described as being more around the eye, as in the temple, cheek, under the eyebrow, etc., than in the globe itself. Sometimes no pain at all will be experienced, or only a slight twitching pain. The pain, when present, is almost always worse during the night, commencing somewhere near sunset, gradually becoming more severe until midnight, then diminishing and passing away about daylight. Warmth is likewise apt to increase the pain.

The sclerotica being the fibrous coat of the eye, inflammation of it, has been termed "*Rheumatic Ophthalmia.*" It is very rare to meet with this disease in its simple form, it being more usually associated with catarrhal conjunctivitis, or "*Catarrho-rheumatic Ophthalmia,*" in which, the symptoms being mixed, we find the peculiar pink radiated appearance of the sclerotica, overspread by the vermillion-red vascular net-work of the conjunctiva. The disease may also be associated with iritis, and corneitis. Adults are more liable to the disease than children and old persons, and, ordinarily, one eye only is affected. The disease is almost always *caused* by exposure to cold and dampness.

The *symptoms* are similar to those of the acute form, but of much

less intensity; the severe pains in the temple, orbit, etc., are considerably diminished, or may not be at all experienced; there will be the peculiar redness of the inflamed parts; dimness of vision, as if a veil were before the eyes, and upon a close inspection, a slight cloudiness may be observed in the eye, the capsule of the aqueous humor being affected; when the iris becomes implicated, there will be a constant tendency to contraction of the pupil, and the movements of the iris will be less active than usual; an abundant flow of tears, especially when the conjunctiva is implicated; and more or less intolerance of light. In some cases, there will be more or less constitutional disturbance. Ordinarily, the chronic form of the disease involves only a part of the sclerotica, as indicated by the greater increase of vascular injection of the affected portion.—If the disease be left to itself, or be improperly treated, from a misunderstanding of its nature, vision may be destroyed from opacity of the anterior crystalline capsule, or closure of the pupil.

In the *treatment* of chronic sclerotitis, it is very seldom indeed that either local or general bleedings will be required. As revulsive measures, stimulating liniment may be applied behind the ear, to the sides and nape of the neck, and to the upper part of the back and spinal column; for this purpose the Compound Tincture of Camphor will be found especially useful. In addition to which, in very obstinate cases, sinapisms may also be applied to the same parts. The inferior extremities should be kept warm, especially in the night, during which period every precaution should be taken to avoid contracting a new cold, which is apt to occur in cold and damp weather, upon the slightest neglect. In order to prevent any structural changes in the iris from taking place, the pupil should, throughout its whole course, be kept under the influence of a mixture of Tincture of Belladona twelve drops, Tincture of Gelseminum half a fluidrachm, Water, one fluidounce. This should be dropped in the eye, or be applied by means of a camel's-hair pencil, as often as found necessary to keep up dilatation of the pupil. Or a solution of Sulphate of Atropia, one to four grains to one fluidounce, may be used instead, applying a drop to the eye by means of a camel's-hair pencil, as often as required. A determination to the surface should also be maintained by diaphoretic agents, so as to produce gentle moisture. When the disease has lost its more active inflammatory symptoms, Sulphate of Quinia, one grain mixed with five grains of Compound Powder of Ipecacuanha and Opium, will be found extremely valuable in many cases. The bowels should be kept regular, but active purgation must be

avoided. While the rheumatic feature of the disease exists, the patient should be kept under the influence of the following preparation: Take of Tincture of Black Cohosh Root, Tincture of Colchicum Seeds, each, one fluidounce, Tincture of Aconite three fluidrachms; mix. From ten to sixty drops may be administered in water, every two, three, or four hours, according to the symptoms, and the effects occasioned by the medicine.

If the disease obstinately persists, notwithstanding treatment, it will then become necessary, in addition to the measures already recommended, to administer agents indicated by the peculiar diathesis or tendencies of the system.

The diet must be regulated by the character of the symptoms, and in cool, damp, or windy weather the patient must remain within doors.

More commonly sclerotitis is associated with conjunctivitis, and the disease is then termed *catarrho-rheumatic ophthalmia*. This is a much more formidable affection than simple sclerotitis. The symptoms are a mixture of those peculiar to catarrhal conjunctivitis and to sclerotitis; sometimes the conjunctiva presenting more severe symptoms than the sclerotica; at other times, and indeed more frequently, the symptoms of sclerotic inflammation will be the more intense. The disease, like rheumatic iritis, appears to be limited to a period of three weeks, before a recovery will ensue from the acute attack; provided, in the meantime, no pupillary adhesions, or serious organic alterations occur, and which may generally be prevented by keeping up pupillary dilatation by solution of atropia, and subduing pain by the appropriate measures.

In the chronic form of this compound affection, the *symptoms* are much less severe than in the acute; the distinctive characters of the redness have already been pointed out; there will be more or less epiphora and intolerance of light; an adhesion of the lids in the morning; *chemosis*, or serous exudation of the subconjunctival cellular membrane, frequently occurs, occasioning an elevation or œdema of the conjunctiva around the cornea, this latter coat appearing, as it were, at the bottom of a circular cup; when this is present, the redness of the sclerotica will be concealed from sight; the cornea is also extremely liable to ulceration, or *onyx*, a deposit of pus between the layers of the cornea. The onyx may penetrate toward the outer surface of the cornea, or, it may burst into the anterior chamber, giving rise to *false hypopyon*. The ulcer is not usually very deep, but extends over the surface of the cornea, and

it often heals without any resulting opacity, but leaving the vision confused or indistinct,—when the ulcer does penetrate the substance of the cornea to any great depth, leucoma will be the result.

The color of the iris frequently changes, if blue, presenting a greenish tint; if blue-gray, a greenish-gray; if dark-brown, a reddish-brown; if bright-brown, a yellow-brown, etc.

By neglect or improper treatment, this disease may terminate in loss of vision from adhesion of the iris to the cornea, abscess of the cornea, partial staphyloma, obliteration of the pupil, etc. Among old persons, the disease is very liable to leave a greater or less permanent diminution of sight.

We may distinguish this disease from *catarrhal conjunctivitis* by the sclerotic vascular injection around the cornea, the pain in the temples and around the orbits, and by the cornea being much involved; from *simple sclerotitis*, by the conjunctivitis, the greater dimness of the cornea from exudation into it, and its abrupt marginal vessels; from *phylctenular ophthalmia* by the age of the patient, and the pain in the temples and around the orbit; from *corneitis* by the great redness of the white of the eye, and the deep-seated grayish white opacity of the cornea, its roughness, dimness, and increased prominence; and from *iritis*, by the absence of any affection of the iris.

The *treatment* will be the same as advised in the preceding section for chronic sclerotitis, but more actively employed; and when the catarrhal conjunctivitis is very severe, the local means adapted to this variety of ophthalmia will be demanded, especially when the conjunctival affection does not yield to the other local measures pursued. In the chronic catarrhal form of this disease, after the more severe symptoms of the sclerotitis have subsided, the following collyrium will be found very valuable: Take of Elixir Vitriol six drops, Water two fluidounces; mix. Drop into the eye three or four times a day.

In this disease, when the eyeball feels tense, with orbital, temporal, or malar pains, compresses of cool or tepid water, applied upon the eye, changed frequently and continued, each time, for an hour or two will be found very valuable. Sometimes, a small stream of tepid water may be poured upon the temples for ten or fifteen minutes at a time. The following, rubbed around the orbit and temples will frequently afford great relief: Take of Aconitina four grains, Glycerin one fluidounce, Hydrocyanic Acid one fluidrachm; mix. It may also be safely applied upon the lids.

The following preparation will often be found of great benefit: Take of Sulphate of Quinia one scruple, Elixir Vitriol one flui-

drachm; mix, dissolve the Quinia, and add Tincture of Black Cohosh twelve fluidrachms, Tincture of Aconite Root two fluidrachms. The dose, is ten or twenty drops in a tablespoonful of water, to be repeated every hour or two. This will be found very valuable in all internal or rheumatic inflammations of the eye.—In many instances, the addition of one fluidrachm and a half of Tincture of Sulphate of Morphia* to the above, will be found to increase its efficacy very materially.

It may also be proper to state here that I have frequently seen the best results follow the use of the following solution, in all cases of rheumatic ophthalmia, in which the urine was of a low specific gravity, and deficient in urates and uric acid: Take of Tincture of Acetate of Iron one fluidounce, Acetate of Potassa half a fluidounce, Distilled Water seven fluidounces; mix. The dose is a fluidrachm or two every four hours. *Irido-choroiditis* may also be treated similarly.

A drop or two of a solution of Sulphate Atropia two grains, Distilled Water four fluidounces, may be placed upon the eye once or twice a day, to produce dilatation of the pupil, as well as for its anodyne effect.

6. *Scrofulous Sclerotitis. Sclerotico-choroiditis. Cirsophthalmia.* This is an affection frequently met with among strumous and debilitated constitutions, females being more subject to it than males, and may exist alone, or accompany any other inflammatory disease of the eye. In the first period, one or more enlarged and tortuous recto-muscular arteries will be observed running along the white of the eye toward the cornea, at or near the margin of which they ramify into smaller vessels; there is no general redness of the eye, nor much conjunctivitis, though there will be some thickening of the conjunctivitis; perhaps, also of the sclerotica; the pupil will be somewhat sluggish and dilated; and there may be more or less haziness of the cornea; with dimness of vision, intolerance of light, epiphora, and more or less pain. The disease may extend no further than just described, in which case vision may ultimately be restored after the subsidence of the inflammation.

If the disease progresses, however, the external coats of the eye become thinned and softened, so that the dark choroid membrane may be seen through the sclerotica, giving a blue or purplish color, and which symptom may be seen at a very early stage. This dis-

* The Tincture of Sulphate of Morphia for the above purpose is to be made by dissolving Sulphate of Morphia fifteen grains in Alcohol three fluidrachms.

coloration will vary in degree, according to the nature and obstinacy of the disease, and its most frequent situation is about a line, or nearly so, behind the margin of the cornea; it may be seen occupying only a portion of this margin, or completely surrounding the cornea. As the disease advances, this dark line gradually becomes broader.—In a short time the softened, thinned, and adherent sclerotica and choroid, bulges outwardly, usually near the cornea, between its margin and the attachments of the recti muscles, at which points the sclerotica is less firm. The protrusion may, however, occur at other points. There may be one or more protrusions, appearing like small tumors of various forms and sizes, in clusters or elongated rings, of a bluish-black color, with the separated fibres of the sclerotica appearing like whitish lines running from before backward. To these projections the name of *sclerotic staphyloma* has been given. Varicose vessels usually pervade the white of the eye.

In this disease, there may be aqueous effusions within the eyeball, either between the choroid and sclerotica, between the choroid and retina, or between the retina and the hyaloid, which effusions may either occasion, or augment, the staphyloma. The first is termed *subsclerotic dropsy*, the second *subchoroid dropsy*, and the third, in which the vitreous body is usually destroyed, *dropsy of the vitreous humor*. Permanent displacement of the pupil, slate color and projection of the iris, opacity of the cornea, especially of that part of its periphery near the diseased sclerotica, protrusion of the eyeball, etc., may also be the result of scrofulous sclerotitis. These staphylomatous tumors must not be confounded with certain blackish pigmentary spots which are frequently observed on the sclerotica; these spots are irregular, congenital, do not disturb the visual functions, and can not be removed.

When the disease involves the posterior part of the sclerotica, it is termed *posterior staphyloma*, which will be referred to hereafter.

When scrofulous sclerotitis has reached the chronic stage, it is rarely that its morbid results can be removed, although the progress of the disease may occasionally be completely checked. The best *treatment* is that calculated to remove the peculiar diathesis of the system, and which should be contined for a long time.

Regularity of the bowels and kidneys; attentions to the skin; tonics; alteratives, as, Iodide of Potassium, Iodide of Ammonium, Bromide of Potassium, etc.; Compound Tar Plaster, alternately behind the ear, to the nape of the neck, and between the shoulders; attention to diet, exercise, etc., are among the chief measures to be pursued. Local applications of Belladonna to the eye, and of

the solution of Muriate of Ammonia, and Chloride of Gold and Soda, on page 1405–6, may also be employed.

It is rarely, however, that any treatment will restore vision, or remove the staphyloma, or other morbid results; and when these become annoying, the case becomes a surgical one, in which the eye may be partially or totally extirpated; the former especially where an artificial eye can be adapted. (*See Sclerotic Staphyloma.*)

7. *Chronic Inflammation of the Cornea. Chronic Corneitis. C. Keratitis.* Although the cornea is more or less directly involved in most of the inflammatory conditions heretofore referred to in this chapter, yet there are certain affections which principally involve its proper substance.

In inflammation of the cornea the redness and vascular congestion is seated in the sclerotica, a plexus of very minute vessels being arranged in scattered radii around the upper or lower edge of the cornea, or in both situations, forming a crescent, a semi-circle, or almost a complete circle, and which may be readily seen by the aid of a magnifying lens. These vessels will extend into the proper substance of the cornea to the distance of from half a line to a line or more, resembling ecchymosed patches. Sometimes, the vascularity is so great, that the whole cornea becomes red, resembling light-red cloth, and which condition has been termed *pannus;* a white spot being observed at the center of the pannus or vascular radiation.

In chronic cases the *symptoms* are less severe than in the acute; there is epiphora, intolerance of light, but little or no pain, less vascularity of the cornea, though the blood-vessels running in the direction of the recti muscles will be considerably enlarged and extend over the cornea; the cornea is often rough, loses its transparency and polish, and presents a degree of dullness; dimness of vision, and slight haziness or opacity is a very early symptom, even when there is but little apparent vascularity. In some cases, especially among rheumatic and gouty persons, the blood-vessels on the surface of the eye will be found varicosely enlarged, and a bluish-white ring will be observed close to the edge of the cornea, with larger or smaller opaque spots in the cornea; there will also be much impairment of vision, lachrymation, and rheumatic or neuralgic pains around the orbit. And not unfrequently there will be a loose fold of thickened conjunctiva at the edge of the cornea, which may occasion so much irritation, as to demand its excision.

The consequences of corneitis are opacity of the cornea from

deposits in its tissue, suppuration or abscess, increased convexity of the cornea, softening of the cornea, etc.

Corneitis may be caused by exposure to cold and moisture, by living in small and badly-ventilated apartments, by bad, or insufficient food, by overexertion of the eyes, by injuries to the cornea, by some morbid condition of the fifth nerve, etc. It is usually a very obstinate disease, is apt to attack both eyes at the same time; or, if but one eye is attacked, the other becomes implicated as the first is getting well. Young children, and especially persons from ten to twenty years of age are more liable to it; and particularly those of a strumous habit; and also females at the period of puberty. Persons of strumous habit are very apt to be affected with some disease of the ear at the same time. The rheumatic or arthritic form is more apt to occur with persons further advanced in years.

The *treatment* will be very similar to that recommended for Scrofulous Ophthalmia; keeping the bowels regular; the skin in as healthy a condition as possible; administering tonics and alteratives, especially Sulphate of Quinia, and the Iodide or Bromide of Ammonia, with Pills of Chloride of Gold and Soda, as: Take of Chloride of Gold and Soda five grains, Muriate of Ammonia, or Starch, two drachms, Alcoholic Extract of Black Cohosh, a sufficient quantity. Mix, and form into a pill-mass, and divide into sixty pills, of which one is a dose; the dose may be repeated two or three times a day. Nourishing diet, warm clothing, and regular but moderate exercise in the open air, with protection of the eye from the light, if required, will also be necessary.

The local applications named for scrofulous ophthalmia should also be employed in corneitis; with Belladonna if there is any suspicion of iritis; and counter-irritants on the neck, and behind the ear, when the disease proves refractory. In the rheumatic variety, warm fomentations to the eye, the local employment of Belladonna, and internal remedies to produce a determination to the skin and overcome the rheumatic tendency, are indicated—similar to the treatment named under Catarrho-rheumatic Ophthalmia. In some cases, a treatment of twelve or eighteen months will be required in order to effect a cure of the disease. As a general rule, unless adhesions, ulcerations, abscesses, or other structural changes take place, the *prognosis* of the diseases referred to in this chapter, may be regarded as favorable.

Division of the ciliary muscle has been recommended for the cure of keratitis by Mr. Hancock, and has proved successful in the hands of several oculists. It is not, however, to be undertaken in inter-

stitial or syphilitic corneitis, in which antisyphilitics are especially indicated.

Ulcerations, and the other consequences of these affections will be treated upon hereafter.

CONTAGIOUS EXTERNAL OPHTHALMIA.

1. *Gonorrheal Ophthalmia. Gonorrheal Conjunctivitis.* This is one of the most formidable affections to which the eye is subject, being sometimes mild in its character, but, frequently, very violent in its attack and rapidly destructive in its results. It is undoubtedly *caused* by the application of gonorrheal matter to the eye, at least such has been the case in the instances that have occurred in my practice. It has been supposed to be metastatic, but I have no confidence whatever in such a supposition, and can only wonder that it should ever have been entertained for a single moment. There are various ways in which careless, filthy, or ignorant persons may convey the gonorrheal matter to their eyes, as, by means of the fingers, towels, handkerchief, etc. The disease is more common among males than females, and is, ordinarily, confined to but one eye, in which respect it differs from Egyptian ophthalmia; I have, however, met with several cases in which both eyes were affected.

The *symptoms* are, great vascular congestion; intense redness of the eye; excessive tumefaction of the conjunctiva; great chemosis; swelling of the lids; profuse yellow puriform discharge; general haziness of the cornea, etc. This history of the disease will afford us a clue to its character; but, we must not forget, that a person affected with gonorrhea may have an ophthalmia, without its necessarily being of gonorrheal origin.

Instances have occurred in which the eyes were lost within thirty-six hours from the period of inoculation, sloughing of the cornea having taken place in this short time.

In the severe form of the disease, there is more or less severe pain, both in the eye and in the head; the pain is often of a burning character, the eye also feeling as if it would burst. Sometimes there will be little or no pain experienced. As a general rule, the first stage is marked with pain, swelling and redness of the conjunctiva and lids; the second, by the puriform discharge and more intense chemosis; the swoln conjunctiva frequently overlapping the cornea all around, so that this, together with the swoln lids, will render it difficult, if not impossible to get a clear view of the cornea. In the third stage, the cornea becomes involved in the disease; it

becomes dull and hazy before it sloughs, but afterward it presents a dirty-yellowish, or brownish-opaque appearance, without polish or transparency, and wholly void of vitality. The more severe the attack the more rapidly will it run its course, depending somewhat on the general character of the constitution.

The *diagnosis* of the disease may be assisted by its history. In purulent ophthalmia the palpebral conjunctiva is the first affected; in gonorrheal, the ocular conjunctiva. The eyelids are swoln to a much greater extent in the purulent form. Purulent ophthalmia generally attacks both eyes at the same time; gonorrheal, ordinarily but one. Purulent ophthalmia presents granulations of the lid; gonorrheal, does not. The cornea is often destroyed by sloughing in the gonorrheal, but never or very rarely in the purulent form of ophthalmia.

The *prognosis* depends upon the severity of the disease, and the mischief it has effected. Where the whole cornea has sloughed off, or where a protrusion of the iris or lens occurs, vision can not be restored. If the cornea be hazy and dull, or white and nebulous, sight will be lost; if, however, the cornea retains its natural clearness, or if it only slough off partially, or if the ulceration be not extensive, the eye may often be saved without injury to vision. Great chemosis, profuse yellow discharge, intense redness and swelling of the upper eyelid are unfavorable symptoms, indicating excessive inflammation.

Gonorrheal inflammation of the eye may result in a flattening of the front of the eye, staphyloma, obliteration of the anterior chamber, obliteration of the pupil, opacity of the cornea, anterior adhesion of the iris, prolapsus of the iris, escape of the humors, and collapse of the globe, etc.

In this disease the *treatment* must be prompt and energetic. Active measures must be taken to promptly subdue the inflammatory symptoms, as, by sinapisms along the whole course of the spinal column, and behind the ear; with internal administration of a mixture of Tincture of Gelseminum one fluidounce, Tincture of Aconite one fluidrachm, of which twenty drops may be given for a dose, in a teaspoonful of water, repeating it every half hour or hour, according to its effects and the urgency of the case. The eye should be covered with a light compress, moistened with cold or warm water as may be found best suited to the case, as the effects of different temperatures will vary with patients. More generally cooling applications will be found the best. And, whether used warm or cold, the compress should be remoistened with the water, every ten or fifteen minutes, and then be re-applied, continuing

these measures unceasingly, until the inflammation has subsided. As a general rule, warm applications increase the heat, and thus augment the vascular disturbance. It will be proper to add Tincture of Belladonna, or Tincture of Stramonium, to the water, say, every three or four hours, in order to keep the pupil dilated, as the iris and other internal structures are apt to become implicated.—Hypodermic injections, a solution of the salts of Morphia, or of Atropia, made in the temporal region around the affected eye, will frequently reduce the intensity of the inflammatory action for a short time, so as to enable our other means to act with greater certainty.

Every half hour or hour, the following solution should be applied to the eye and beneath the eyelids, either by means of a camel's-hair pencil, or a small syringe, viz.: Take of Chloride of Gold and Soda ten grains, Distilled Water one fluidounce; mix. This course will generally save the eye, if commenced in time. If the chemosis be considerable, scarification or incision of the chemosed conjunctiva, close around the corneal margin has been found very advantageous; but I should hesitate to do this until after having well cleansed the eye of virus. The swelling of the parts may be so great as to render this operation almost impossible, unless the patient be placed under the influence of chloroform. After the incisions have been made, warm fomentations should be applied and continued for twenty-four hours or longer; and then astringent solutions, or one of the solutions named below, may be applied. Not forgetting, however, that we must not neglect in the meantime our antigonorrheal applications.

If, after the inflammation has been checked and the gonorrheal virus destroyed, there still remains a profuse purulent discharge, with paleness and flabbiness of the conjunctiva, the following preparation may be applied to the eye three or four times a day: Take of Strychnia one grain, Distilled Water two fluidounces; Nitric Acid four drops; mix, and dissolve. Or, the following may be used: Take of Sulphate of Quinia ten grains, Elixir Vitriol half a fluidrachm,—dissolve the Quinia in the Elixir, and then add Camphor Water half a fluidounce, Distilled Water one and a half fluidounces, Solution of Iodide of Iron fifteen minims. In some cases a solution of Tannin three or four grains to the ounce, will be found useful. But I generally prefer a continued use of the Gold solution.

The general system must be attended to during the treament, keeping the bowels regular, the skin moist, allowing only a light diet, and having the patient in a state of quiet and rest, with the eyes carefully protected from the light, in the first stage; and per-

mitting a more generous and nourishing diet, with tonics, if necessary, and gentle exercise in the open air, in the second.

My colleague, Prof. A. J. Howe, has found the following a prompt and successful treatment in many instances: Place the patient under the influence of Chloroform, then evert the eyelids, cleanse them, and apply over their whole conjunctival surface, concentrated Nitric Acid. The acid is applied by means of a soft piece of wood, of proper shape, which is to be dipped into the acid, and any superfluous acid removed from it, by wiping the stick once over with a piece of bibulous paper. If chemosis be present, apply the acid likewise upon the chemosed part. If necessary, this application may be repeated two or three times. The treatment, in the meantime, is similar to that already named.

Dr. H. M. Collis states that he has found this formidable affection to yield with marvellous rapidity to repeated weak injections, as follows: Puncture the inflamed and œdematous conjunctiva, or, if necessary, snip it with the scissors. Then inject underneath the upper lid, from the external canthus across the eyeball, a weak solution of Nitrate of Silver, repeating the injections regularly every half hour for twenty-four or forty-eight hours, without any intermission. In very acute cases, a solution composed of one grain of Nitrate of Silver to four ounces of Distilled Water, should be injected every ten minutes for the first hour or two; after that a solution of two grains to the ounce of Water, should be used carefully every half hour. He has pursued this plan successfully for nine years.

2. *Purulent Ophthalmia. Granular Ophthalmia. Egyptian Ophthalmia. Military Ophthalmia.* This disease at its commencement resembles ordinary Catarrhal Conjunctivitis, but its progress is much more rapid. There will be great vascularity, bright redness, excessive tumefaction of the membrane and of the lids, and profuse discharge. The tumefaction of the conjunctiva (*chemosis*) is often so great, that this membrane will overlap and cover nearly the whole of the cornea. A sensation as of sand in the eyes, or of some other foreign body, is always experienced, and there is a deep-seated pain in the eyeball, more or less severe; with itchings of the eyes, incessant and excessive discharge of a thick and yellowish matter, with epiphora, and intolerance of light. The cornea becomes hazy, and granulations will be seen covering the palpebral conjunctiva. These granulations may be so small as to give a velvety appearance to the part, or they may attain the size of a lentil. The largest are

generally toward the middle of the palpebral conjunctiva, and become flattened by angular pressure against the eyeball. They vary in color from the darkest blood-red to the palest brick, or may be yellowish, depending upon the degree of vascular turgescence; and when excised or cauterized, no ulceration follows. The disease is originally seated in the conjunctiva of the eyelids, from which it extends to other parts from neglect or bad treatment; and sometimes, notwithstanding treatment, it will extend, frequently producing injurious effects upon the cornea and iris. Of course, these symptoms will be found to vary from a mild character to one of great violence; and, ultimately, the general system will suffer from the influence of the disease, in the more severe cases.

The *cause* of the disease is not fully understood. It is supposed to be propagated by contagion, though medical men differ on this point. It frequently occurs epidemically, and seems to depend upon some peculiar condition of the atmosphere; and, under some circumstances, there is no doubt but it may be produced by exposures to high winds, dust, cold, and moisture, by injuries, and by the other causes that may develop the catarrhal form.

The *diagnosis* of this disease is not very difficult.* The bright-

* Dr. J. De Kabath, of St. Petersburgh, states that for more than twenty years he has had ample opportunities to investigate the nature of this disease in different localities throughout the Russian empire; that he has treated over twenty thousand cases, and has had three different attacks of it in his own person. He adds: "Facts prove that catarrhal ophthalmia, under certain conditions, as, for instance, certain atmospheric influences, the concentration of too great a number of soldiers into a barracks, want of air and light, damp soil, as well as other unfavorable hygienic conditions, that is to say, bad or insufficient nourishment, excessive fatigue, frequent colds, bad clothing," (exposure to dust, dry sand, or the hot rays from the sun), "may be transformed into a purulent or military ophthalmia, which then usually spreads itself by immediate contagion.

He classes conjunctival inflammations as follows: 1. *Catarrhal Conjunctivitis*, which is seated in the epithelium of the mucous membrane. The mucous membrane being a continuation of the skin, this disease may be compared to erythema of the skin. 2. *Granular Trachomatous Conjunctivitis*, also seated in the epidermis of the conjunctiva, but only in its deeper part, where the microscope granules of the conjunctival epidermis (trachoma) are found, and which are only verruca of the skin. 3. *Purulent Conjunctivitis* seated in the whole of the conjunctiva; it is the phlegmonous erysipelas of the skin. 4. *Diphtheritic Conjunctivitis*, also seated in the conjunctiva, with the difference that it furnishes more membranous plasma than purulent matter.

"Beside the means that should be taken to prevent immediate contagion, which are always of the highest importance, I adopt the cure of conjunctivitis by the abortive method, which consists in the introduction of a sufficient quantity of a saturated solution of Nitrate of Silver under the eyelids, so that the whole of the inferior and superior conjunctival surface is touched or moistened with it; after which the eyelids are to be covered with dry camphorated com-

red membrane, the chemosis, and the purulent discharge will discriminate it from catarrhal conjunctivitis. Beside, although one eye only may be affected, it is more common to observe the disease attacking both eyes. It may be determined from gonorrheal ophthalmia, which is usually confined to one eye, and in which the chemosis is greater, but the eyelids are not so much tumefied. Gonorrheal ophthalmia presents no granulations. It is of the utmost importance in this disease that the cornea be often examined; a thickened secretion over it may be mistaken for a haziness or opacity, but which mistake will not occur if the cornea be carefully wiped. Again, although ulceration may not be seen in the central part of the cornea, it may be situated at its margin, and be concealed by the overlapping of the chemosis.

The *prognosis* of purulent ophthalmia in the adult is not very favorable, especially when the inflammatory symptoms are intense, in which case the disease is frequently unmanageable. The cornea is the part most subject to the destructive effects of the inflammation. If it retains its natural transparency, vigorous treatment may arrest the inflammation; if it be dull, with deep-seated pain of the eye and head, indicative of extensive inflammation of the eyeball, the result will be doubtful. When the disease arises from contagion, it is apt to prove more severe and dangerous; epidemic and endemic cases are apt to be inveterate; sporadic cases are usually the mildest. Inflammation of a torpid character, especially in strumous systems, is less yielding to treatment, and more apt to affect the cornea, iris, etc.; irritable cases, also, present an unfavorable prognosis. After partial suppuration, considerable ulceration, or interstitial deposition, recovery of sight may happen, especially if these morbid changes in the cornea occur toward its circumference, and not at its center.

Purulent Ophthalmia may result in bursting of the cornea, suppuration of the cornea, ulceration of the cornea, interstitial deposition into the conjunctival covering, or throughout the corneal layers, opacity from cicatrization of ulcers, prolapsus of the iris,

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presses—as the application of moisture upon the eyes appears to interfere with the action of the nitrate of silver. The instillation should be repeated once or twice a day, according to the severity of the purulent conjunctivitis. As soon as the purulent secretion ceases, the use of the silver must be omitted; the rest is the result of time. It is never necessary to destroy the mucous membrane in order to cure the disease. Not only have I never failed with this method, but I have never seen any unpleasant result from it."—"Bestow all your attention to an investigation of the diseases of the mucous membrane, they are the most important diseases of the eye; more than half of the blind lose their moral and material existence, in consequence of attacks of these diseases." (*Grubbi.*)

anterior synechia, loosening and thickening of the corneal mucous membrane, staphyloma, ectropium, or entropium.

In the *treatment* of the acute form of this disease, prompt and vigorous measures must be taken to subdue inflammation as promptly as possible, and to prevent the cornea from becoming involved in the disease; for the methods of doing which see "Scudder's Manual of Practice," and translation of Wecker, in the "Eclectic Medical Journal," Dec., 1865, and Jan., Feb. and March, 1866.

In the chronic form of the disease, cauterizations should be applied, and repeated, according to the degree of inflammation present. And they should be carefully brought into contact, not only with the conjunctiva of the lids, but also that of the cul-de-sac, as much as possible; and, if the ocular conjunctiva be affected, as it often is secondarily, and its vascularity and swelling do not disappear soon after our applications upon the palpebral conjunctiva, we will also have to make a few gentle cauterizations upon the affected ocular conjunctiva itself. Modified Nitrate of Silver, or pure Nitric Acid, upon a soft-wood porte-caustic, may be employed, re-applying them every day or two, so as to keep up a moderate degree of action in the parts, but not too much irritation or inflammation; and, during the intervals between the cauterizations, frequently bathing the eyes with a solution of Chloride of Gold and Soda; or, with a strong decoction of Golden Seal and Witch Hazel or Geranium; or of Black Cohosh and Geranium. Preparations of these articles will keep for a long time, when consisting of equal parts of Water (boiling at first) and Glycerin.

If there is a low grade of inflammation present, a kind of stasis in the vessels, or a tendency to ulceration of the cornea, the following may be applied once or twice every day with the most marked benefit, omitting its use whenever the parts have recovered a more healthy action, or when the irritation produced by it becomes persistent: Take of Golden Seal, in powder, one drachm, boiling Water half a fluidounce; mix together, and shake frequently. When cold, add Glycerin half a fluidounce, and let the mixture stand several days; then filter, and add Tincture of Capsicum six fluidrachms.—The vapor of Bisulphuret of Carbon applied to the eye, for about five minutes at a time, and repeated two or three times a day, will also be useful in many cases.

Sometimes much advantage will follow the application of an irritating lotion, or of a small blister, upon the temple and in front of the ear.

Constitutional treatment is also required, administering altera-

tives, tonics, chalybeates, etc., according as there is a tendency to struma, debility, or anemia, etc.

If granulations alone remain on the lids, the cornea and ocular conjunctiva being little, if at all injured, the same measures may be pursued as advised for Granular Conjunctivitis, on page 1412. If the granulations prove intractable to these means, they may be carefully touched, every five or six days, with pure Nitric Acid, by means of a soft-wood porte-caustic, as heretofore named.

3. *Ophthalmia Neonatorum. Ophthalmia of New-born Infants.* This affection is more generally due to inoculation with some morbid discharge from the vagina, as well as to the application of irritating substances to the infant's eyes. The principal *symptoms* are, a glueing together of the eyelashes, slight swelling and redness of the margins of the lids, red and swoln conjunctiva, and the conjunctival sac is filled with a yellow or greenish-yellow fluid, followed by a purulent secretion. These symptoms vary in intensity with different patients; the lids become red, smooth and velvety, and the purulent discharge may become so profuse as to flow over upon the infant's cheeks. If not promptly checked, the disease may terminate in corneal opacity, myopia, amblyopia, strabismus, corneal ulceration, corneal necrosis, capsulo-lenticular cataract, or staphyloma, etc.

I introduce this disease* here merely for the purpose of remarking that I have been very successful in treating it, in an advanced stage, when the tissues were not destroyed, by internal means addressed to the general system, and by the following local applications:

1. Take of Chloride of Gold and Soda four grains, Distilled Water one fluidounce; mix. Apply this three times a day. 2. Take of Golden Seal, Witch Hazel and White Indian Hemp, each, equal parts; make a strong decoction, filter, and when cool apply every hour or two, cleansing the eye with it. These collyria must be carefully applied beneath the lids, in the cul-de-sac, and on the eye, by means of a camel's-hair pencil; and between the application of the first and the second fluid, an interval of an hour should always be allowed to elapse. In some rare instances, a solution composed of Nitrate of Silver one or two grains, Distilled Water one fluidounce, may be substituted for the gold solution.

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*For treatment of this malady from its commencement, see translation of Wecker, in "Eclectic Medical Journal," March No., 1866.

INTERNAL OPHTHALMIA.

1. *Chronic Inflammation of the Iris. Chronic Iritis.* Iritis may be produced or accompanied by rheumatism, gout, syphilis, etc., to which conditions the names have been applied of "rheumatic iritis," "syphilitic iritis," etc.; but, although the disease has been thus subdivided, in all instances these subdivisions are only modifications of one and the same affection.

In Iritis, the intensity of the redness of the vascular zone in the sclerotica, around the margin of the cornea, will convey some idea of the intensity of the inflammation; the color of the iris also changes, becoming green if the iris were naturally blue or gray, and reddish-brown if it were brown or black; the pupillary circle is somewhat of a pinkish color; the brilliancy of the iris is impaired or lost; the pupil becomes more or less deformed, losing its normal mobility; and one or several exudation spots of blood may be seen on the surface of the iris. Vision may be destroyed in a few days.

Chronic Iritis usually succeeds the acute form; sometimes, however, it may arise so imperceptibly, and progress so slowly to effusion of lymph, or loss of sight, as to hardly attract the patient's attention. In some cases, it is characterized by the vascularization of the iris, formed by two or three very delicate vessels which ramify around the pupillary opening; in others, by a mass of vessels which form variegated arborizations on the surface of the iris. At a later period, plastic exudations unite the borders of the pupil, which have become irregular; adhesions occur between the anterior crystalline capsule and the diaphragm of the iris; exudation spots appear on the surface of the iris, and their incomplete absorption leaves small black or yellow spots, appreciable at the bottom of the anterior chamber. These successive modifications are effected without any severe reaction, and the patient is aware of his disease only by the more and more considerable disturbance which diminishes his visual faculties. Frequently there is more or less pain, and intolerance of light, but these gradually disappear.

With these symptoms there will be a scrofulous, rheumatic, or syphilitic, condition of the system, which will modify the iritis by adding to it the symptoms peculiar to such condition, and render it, accordingly, more or less rapid in its progress, and more or less obstinate in its character. In the syphilitic form, the smaller circle of the iris is copper-colored, the pupil angularly deformed, the pupillary field will present lymphatic exudations, and on the pupil-

lary or ciliary margin of the iris, yellow or reddish-brown fibrinous, condylomatous growths, of various sizes, may often be observed.

Iritis may be *caused* by over-exertion of the eyes, long-continued examinations of minute or bright objects; blows on the eye; exposures to cold, and dampness; and by the application of gonorrheal or chancrous matter to the eye, constitutional syphilis, scrofula, etc.

The change of color in the iris; the deposition of lymph into the texture of the iris, usually confined to its inner circle, and which occasions the change of color in the iris; yellow, yellowish, or reddish-brown, small drops or tubercles, of varying sizes, deposited in any portion of the anterior surface of the iris; protrusion of the iris; sluggish motions of the iris; excessively-contracted pupil; dimness of sight from the commencement, gradually resulting in entire loss of vision; pain in the temple, brow, or cheek, together with the symptoms previously named, will assist in the *diagnosis*.

The *prognosis* will depend entirely upon the changes which have taken place in the eye. If the chronic form follows the acute, vision will probably be permanently lost; but, if it come on gradually, without having been preceded by the acute form, the eye may be restored to health, if taken in time, and the proper treatment be pursued. Any of the following results having taken place, the prognosis will be unfavorable:

The results of iritis which are unfavorable to vision, are, opacity of the cornea, considerable lymphatic exudation, adhesion of the iris, dropsical enlargement of the anterior chamber, with closed pupil, staphyloma scleroticæ, disorganization of the iris, adhesion of the pupillary margin, false cataract, or opaque adventitious membrane in the pupil, more or less complete closure of the pupil, atrophy of the globe, fluidity of the vitreous humor, amaurosis, etc. Myodesopia is a common result.

In the chronic stage of the disease, when the inflammation has wholly subsided, the effects of the disease upon the retina and the vitreous humor may be observed by the ophthalmoscope. (*See Ophthalmoscopic Examinations of the Retina, and of the Vitreous Humor.*)

Treatment. Any active inflammation must be subdued by a poultice applied over the eye, consisting of fresh Stramonium Leaves, bruised, and moistened. Or, if the fresh leaves can not be obtained, a drachm of the Extract of Stramonium may be dissolved in Glycerin a fluidounce, to which ten drops of Oil of Lobelia may be added; and this solution should be added, together with a sufficient quantity of Water, to Elm Bark, enough to form a poultice

for both eyes. This local means must be aided by purgatives, diuretics, and sudorifics; as well as by constitutional measures to combat the rheumatic, scrofulous, or syphilitic condition of the system.

If there is a probability that the effusion of coagulable lymph, or the adhesions may be overcome by treatment, I would advise the following:

Apply to the eye, every two hours, a wash, composed of Chloride of Gold and Soda ten grains, Distilled Water one fluidounce. I have saved the eye in several instances by this wash, where chancrous matter had accidentally entered it, giving rise to symptoms threatening its rapid disorganization. In addition to this wash, the pupil should, if possible, be kept dilated by the occasional application of Belladonna, or solution of Atropia, which, however, will often be found an impossibility when there is an adhesion of the iris to capsule of the lens. Yet, these adhesions may frequently be detached, or elongated, by the use of atropia, so as to allow the iris to move freely, and prevent the formation of new adhesions. When the adhesions can not be removed or loosened by this means, a surgical operation may be required for their detachment.

Any debility or morbid sensibility of the eye remaining, in the chronic form of iritis, may, if the above solution of Gold and Soda be not stimulating enough, be overcome by one of the stimulating collyria heretofore named under the several forms of conjunctivitis. For the purpose of preventing lymphatic deposits, or causing their absorption when deposited, I know of no better agents than the Iodide, or Bromide of Ammonium, one of which may be administered during the whole course of the disease, commencing its use as soon as the more active inflammatory symptoms have subsided.

An irritating plaster should, in obstinate cases, be alternately placed behind the ear, and to the nape of the neck; if the patient be rheumatic, etc., adopt the constitutional treatment named for Rheumatism, Scrofula, or Secondary Syphilis, together with tonics or chalybeates if he be debilitated or anemic. So long as zonular redness of the sclerotica, and dimness of vision exist, we may be certain that disease has not left the eye, and must persevere in our treatment.

2. *Chronic Crystalloiditis. Chronic Inflammation of the Crystalline Capsule.* This has been described as a disease coming on slowly, with little or no pain, or if pain be present, it is dull and seated in the forehead, the crown of the head, or deep in the orbit; there is also a varicose condition of the vessels; if the anterior hemisphere

of the capsule be affected, a vascular wreath may be seen upon its surface at about the distance of a quarter of a line from the pupillary edge of the iris, forming a concentric circle within the pupil, from which vessels radiate toward the circumference of the capsule; if the posterior hemisphere be affected, a deep-seated opacity will be observed, and the vessels are stellately arranged. Muscæ volitantes and more or less dimness of vision are usually present.

The *cause* of this affection is not well understood. It is undoubtedly more often a result of iritis, choroiditis, or the two combined. It proves exceedingly intractable to *treatment*, which should be similar to that pursued for chronic iritis.

3. *Chronic Aquo-capsulitis. Kerato-iritis.* This is an inflammation of the walls of the aqueous chambers, and especially of the membrane of Descemet, (posterior elastic lamina of the cornea), and the anterior surface of the iris. In the acute form the *symptoms* very nearly resemble those of rheumatic ophthalmia. In the chronic stage there is more or less dimness and opacity of the cornea; a diffused muddiness in the anterior chamber; a number of circumscribed grayish or yellowish-white spots, often very numerous, and generally on the lower half of the internal surface of the cornea, giving a mottled appearance to it. The iris loses its brilliancy and color; the pupil is sluggish, or immovable, and when the corneal opacity is not too great, flakes of lymph may be seen in the aqueous humor; there is an increased accumulation of aqueous humor, causing a distension, if not prominence of the cornea, or the iris may be pressed backward assuming a funnel form. Sometimes, hypopium is present. The patient usually complains of a sense of fullness and distension in the eyeball, a dull aching pain in the forehead, and sometimes in the back part of the head. The pains are generally worse at night. Vision is disturbed according to the opacity and lymphatic exudation; though sometimes the patient will hardly see at all in the morning, but much better toward evening, in which case the minute spots, or depositions of lymph on the inner surface of the cornea, above referred to, will be observed to spontaneously appear and disappear.

The disease most commonly affects persons below middle age; and is liable to relapses. Its *causes* are long-continued overexertion of the eyes; suppressed perspiration; slight blows on the eye, exposure to cold, etc.

The disease may be *distinguished* from *corneitis* by the deep situation of the corneal opacity, or of its mottled appearance; and this

opacity, together with the changes in the iris, will determine it from simple *iritis*. The chronic form of the disease is very obstinate.

The *treatment* for chronic aquo-capsulitis will be the same as that named for Chronic Iritis, with tonics and alteratives internally. The Quinia and Cohosh Tincture on page 1418, will be found very valuable. Belladonna to dilate the pupil, is especially of use to prevent adhesions of the iris, or to loosen them when formed but slightly. The opaque depositions may often be removed by exposing the eye to the vapor of hydrocyanic acid or of bisulphuret of carbon, for ten or fifteen minutes every day.

4. *Chronic Choroiditis. Chronic Inflammation of the Choroid. Arthritic Posterior Internal Ophthalmia.* The history of choroiditis has remained in obscurity for a long time; and it is only since the discovery of the ophthalmoscope, that correct views of it have been held. Until this discovery, the morbid changes produced in the choroid by inflammation, as well as those developed in the retina, two membranes of great vascularity, were unknown or confounded under the names of *internal ophthalmia* or *amaurosis*, when they were associated with a subacute or chronic state. I will endeavor to briefly relate what properly belongs to this affection.

Choroiditis may exist in the acute form, which more generally supervenes on the chronic; it is a rare affection, and runs through its course rapidly, sometimes destroying vision in a single night; and the greater part of patients laboring under it, require medical assistance only after the acute stage has nearly passed, and then not for the inflammation itself but for the lesions occasioned by it. More commonly, choroiditis is chronic in its character, advancing slowly and insidiously, and presenting itself under two forms, viz.: 1. *Hyperemia* or *congestion of the choroid*, and, 2, *Exudative Choroiditis*, or *Chronic Choroiditis proper*. Properly speaking, these two forms are only two subsequent degrees of one and the same malady. Some authors describe a third form under the name of *Atrophy of the Choroid;* this will be referred to hereafter.

Choroidal congestion is generally serious according to the length of time it has lasted. One eye alone may be affected, but sometimes both, the affection in one generally succeeding that of the other.

It is very important to know the *causes* of choroiditis, for upon them rests the principal indications upon which the treatment is based. These causes are numerous, and have been divided into predisposing and exciting. Among the *predisposing causes*, it has

been remarked that persons advanced in life, and especially females, who have suffered from piles, headaches, derangements of the digestive organs, etc., are more predisposed to it. Also that individuals with black hair, dark complexion, prominent, expressive eyes, of robust appearance, are more frequently attacked with the disease than those who do not present these particular conditions. It is also met with among rheumatic subjects. Persons subject to this affection are apt to have large and indolent pupils; large varicose vessels running across the dark and dirty-looking white of the eye; the margins of the eyelids swoln and pervaded by large vessels; a sense of fullness in the eyeball; muscæ; occasionally seeing bright sparks or luminous spots, flame, etc.; and temporary dimness of vision after stooping, or being heated, etc. (*Jones.*)

The *exciting causes* are fatigue of the eyes by labor requiring a constant application of them, as, among watch-makers and jewelers; examinations with the microscope; the abuse of too strong lenses, which keep up an increased activity of the visual organ; sudden suppression of the menses, or of a hemorrhoidal flow; obstinate constipation; mental distress; strong light; cold, and all causes which favor cerebral congestion, may occcasion that of choroiditis.

The *anatomical symptoms of hyperemia of the choroid* can be ascertained only with the aid of an *ophthalmoscope*, and, in some cases, this examination becomes impossible, because the inflammation exists at the same time in other tissues of the eye, as, in the iris, the retina, and the conjunctiva. Very often, however, it exists alone, and then the reflector will enable us to distinguish a scarlet-red tint at the bottom or fundus of the eye, much deeper than the normal tint, and a considerable turgescence of the tortuous vessels of the choroid, and the pigment becomes less distinguishable, or disappears partially or entirely. At the same time, if the disease persists, the subconjunctival vessels distend, and a bluish or red circle, according to the intensity of the congestion, surrounds the cornea. At a later period, the globe of the eye becomes hardened, the pupil sluggish in its movements, the iris dull and discolored, pervaded by varicose vessels, its pupillary margin retracted, its middle part inclined toward the cornea, the sclerotica bluish, and perhaps bulging out, and the disease degenerates into *glaucoma*, or *phlegmon of the eye.*

The *subjective symptoms* are; at first the patient experiences only a slight tension in the globe, a tension which may eventuate in painful twitchings, if he fatigues himself with a slightly prolonged

labor, reading, writing, etc. A dimness of vision, as if a cloud, net-work, or spider's web were constantly before the eye, is complained of, and of which he endeavors to give a very complete description. When the congestion is more active, the tension and accompanying pain is replaced by lancinating pains which shoot into the temple, the forehead, and beneath the orbitar arch; light is supported by the eye with difficulty; the patient seeks the shade, and is tormented by the appearance of black, yellow, or green spots, sparks, and luminious points, due to the influence exerted by the engorged choroid upon the retina. Indeed, it is rare that hyperemia of the retina does not exist at the same time. Optical illusions of various kinds are frequently present.

The progress of choroiditis is ordinarily slow; it advances by starts or paroxysms; thus, the disease comes on, then follows a great improvement, then an aggravation of its symptoms, and so on, until after a certain time when the disease is supposed to be checked, all the symptoms re-appear with greater violence, owing to some imprudence, as a prolonged exposure to the sun, a prolonged reading, writing, etc. This second attack passes off more slowly than the first, to re-appear and disappear again, and so on. These successive attacks at length effect serious morbid changes in the substance of the choroid; which are the exudations.

In *exudative choroiditis* the *ophthalmoscope* alone will enable us to recognize the changes undergone by the choroidal tissue under the influence of this second degree of inflammation. If the exudation is *serous*, we will perceive through the transparency of the retina a large whitish patch, elongated, irregular, ordinarily encompassed by a blackish border and fringed with the pigmentary layer of the choroid, and around this patch will be seen the deep vessels of the choroid filled with blood. If the exudation is *plastic*, we will see either grayish or silvery-white patches which conceal the parts beneath, or small yellowish-white points spread over the surface of the choroid. These thin or thick exudations sometimes detach and elevate the retina, causing it to press upon the vitreous humor; at other times they condense between the choroid and the sclerotica. At the same time, it is by no means rare to observe in the neighborhood of the papillary region small yellowish, circular patches, surrounded by a circle of black pigment. These patches which are due to the disappearance of the pigmentary layer, at a later period appear of a pearl-white, for the vascular layer of the choroid becoming atrophied, we are then enabled to see the normal color of the sclerotica. We will also sometimes meet with small black spots formed by a certain amount of accumulated pigment,

and small reddish points produced by the extravasation of blood, following the spontaneous opening of a small artery or vein.

To sum up, I will say that *exudative choroiditis* is characterized anatomically by the presence of exudations, by yellow patches resulting from the disappearance of the pigment, by pigmentary accumulations, by pearl-white patches due to the sclerotica, and by hemorrhagic reddish points. I will also observe that the vitreous body is ordinarily softened, containing grayish flakes in suspension, and that the retina almost always participates in the morbid action.

The *subjective symptoms* consist especially in the perception of fixed muscæ of various forms and colors; in micropy; luminous visions; and sometimes in photobia, lachrymation, and a painful sense of fullness.

The progress of this affection is essentially chronic, but like the preceding it is subject to exacerbations, which occur by intervals. Its *prognosis* is always unfavorable.

The *treatment* in the first form of the disease, will depend somewhat upon the cause of the attack; if this be menstrual suppression, means must be taken to promptly recall this flow; if it be difficult menstruation, this must be remedied as speedily as possible; and so with any other suppressed habitual discharge. The eyes must not be employed for any purpose whatever.

In addition to the measures just hinted at above, the following must also be pursued. Every night, warm pediluvia should be used, composed of half an ounce of powdered mustard seed, one ounce of soft soap, hot water two or three gallons; the feet and lower portion of the legs should be bathed in this for ten or fifteen minutes, and then be well dried. The Compound Tincture of Camphor should be well rubbed upon the temples, behind the ears, upon the nape and sides of the neck, and along the whole course of the spinal column; after which sinapisms should be applied to the same parts. This stimulating treatment should be practised every night, or every other night, as the symptoms demand, and as the patient can bear it. And upon retiring to bed in a properly-warmed room, hot irons should be kept to the patient's feet during the night, which will produce more or less perspiration, and increase the action of the stimulating tincture upon the surface.

If there be any pain or sense of fullness in the eyeball, no matter how slight, light compresses moistened with cold water may be placed upon the eye, and should be frequently renewed, for an hour or two at a time. These may be applied once or twice daily, as long as the symptoms, just referred to, continue. If there be much pain around the orbit, or in the temples, some anodyne may be employed

in frictions over the parts, as, Tobacco Ointment, Stramonium Ointment, Belladonna Ointment, etc., or plasters of the extract of one of these anodynes may be worn for a time over the painful part. Or, the following may be rubbed upon the painful parts, afterward covering the parts with oil-silk: Take of Chloroform, Fluid Extract of Aconite, Tincture of Camphor, Laudanum, each, equal parts; mix. In many instances hypodermic injections will be found useful.

To keep the bowels regular, prevent renewed exacerbations, and to aid in completing the resolution of the disease, moderate doses of the Compound Pills of Aloes may be given, or, the Compound Pills of Gamboge, especially when a habitual hemorrhoidal discharge is suppressed, or where there are sympathetic pains in the head from an obstruction of the circulation of the abdominal venous system. If there is a sluggishness or inertia of the bowels, the Compound Pills of Podophyllin may be given; or, one of the following: 1. Take of Aletridin one scruple, Extract of Nux Vomica two grains, Podophyllin five grains; mix, and divide into twenty pills, one or two of which may be taken every night. 2. Take of Extract of Hyoscyamus, Extract of Aloes, Sulphate of Iron, each, one drachm, Extract of Nux Vomica ten grains; mix, and divide into sixty pills, two or three of which may be taken daily.

If menstruation is difficult, the Tincture of Gelseminum, either alone or combined with Tincture of Aconite may be administered, or, one of the following: 1. Take of Compound Decoction of Aloes two and a half fluidounces, Borax one drachm, Tincture of Aloes, Tincture of Castor, each, three fluidrachms, Cinnamon Water, a fluidounce and a half; mix. The dose is half a fluidounce or more daily. 2. Take of Tincture of Blue Cohosh, Tincture of Guaiacum, Tincture of Cinnamon, each, one fluidounce; Tincture of Belladonna, four fluidrachms; mix. The dose is from thirty to sixty drops three times a day, in a little water.—And so on with other conditions, as, recession of a cutaneous disease, scrofulous or rheumatic diathesis, suppression of perspiration, suppressed menstruation, syphilitic taint, etc.

The bowels must be kept regular; the functions of the skin and kidneys be attended to; the diet must be moderate but nourishing; the patient must avoid the least fatigue of the eyes, and a drop or two of solution of Atropine may be placed in them two or three times a week, at bed-time; neutral-tint glasses, without any green in them, should be worn; and on fine days the patient should walk out in the open air.

In the *exudative form*, the treatment is rarely as efficacious as in the preceding one. However, after having overcome congestion

when present, treat the complications, and remove the causes when we can discover them.

We may apply the Compound Tar Plaster to the back of the neck, and behind the ear, alternately; keep the bowels, skin and kidneys in as normal a condition as possible; administer internally the following preparation: Take of Chloride of Gold and Soda four grains, Water Distilled eight fluidounces, Muriate of Ammonia one ounce; mix and dissolve, and then add Compound Solution of Iodine ten fluidrachms and a half. The dose of this is thirty minims, three times a day, in a tablespoonful of water; and, after having used it thus for six or eight weeks, take only two doses per day. This preparation, which I now make known for the first time, will be found a very efficacious remedy in nearly all forms of chronic disease; I have employed it largely and successfully for the last twenty-five years, and consider a knowledge of it, to any physician, equal to a hundred times the price of this work.—Other agents, however, may be used, and frequently with benefit, as Iodide of Ammonium, Bromide of Ammonium, Bromide of Potassium, etc.

Frictions around the orbit, on the temples and cheeks, should be made every night and morning, and be continued daily for several months, with the following preparation: Take of Tincture of Arnica, Tincture of Conium Maculatum, Water, each, one fluidounce; Muriate of Ammonia two drachms; mix, and make a lotion.

The patient should avoid efforts at accommodation, prolonged reading or writing, great light, minute examinations, and should use neutral-colored glasses.—Section of the ciliary muscle has been followed by beneficial results in chronic choroiditis, with or without hydrophthalmia being an accompaniment, as well as pain, hardness of the globe, etc.

5. *Chronic Retinitis. Chronic Inflammation of the Retina.* Since the discovery of the ophthalmoscope, our knowledge of retinitis, like that of choroiditis, has been more correct. Acute retinitis is rarely met with in practice; but the chronic form is of frequent occurrence, being met with daily. By means of the ophthalmoscope we are enabled to distinguish it from sthenic or congestive amaurosis, with which it has been for a long time confounded. Chronic retinitis is hardly ever primitive; it is often accompanied with a certain degree of congestion or inflammation of the choroid, or else results from the compression produced by a sclerotitis which has existed for some time.

The *cause* of an affection so common is very important in a therapeutic point of view. Persons of feeble constitution, with clear complexion, light hair, eyes transparent and brilliant as a mirror, with a bluish sclerotica, and whose look presents a peculiar expression of mildness, appear predisposed to it. Their sight, although good, is easily fatigued, their ocular conjunctiva becomes injected readily, and if their business requires them to make prolonged efforts of accommodation, they expose themselves to a hyperemia of the retina, which, kept up by the continued action of the same causes, gradually progresses and ultimately terminates by determining material morbid changes in the texture of the retina.—The affection is frequently met with among watch-makers, engravers, and microscopists who constantly work with or use very strong lenses; among dyers, metal-forgers, and those mechanics who are nearly all the time in presence of very bright colors, as, scarlet, red or fire; and also among seamstresses, laundresses, and embroiderers, whose eyes are more or less constantly receiving the rays of light reflected from white surfaces. Persons who write or read constantly, and especially by artificial light, are also disposed to this malady; on which account, the constant reading of small print is very injurious. Among predisposing causes may also be named the excessive use or abuse of liquors, which facilitates hyperemia of the retina by favoring cerebral congestions; also venereal excesses, masturbation, use or abuse of tobacco, opium, etc.; and, frequently, nurses or mothers who suckle their children for too long a time, or who severely employ their eyes too soon after confinement, become attacked by this malady.

Retinitis, like choroiditis, presents two well-marked degrees; the first will be described under the name of Choroido-retinal and Papillar Hyperemia, and the second under that of Exudative Choroido-retinitis.

1. *Choroido-retinal and Papillar Hyperemia.* Retinal congestion may be either partial or general; in the first instance the papilla is more frequently in a state of hyperemia. The *anatomical symptoms*, as determined with the *ophthalmoscope*, are, a reddish aspect of the papilla, due to very minute vascular ramifications which extend from the center of the papilla to the surface of the retina. When the congestion is general, the whole fundus of the eye appears deep red, and the red papilla itself is so masked by the vascularity, that it is difficult to recognize it. At the same time, if, in consequence of some portion of the retina yet remaining normal, it be possible to discern the choroidal vessels, they will appear swoln and turgescent. The papilla seems to be blended altogether, or in

great part, with the rest of the fundus. Sometimes it will be so red as to resemble pannus of the cornea, or it may present the appearance of fascicular redness, similar to what we see in pustular corneitis, etc.

This first degree of retinitis, which has for a long time been confounded with *copyopia* or *fatigue of vision*, is remarkable for its *subjective symptoms.* Patients complain that working for a short time, or a lengthy reading or writing, produces uneasiness and heat in the eyeball. If they continue, their eyelids become heavy, they experience a feeling of pain and tension in the orbitar cavity, and their vision is disturbed. The letters, etc., seem to be confused, smaller than they are in reality; they seem to be displaced; the lines appear irregular, and, if they still persist in reading, etc., their eyes water, the pain augments, and a thick mist is spread over all objects. At the same time, they complain of seeing sparks, flames, black specks, cobwebs, etc., and luminous spots or shadows of various colors.*

2. The *Anatomical Symptoms of Exudative Choroido-retinitis*, as determined with the *ophthalmoscope*, are as follows: The fundus of the eye always appears blood-red, the papilla more or less covered with vascular ramifications; we may also discern small, whitish patches which mask and interrupt a portion of the papillar and retinal vessels. We must not confound these retinal exudations with those of the choroid, for, in these last, the retinal vessels pass

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* Desmarres says that hyperemia of the retina is exceedingly common. "The patients complain of an uneasy sensation in the eyes after reading or working. On commencing work, the sight is good, and remains so for a variable period; in some, for many hours; in others, for a few minutes only. There then supervenes a sensation of fullness and aching in the eyes, which feel hot and dry; the eyelids also feel dry and stiff; the sight becomes confused. If the patient be reading, the letters appear unsteady; and, if he persists, disappear altogether. In some cases there is slight temporary strabismus, and double vision. Some complain of acute pain darting through the eyeball; others of dull pain in the situation of the frontal sinus. Slight temporary relief is obtained by rubbing and pressing the eyes; but, as soon as work is recommenced, the symptoms return, and continue to increase. In more advanced cases, the pupil, though it does not lose its mobility, is generally much contracted; while the eye is being used, the cornea becomes of unusual brilliancy, and is surrounded by a faint circle of sclerotic injection, which disappears after an interval of rest; in some instances there are muscæ volitantes of various colors. These symptoms disappear, and there is good vision, in cases which are not of long standing, and in which the patient gives his eyes perfect rest; but, if the affection has lasted long, and especially if work has been persisted in, the impairment of sight becomes permanent; small objects can not be distinguished clearly, and large and distant objects are seen as through a veil. Ultimately hyperemia passes on to chronic retinitis."

in front of the exudation formed on the choroid, while, in the former, the vessels of the retina appear to be interrupted in their tract as far as the exudative patch extends. The central arteries and veins are larger than in health.

The *subjective symptoms* are pain or headache, but more frequently no ocular pains are complained of; fixed and dark muscæ are more or less constantly present; the vision loses its clearness, and becomes more or less completely obscured; there is an encroachment upon the visual field, in accordance with the seat and extent of the exudative spots; small, or distant objects, are no longer sharply defined; various spots, flashes of light, rings, brightly-colored spectra, etc., are complained of as annoying the eyes; and if the progress of the disease be not checked by proper treatment, vision will ultimately be permanently destroyed.—The *prognosis* of chronic retinitis like that of choroiditis is unfavorable; being rather more favorable in the first degree, or hyperemia, than in the second.

The *treatment* of retinitis rests upon the same basis as that of choroiditis. In the *first stage or form*, we must employ means to lessen the exalted sensibility of the retina, to remove the sanguine congestion, and to diminish the plasticity of the blood, in order to prevent the structural morbid changes which characterize the exudative period. We must also remove all causes which may produce the inflammation, endeavor to overcome the complications, and to prevent any relapses. To fulfill these indications, we make use of cold applications over the eyeball; sudorifics, diuretics, and cathartics, so as to remove the congestion, and produce a depletion of the lymphatic system; in addition to which, sinapisms may be applied alternately and for a long time to the temples, behind the ear, to the nape of the neck, and along the whole course of the spinal column. Every night a warm foot-bath should be had, and during the night the patient should have hot irons or bricks kept to the soles of his feet, as hot as can be borne.

When the more active symptoms have been subdued, (or when they are not present at all), cold applications to the eyes must be prohibited; the bowels must be kept regular; the functions of the skin and kidneys be attended to; and a few drops of Solution of Atropine may be placed in the eye every day or two, to keep up a dilatable state of the pupil. The eyes must be kept quiet and not be used at all for a long time, and the patient should wear an eye-shade with neutral glasses. Internally, the following may be given with advantage: Take of Sulphate of Quinia one scruple; Elixir of Vitriol one fluidrachm; mix, and dissolve, and then add Tincture of Black Cohosh fourteen fluidrachms. The dose is from twenty to

sixty drops, in a wineglass half full of water; to be repeated every four hours. And, if necessary, adopting such other measures as will strengthen and invigorate the nervous system generally.

In the *exudative form*, beside the means which have been named, we must employ powerful counter-irritants, as, the Compound Tar Plaster alternately to the nape of the neck, and behind the ear; with Croton Oil Liniment to the temples and in front of the ears; and active stimulating liniments along the whole course of the spinal column. The suppurative discharges should be kept up for a long time. Also give internally, in connection with the above preparation of Quinia and Black Cohosh, the Compound Gold mixture recommended under Choroiditis, on page 1440.

When the disease has been of long standing, and the phenomena of irritability of the retina have disappeared to be replaced by those of paralysis, to the preceding measures may be added local excitant applications, as, douches to the eye, of Water made stimulating by the addition of Brandy, Compound Spirits of Lavender, Tincture of Prickly-ash, or Tincture of Arnica, etc.; also stimulating ointments containing Ammonia, Strychnia, etc. The vapor of Bisulphuret of Carbon to the eye, will sometimes prove useful; and we may even have recourse to electricity or electro-galvanism, the action of which is undoubtedly indicated to recall the vitality of the retina. Hypodermic injections of Strychnia in the temporal region, may also prove useful. Yet, the prognosis is highly unfavorable.

6. *Syphilitic Choroido-retinitis.** Chronic or exudative syphilitic

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* A few remarks on the *acute* form of this disease may be proper here. It is characterized by excessive sensitiveness of the eyes; an intense photobia which obliges the patient to avoid the least ray of light and to seek darkened places; a general feeling of indisposition; pains in the head, heat and weight in the eyeball; and a marked disturbance in the function of vision. If the patient be questioned as to the presumed cause of the disease, he will attribute its appearance to the influence of such cause or causes as more commonly give rise to congestion of the retina. If we examine the affected eye, we observe nothing abnormal; there is neither redness nor swelling; the pupil preserves its mobility and its color, and the center of the eye appears transparent. The *ophthalmoscope* alone, will enable us to detect an intense injection of the fundus of the eye and a superabundance of vessels which nearly completely conceal the papilla of the optic nerve.

These symptoms, which indicate the first stage of the disease, improve rapidly under the influence of an antivenereal treatment, similar to that for iritis due to a syphilitic taint. But it frequently happens that the disease which commences in this manner, and of which we have not been able to discover the real cause, is only combated by other measures for the purpose of diminishing the congestion, but which are insufficient to destroy the specific principle which holds the inflammatory phenomena under its direct dependence, then the retinitis soon passes

retinitis is characterized by the presence of small whitish patches, *under ophthalmoscopic examination*, which are limited, regular, surrounded with a red-brown halo, and have their seat in the posterior segment of the eye. The papilla seems slightly prominent, and appears in a confused manner through a cloud of greater or less thickness, of a grayish color, and which is nothing but a syphilitic exudation. The retinal vessels are either engorged, or diminished in size; the retina appears œdematous, thick, and here and there may be observed masses of decolorized pigment, and a little disturbance in the posterior part of the vitreous body.

Patients laboring under this disease complain of a progressive, and sometimes a sudden diminution of their vision. Among the greater part, a large grayish or blackish spot appears in the center of objects at which they are looking, and which is called *scotomata*, or *muscæ volitantes*. Ordinarily syphilitic chorido-retinitis remains but a short time in the acute form, and often the chronic stage becomes established without any preceding acute phenomena. It usually attacks but one eye. Its progress is slow and irregular, and its *prognosis* is less unfavorable than that of idiopathic choroido-retinitis. It is subject to relapses, and always leaves some visual disturbances, which are due to the fact that the fundus of the eye never returns to its original color and transparency.

The *cause* of this malady is a syphilitic taint of the system, and it is rarely met with unaccompanied by secondary or tertiary syphilitic symptoms, as morbid conditions of mucous membranes, vegetations, ulcerations, exostoses, gummy tumors, etc., which it is important to discover. We may suspect it whenever the ophthalmoscope reveals limited exudations on the posterior segment of the choroid, and an œdematous infiltration of the retina and of the papilla.

The *treatment* will be similar to that named for Choroiditis of a syphilitic character, on page 1440; occasionally placing a drop or two of a weak solution of Atropia into the eye. The bowels, kidneys, skin, diet, etc., must not be neglected.

DISEASES CONSEQUENT UPON THE OPHTHALMIA.

1. *Conjunctival Xeroma*, or *Xerophthalmia. Cuticular Conjunctiva.*

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from the acute or congestive to the chronic or exudative stage, a frequent form, known commonly under the name of *syphilitic amaurosis*, not that the symptoms accompanying it tend to reveal its character, but because the antivenereal treatment, which is often resorted to as a last hope, proves efficacious and thus makes known the specific nature of the disease.

This is a rare affection, is sometimes congenital, but more frequently is the result of a chronic conjunctivitis, or a constant exposure of the eyeball to the contact of foreign bodies, as, dust, sand, the improper use of collyria, or too active ointments which disorganize the conjunctival tissue and suppress the mucous secretion designed to lubricate the eye and facilitate its movements. This morbid change of the conjunctiva is accompanied with considerable dryness of the eye, suppression of the lachrymal fluid, and loss of sensibility of the eyeball; the conjunctiva becoming thickened, corrugated, of a dusky appearance, and ultimately assuming a parchment-like appearance. If the epithelium of the cornea participates in the pathological alteration, the sight becomes impaired in proportion to its dimness, and may even disappear wholly.

The *treatment* is merely palliative. The conjunctiva may be bathed occasionally with a tepid liquid composed of Water one fluidounce, Liquor Potassa two or three drops. In the intervals, the Gold Collyrium named on page 1405–6 should be frequently applied. In addition to which, general hygienic measures should be adopted. Cures are very rarely performed. The application of Glycerin to the eye, two or three times a day, has been recommended as a palliative.

2. *Pterygium.* This consists of a morbid alteration or thickening of the conjunctiva and subjacent areolar tissue, with enlargement of the vessels of the part, which comes on slowly and insensibly, without any pain or uneasiness, in the form of a triangular growth, the base of which is almost always toward the oculo-palpebral surface, generally on the nasal side of the eye, while the apex is directed toward the cornea, either being arrested at the circumference of the cornea, or extending over its edge without, however, passing beyond its center. The disease may exist either on the nasal, temporal, superior, or inferior side of the eye, or upon two or more of these sides at the same time; when upon all four sides, it resembles a Maltese cross. It is more common among old persons than young; and very often extends so far over the cornea as to interfere with vision.

The *cause* of pterygium is involved in much obscurity. Its origin has been attributed to a chronic conjunctivitis, to the contact of foreign bodies drawn toward the inner angle of the eye by the lachrymal fluid, as, particles of dust, powder, sand, etc., and it appears to be common among seamen who have spent much of their time in tropical climates.

The disease usually commences on the white of the eye or con-

junctiva, that is by its base. The pterygium is then simply *cellulous*, (*pterygium tenue*), thin and semitransparent, and most commonly stops at the corneal circumference. At a later period, it may advance upon the corneal tissue and slightly disturb the visual functions. At other times, the pterygium is muscular, (p. crassum); thick, of a fleshy appearance, reddish, and furrowed by numerous vessels, having almost the appearance of a thin muscle; should this encroach upon the cornea it becomes a great impediment to vision, and interferes with the movements of the eye. If the disease be not treated, it will not disappear spontaneously; if improperly treated, it may degenerate into a fungous excrescence covering the whole cornea.

The *treatment* varies; sometimes it may be removed by frequent cauterizations with Sulphate of Copper, or Nitrate of Silver; or even by frequently dropping Wine of Opium into the eye. The best method, however, is that originating with Prof. A. J. Howe, and which he has used, to my knowledge, with great success. A small pencil of soft wood with one end as broad as the part near the base of the pterygium, is dipped into chemically pure Nitric Acid, and then wiped off with soft paper. The wood absorbs enough of the acid to produce all the cauterization desired, and prevent the caustic from spreading to the surrounding tissues. This is then gently applied upon the part above designated, or directly upon the largest of the vessels beyond the margin of the cornea; and its application may be repeated every three or four days, being careful to apply the acid always upon the same point, or as nearly so as possible. It occasions a severe burning pain, which soon passes away. The vessels soon contract or become obliterated, and the haziness of the cornea, as well as the pterygium, gradually disappear. The acid should be kept in a glass-stoppered vial.

A European oculist has recommended a layer of neutral acetate of lead, to be placed over the whole extent of the pterygium; allowing it to remain there for a few moments, and then removing it with a small pencil moistened with clear water. Repeat this for eight or ten days, when the morbid growth completely disappears. The application of a drop of Oil of Turpentine, once or twice a day, or once in every two or three days, has likewise been found very effectual in removing this and other deposits upon the surface of the eye. It should not be re-applied at any time until all irritation resulting from the last application has disappeared. This will also be found a very useful agent to remove habitual injection of the vessels of the conjunctiva; and which may likewise be often

removed by frequent applications of a solution of Hydrochlorate of Ammonia, six or eight grains to a fluidounce of Water.

When these therapeutic measures fail, the growth may be removed by an operation; raising the pterygium with a small hooked forceps, passing a small iris knife beneath its middle, being careful not to wound the sclerotica, and detaching it by cutting inward as far as the margin of the cornea, and no further, at which point the knife must be made to cut itself out. Then, still holding the growth with the forceps, separate the pterygium in the same manner, (or with a pair of curved scissors), toward its base, being careful not to extirpate the entire base, or encroach too near the semilunar fold, if it be an internal pterygium. It is not desirable to cut away from the sclerotica more of the conjunctiva, than has really become degenerated and unsightly; and, as a general rule, if the portion between the corneal margin and the center of the growth be excised, the rest of it will disappear more or less rapidly. I might say here, that as a general rule, unless the pterygium be very unsightly, or interferes with vision, it should be left alone.

3. *Pinguecula. Pterygium Pingue.* This is a small tumor of lenticular form, of a fatty appearance, yellowish color, developed in the subconjunctival cellular tissue, toward either angle of the eye. It is common to old persons only, and usually both eyes are affected. The *causes* of its production are not known, though supposed to be a natural alteration of the part. It never invades the cornea, nor occasions any inconvenience. No *treatment* is desirable unless it becomes large, when it may be raised with forceps, and snipped off with convex scissors.

4. The ocular conjunctiva may also be attacked with *tumors, cysts, polypi, fungous excrescences*, etc., which require *treatment* only when they become a cause of permanent irritation, or interfere with the functions of the eye and lids. They may then be removed with the curved scissors.

5. *Sclerotic Staphyloma. Choroid Staphyloma.* Inflammation of the sclerotica, wounds, bruises of the eyeball, etc., may give rise to one or several bulgings out, or, prominences of the coats of the eye. These prominences are due to the softening, thinning and distension of a portion of the sclerotica, and are termed "sclerotic staphyloma."

The affection presents itself under the form of a bluish black projection, of variable size from that of a pin's head to that of a pea, and placed near the margin of the cornea. In some instances there may be several projections by the side of each other around the cornea, the white of the eye being pervaded by engorged and varicose vessels, and the globe projecting between the eyelids. This affection has an unfavorable prognosis. It is the usual indication of an inflammatory condition of the deep-seated membranes of the eyeball, and always more or less wholly extinguishes vision, and, after a time, renders the eye liable to burst, from rupture of the membranes forming the tumor, and thus evacuate its fluid.

These staphylomatous projections are due to the bulging out of the choroid or corpus ciliare through the thinned sclerotica, and should not be confounded with certain blackish pigmentary patches which are sometimes observed on the sclerotica, but which do not disturb the functions of vision. These patches do not stand out in relief, are irregular, and always congenital. (*See* page 1419–20.)

The *treatment* of staphyloma is purely palliative, for the purpose of diminishing the size of the eye, and to lessen the pains caused by the distension of the globe, and which is generally effected by puncturing the projecting point. Or, the eye may be removed for the purpose of ultimately wearing an artificial one. Division of the ciliary muscle has been highly recommended in this affection.

6. *Opacities or Specks of the Cornea.* These usually attend acute or chronic corneitis, or else follow an injury to the cornea. They are superficial, central, or deep-seated; and are distinguished by different names, as follows:

a. Nebula. This presents itself under the form of a superficial, bluish-white, semi-transparent exudation, with its circumference so shaded off as to present no defined or precise limits, never projecting below the surface of the cornea, and occasions very slight disturbance in vision, the patients being able to see, but as through a cloud.

b. Albugo. These are formed by a more abundant, thicker, and better circumscribed exudation than the preceding, of a whitish, chalky, or pearly appearance, and is usually seated under the anterior elastic lamina of the cornea; sometimes it assumes the form of a whitish track setting out from the center of the cornea, and extending to its margin. When these opacities are central, they may completely prevent the person from seeing objects placed directly in front of him.

c. Leucoma. This is the result of an opaque cicatrix due to a

traumatic lesion, or to an ulcer of the cornea, according as their form is circular or linear. Leucomata have nearly the same characters as albugos. The difference, however, is, that in the first there is often an adhesion of the iris to the opaque corneal spot, or else when the eye is examined by oblique light the opacity will be observed extending backward even as far as the posterior surface of the cornea. In albugo, on the contrary, oblique light enables us to recognize in front of the spot, or behind it, the still normal and transparent layers of the cornea.

These three opacities do not always present themselves so well marked as theory would seem to indicate; it is, indeed, common to observe a speck presenting a leucomatous center surrounded with a halo of albugo. In this case, it is termed a mixed speck.

The *prognosis* of specks of the cornea is unfavorable in proportion to their extent, depth, and central proximity. When they are seated on the margin of the cornea, they disturb vision but little, though sometimes they occasion strabismus; if they are in the center of the cornea they cause *nystagmus*.

The *treatment* of opacities of the cornea is general and local. The first consists in the employment of tonics, alteratives, anti-scrofulous agents, etc., for it is more commonly at the termination of scrofulous ophthalmic affections that these opacities manifest themselves, and it is of great importance to modify the constitution and the temperament, if we desire to have any chances for removing the local lesion.

The second or local treatment demands great attention on the part of the oculist; it will vary according to the nature of the opacity, and according as the inflammation which has produced it is still impending, or has completely disappeared. In the first instance, we must treat the ophthalmia; in the second, the condition of the ocular membranes being in a proper condition, we must employ topical means for the purpose of favoring absorption of the plastic deposit which constitutes the opacity.

In *nebulæ*, we may employ one of the following collyria, viz.: 1. Take of Muriate of Ammonia eight grains, Sydenham's Laudanum twenty drops, Glycerin four fluidrachms; mix. 2. The Gold and Soda Collyrium, on page 1405–6. 3. The vapor of Hydrocyanic Acid. 4. The vapor of Bisulphuret of Carbon. 5. Sulphate of Cadmium two grains, Laudanum twenty drops, Rose-water four fluidounces; mix. If these agents prove inefficacious, we must have recourse to more active medication.

In *albugo*, we may employ an ointment of Borax or of Sulphate of Copper, or one of the following, viz.: Take of Iodide of Potas-

sium three grains, Iodine one grain and a half, Fresh Butter one drachm; mix well together. 2. Take of Cyanide of Zinc one part, Lard twenty-five parts; mix. 3. Caustic Potassa one grain, Extract of Opium four grains, Distilled Water one fluidounce; dissolve and filter. Some of the European oculists employ a collyrium composed of equal parts of Cod Liver Oil and Walnut Oil. And, sometimes, when the speck has a cretaceous appearance, the following: Take Walnut Oil one drachm, Cod Liver Oil one drachm and a half, Caustic Potassa four grains and a half; mix, and apply with a small camel's-hair pencil.—Equal parts of Oil of Turpentine and Oil of Sweet Almonds, mixed together, will also be found an excellent application.

In *Leucoma*, powders are generally preferred, thus, Urate of Ammonia may be placed in the eye by means of a camel's-hair pencil; or, a mixture of Iodide of Potassium twenty-five grains, Powdered Orris, Rock Candy, each, one grain; mix. Nitrate of Bismuth fifteen grains, Red Precipitate seven grains and a half, Sugar one drachm, mixed well together, has been recommended, but I have never used it. If the opacity does not cover a great portion of the pupil, it may be dilated with a solution of Sulphate of Atropia; or else, if this artificial dilatation is insufficient, the operation for artificial pupil may be performed.—Section of the ciliary muscle is said by eminent oculists to have been attended with marked benefit in leucoma.

It may be proper to state here, that, although these applications do sometimes cause the opacities to disappear, yet, as frequently they will pass away without the employment of any local means whatever. In young persons they are always absorbed much more rapidly than in old ones. It is useless to attempt the removal of an old speck, with abruptly-defined margins; though I know of one instance in which such an one was successfully removed in twelve or fourteen weeks, by the careful application of pure Nitric Acid upon the opacity, by means of a piece of soft wood, pointed, the application being repeated every four or five days.

7. *Ulceration of the Cornea.* Ulceration of the cornea may occur as a consequence of purulent and scrofulous ophthalmia, inflammation of the external coats of the eye, of great debility of the system, of disease of the fifth pair of nerves, etc. The ulcers may be superficial or deep-seated, the former, of course, being less unfavorable than the latter; also, an ulcer near the edge of the cornea being more favorable to vision than a central ulcer.

Some ulcerations are in the form of facettes (or planiform), resulting from a kind of wearing or abrasion of the most superficial parts of the cornea at a limited point. They are flat, round, and transparent, often passing unperceived unless by careful examination with oblique light. They almost always follow a semi-transparent phlyctenula, and their cicatrization is obtained with difficulty. They may likewise be produced by an injury. *Other ulcers*, again, are cupuliform or cup-shaped, resulting from the rupture of a pustule, or the evacuation of an onyx. They usually extend deeply into the cornea, are round, funnel-shaped, of a grayish aspect, and are almost always seated at the center of the cornea; their prognosis is still more unfavorable than the preceding. A *third variety* of ulcers are annular, and, more frequently, are a complication of purulent ophthalmia, having their seat ordinarily at the margin of the cornea. They always coincide with a considerable chemosis, and threaten complete destruction of the cornea. Their prognosis is eminently unfavorable. A *fourth variety* resembles a scratch, which has the form of a segment of a ring, and is met with at the corneal circumference. Its margins present a slight opaline cloud, and are not vascular. They are more readily cured than either of the preceding kinds.

These several varieties of ulcerations may at length assume particular characters, and mask themselves with a grayish-white detritus, a sloughy-looking matter, which interferes with their progress and cure; they are then called *pulpy*, or *atonic ulcers*. They are frequently followed by perforation of the cornea, and leucoma.

The *treatment* of ulcers must be in accordance with the opthalmia or cause which has given rise to them. Generally, when the inflammatory disturbance is arrested, the ulcers will soon heal; and when we find the ulcer is healing, the best plan is not to disturb it, save by occasional tepid ablutions. If palpebral granulations be present, they should be properly attended to. Where there is a tendency to spreading of the ulcer, attended with considerable debility, tonic and stimulating treatment will be indicated, as, the Collyrium of Golden Seal, Tincture of Capsicum, etc., on page 1429. In cases of great vascularity and superficial ulcerations, the vascular fasciculus may be divided, and the edges of the ulceration be lightly touched with the end of a well-polished crayon of Sulphate of Copper; if cicatrization goes on slowly, it may be stimulated by the Gold Collyrium named on page 1405–6. Dr. Dixon highly recommends a drop of perfectly fresh Castor Oil or Sweet Oil to be occa-

sionally placed upon the corneal surface in cases of abrasion of the cornea, or superficial ulceration; it affords instantaneous relief.

If the ulceration is central, and threatens to perforate the cornea, the pupil should be kept largely dilated with a solution of Atropia; if, on the contrary, it is at the circumference, some drops of Laudanum, or of a solution of Calabar Bean may be placed upon the eye to contract it, and thus oppose a prolapse or hernia of the iris. This opiate application is also useful on account of its anodyne influence.

When the ulcers are very indolent, and appear to be slowly augmenting either in breadth or depth, they may be touched with a solution of Salt, one part to fifteen or twenty parts of Water; or with a solution made by adding half a drachm of Tincture of Aloes to one fluidounce of Water; or, the Collyrium referred to above, composed of Golden Seal, Tincture of Capsicum, etc. Among the other means which have been found very successful in the treatment of ulcers of the cornea, are applications of solution of Vegetable Caustic, Compound Tincture of Myrrh, or, Tincture of Capsicum; these are painful, but exceedingly efficacious. They should be applied once or twice a day, and of full strength, if the patient can possibly bear it. In obstinate cases, the Compound Tar Plaster placed behind the ear, and over the nape of the neck, alternately, will prove of great value in the treatment. Constitutional and hygienic measures must be fully attended to, according to the indications present; they are of as much importance as the therapeutical means.—A mixture of one part of Cyanide of Zinc with twenty-five parts of Lard, applied once or twice a day, has been found effectual in healing ulcers of the cornea, and absorbing opacities.

8. *Onyx and Abscess of the Cornea.* *Onyx* or *Unguis*, is an exudation of yellowish matter formed between the lamellæ of the corneal circumference, and exactly resembling in form the white mark at the root of the nails. It is a symptom complicating some external ophthalmic affections, and generally appears at the inferior margin, though sometimes, it may be seated at any part of the cornea, even over the pupil. The seat and form of onyx is not disturbed by a change in the position of the patient's head. Onyx should never be punctured; the proper *treatment* for it, is, the removal of the particular ophthalmia in which it originates. If not cured it is apt to occasion destruction of more or less of the cornea, etc., and perhaps loss of vision. Warm Anodyne fomentations to the eye, Compound Tar Plaster alternately to the nape of the neck

and behind the ear, Iodide of Ammonium internally, and solution of Atropia to maintain dilatation of the pupil, are the means to be depended upon for a cure, if this be at all possible, aided by proper hygienic measures.—Sometimes, local applications every day or two of equal parts of Oil of Turpentine and Oil of Sweet Almonds, continued for several months, will answer an admirable purpose.

Abscess of the Cornea forms in the same manner, and under the same circumstances as onyx. It is sometimes superficial, and sometimes deep-seated, and ruptures externally, producing an ulcer which ultimately cicatrizes, or, inwardly, giving rise to *hypopium*, in which the matter is effused into the anterior chamber. In some fortunate cases this matter is gradually absorbed. The treatment for abscess is the same as that for onyx.

9. *Hernia of the Cornea. Keratocele.* This occurs when a portion of the thickness of the parenchyma of the cornea has been destroyed, or, when the part which remains has no longer a sufficient resistance to support the pressure of the fluids of the eye which are pushed forward. The hernia has the form of a small, thin vesicle, sometimes opaque, sometimes transparent, and which disappears under pressure. Once produced, it may remain stationary for a long time, or it may rupture and give rise to numerous unpleasant results. The predisposing *causes* are wounds and ulcerations of the cornea; when the latter exist, sneezing, coughing, blowing the nose, straining at stool, etc., may cause the thinned cornea to give way and protrude through the ulcer.

The *treatment* consists in keeping the pupil well dilated, to prevent the iris from being involved, and then lightly touching the *ulcer* with Sulphate of Copper, or solid Nitrate of Silver; or applying pure Nitric Acid to its edges, by means of a soft-wood porte-caustic.

10. *Perforation of the Cornea*, from wounds, is almost always followed by an immediate loss of sight. Perforation from ulceration, may be central, or peripheral. In the former instance, the iris has but little tendency to protrude between the lips of the solution of continuity, but, on the contrary, the cicatrization always gives rise to an opaque leucoma which may destroy the visual function; or else, to a fistula, especially when the perforation is considerable. In the latter instance, hernia of the iris more readily occurs, and is almost always produced; then the pupil becomes deformed, even

wholly disappears, adhesions take place, and the sight is lost. In either case the *prognosis* is very unfavorable, and it is seldom that an incurable blindness does not result. The only chance of cure is dilatation of the pupil, kept up by means of solution of Atropia.

11. *Fistula of the Cornea* is the result of a corneal perforation, which does not fill up and heal; sometimes giving issue to the aqueous humor. It involves the fundus of the eye, and loss of sight. The *treatment* which has been recommended is, to cause the engagement of the iris in the fistulous opening and to favor its adhesion to the fistulous walls, for the purpose of preventing the eye from discharging its contents.

12. *Vascular Cornea. Vasculo-nebulous Cornea. Pannus.* This disease is characterized by a vascular state of the cornea, and a thickening of its epithelium or conjunctival layer. When present in a slight degree, it is named "vascular cornea;" and when the thickening and vascularity is so great as to appear as if a reddish foreign substance was lying upon it, it is termed "pannus." This reddish thickened mass has been likened to a piece of red cloth, or a red cherry; but I think with a lack of accuracy. Pannus, however, does not require to be red, as the term may be equally applied to exudations which remain after the inflammatory symptoms have disappeared.

Pannus is the result of chronic ophthalmic affections, and principally the granular forms. At first, it exists in the form of a white web or veil, semi-transparent, with very small vessels pervading it, still allowing the pupil to be perceived, and occasioning only some disturbance and confusion in the visual perceptions; it is then called *membranous pannus*. But frequently the vascularity increases, the membrane becomes thicker and organized, a plastic exudation is formed, and the pannus assumes a reddish aspect analogous to that of erectile tissues; it is then called *fleshy pannus*. The deep-seated parts are then entirely hidden, sight is almost wholly destroyed, and this protuberant mass becomes the seat of severe pains, hemorrhages, and various inflammatory attacks attended with photobia and weeping of the eyes. The first form is more frequently met with in practice; the latter variety is rare.

The *treatment* consists, first, in removing the causes giving rise to the growth, as, inflammation, granulations of the palpebral conjunctiva, evulsion of inverted eyelashes, etc. After which, if the

pannus still remains, it may be carefully touched every two or three days with Perchloride of Iron in solution, or pure Nitric Acid. Blennorhagic inoculation has been recommended by some eminent oculists, and has been successful especially in cases where the matter used was taken from the eye of an infant affected with purulent ophthalmia; it must be recollected, however, that this method is not always followed by success, and that in many instances it has occasioned a complete destruction of the eye.—Fleshy pannus, if it can not be removed after a fair trial of one of the above agents, may require to be removed by a surgical operation.

13. *Conical Cornea. Hyperkeratosis. Staphyloma Pellucidum.* This is a rare disease, almost always attacking both eyes at the same time. It is characterized by a particular deformity of the cornea which protrudes in the form of a cone without losing its transparency, and which may be readily observed when viewed in profile and by oblique light. From a distance, the eye presents a peculiar bright and sparkling appearance, as if a tear were hanging on the center of the cornea. Viewed in profile, the cornea looks like a drop of water, or like a solid piece of glass projecting from the front of the eye. The center of the cornea, one side of it, or the whole of it, may be involved in the projecting cone. Sometimes the conical portion may be nebulous or opaque. At first it is accompanied with more or less myopia, and at a later period with disturbance of vision. Its development is very gradual and sometimes, after reaching a certain degree of projection, it remains stationary.

The *treatment* of this affection consists in the use of very concave glasses; when the cone has become more developed, a blackened thin metal or horn plate, pierced along the middle with a very narrow slit may be substituted for the glasses, or be worn in front of them. At a still further advanced period, it has been recommended to evacuate the aqueous humor by puncturing the cornea at any convenient point near its edge, and exercising gentle and uniform pressure upon the eyeball. Dr. Bowman, of London, proposes an operation to favor adhesion of the margin of the pupil to the cornea. I have no knowledge of its success.—Division of the ciliary muscle has also been found advantageous in many cases.

14. *Excrescences of the Cornea.* Sometimes excrescences or morbid growths are developed on the cornea. Their *treatment* consists in

the use of dry Collyria, Perchloride of Iron, slight cauterizations, or removal with curved scissors, or the knife.

15. *Arcus Senilis. Circulus Adiposus. Gerontoxon.* Is a whitish opacity developed in the form of an arc or ring, of greater or less breadth, and situated just within the circumference of the cornea, leaving between it and the sclerotica, a portion of the cornea still transparent. This change is due to a fatty degeneration of the corneal substance, the result of a deficient vitality of the cornea. It is almost always met with among old persons, does not interfere with vision, and requires no treatment. It is often an accompaniment of heart disease.

16. *Hernia of the Iris. Irido-corneal Staphylomæ.* Hernia of the iris may be caused by everything susceptible of producing perforation of the cornea, as, penetrating wounds, ulcerations, scrofulous, purulent, granular, and other forms of ophthalmia. In the more simple cases, the cornea is perforated, the aqueous humor flows out, the iris collapses upon the cornea, and partly engages betwen the lips of the wound. The hernia is then formed, and presents itself as a small, round, grayish or black tumor, very much resembling the head of a fly, and is termed *myocephalon.*—If the solution of continuity is more extensive, instead of a small tumor, we will observe a flattened protuberance, somewhat resembling the head of a nail, and termed *clavus.* When the cornea has several apertures in it, the iris protrudes partly through each of them, and the tumor, resembling a small bunch of grapes, is termed *staphyloma racemosum.*

The different varieties of protrusions of the iris produced at the expense of the corneal substance, commence as described. The tumor once formed, ulceration ceases, the aqueous humor reaccumulates, and the iris returns to its normal position, or else becomes inflamed and forms adhesions with the lips of the wound, which is termed *anterior synechia.* In this case, the patient has the sensation of a foreign body under the lids, with epiphora, photobia, and more or less violent pains which remain as long as the inflammation is not subdued, the iris gradually becomes flatter, leaving only a hardly perceptible projection beneath the cornea. If the inflammation progresses, either because the treatment employed is inefficacious, or from the contact of air, dust, friction of the eyelids, etc., the tumor of the iris becomes organized and assumes the aspect of a purple mushroom, with a fungous appearance which ultimately becomes a thick and resisting membrane, of the nature of cicatricial

tissue, and blended at the base with the remaining healthy portion of the cornea; thus constituted, the tumor is called *partial staphyloma of the iris and cornea.*—As to *total staphyloma*, the mechanism of its formation is the same.

The progress of these several kinds of staphyloma is variable; sometimes they remain stationary after having acquired a certain development; at other times they increase in size, degenerate, and terminate by rupturing, furnishing a ready issue to the humors of the eye, which flow outside, leaving only a deformed stump which retracts to the base of the orbitar cavity.

The *treatment* of hernia of the iris at the commencement when there are no adhesions, or when these adhesions are slight, consists in reducing the hernia. For this purpose a few drops of a weak solution of Atropia may be dropped upon the eye, and frictions of Belladonna Ointment may be made upon the eyelid, and around the orbit. Gentle friction upon the superior lid, will aid in reducing the hernia.—At a later period when the adhesions are firm or when the tumor is staphylomatous, and presents the appearance of an organized fungous mass, the eye is lost forever, and it only remains to cut away the tumor.

17. *Synechia* is the term applied to a morbid adhesion of the iris,—generally its pupillary margin,—with the cornea, or with the anterior capsule of the lens; in the first instance it is termed "*anterior synechia*," and in the latter, "*posterior synechia.*"—Anterior synechia may, as has just been named, follow hernia of the iris, but it also supervenes upon simultaneous inflammation of the cornea and iris, may follow effusions of pus or lymph into the anterior chamber which wholly or partially disappears according to the degree of adhesion.

Posterior synechia is generally the result of iritis, and in this case the iris appears concave in front, the anterior chamber is larger and the posterior smaller; the pupil is almost always contracted, and often filled with plastic exudations.

The *treatment* of these affections consists in keeping up dilatation of the pupil by a mydriatic solution; and if the pupil is obstructed by false membranes (*atresia of the pupil* or *atresia iridis*), the operation for artificial pupil may often be successfully practised. (*See Treatment of Chronic Iritis*, page 1432.)

18. *Tremulous Iris. Iridonesis.* Trembling of the iris is a phenomenon which is always symptomatic of an affection of the eye-

ball. It consists in oscillations of this diaphragm forward and backward whenever the eyeball is rapidly moved about. It is observed in a fluid state of the vitreous humor, hydrophthalmia, and following the operation for cataract by depression, and in some old amauroses. It affords an unfavorable index of the state of the vitreous humor, and perhaps, of the retina; and is incurable.

19. *Tumors of the Iris.* The iris is occasionally the seat of condylomatous, vascular, and fungous growths, cysts, etc. These affections are very rare, and their treatment is wholly surgical.*

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* A few brief remarks may be given here, concerning the *Operation for Artificial Pupil.* This operation has for its object the formation of a new opening in the iris when the natural pupil is marked by an indelible spot, or when it is obstructed by false membranes interfering with its functions. It is one of the finest and most important operations in ocular surgery. It may be advantageously performed: 1. When the pupil is masked by a spot on the cornea which can not be cured; 2. When the pupil is completely obstructed by plastic deposits, or false membranes; 3. When there is an anterior synechia, and the pupil is masked by a spot; and 4. When a cataract is complicated with posterior synechia with considerable contraction of the pupil. These are the lesions which require the formation of a new pupil, but we must ascertain previously that there exists no contra-indication to the operation. Thus, we must never operate, 1, when one of the eyes is capable of seeing; 2, when the other eye is affected with simple cataract, in which case, we will at first operate for the cataract, and if sight thereby becomes restored we leave the other eye to itself; 3, when that portion of the cornea which is to correspond with the pupillary orifice of the new formation is not wholly transparent; 4., when there is glaucoma, amaurosis, hydrophthalmia, paralysis of the retina, total staphyloma of the cornea, atrophy of the eyeball, inflammation of one of its membranes, softening of the vitreous humor, etc., or when there are evident indications of a constitutional affection; in all other instances, the operation is practicable, and the oculist may select for the purpose one of the following three methods:

1. *Incision*, (*iridotomy*, or *coretomia*), which simply consists in an incision of the iris.—2. *Excision*, (*iridodialysis*, or *coredialysis*), or method of laceration or separation *from* the ciliary ligament.—3. *Separation*, (*iridectomy* or *corectomia*), which consists in excising a portion of the iris.—Of these three proceedings, the first is but little employed, and does not give very satisfactory results. The second, on the contrary, frequently succeeds, but it may give rise to formidable inflammatory phenomena, because of the seriousness of the wounds of the iris from laceration. The third is the one to which preference is almost always given.

Having carefully devised the position in which the artificial pupil can best be made, the surgeon penetrates the cornea, close to its junction with the sclerotica, with a broad cutting needle, so as to enable him to pass in readily a small blunt hook, which he firmly fixes in the portion of the iris to be removed; then, he rotates the handle of the instrument so as to bring the convexity of the short, bent part of the hook forward or toward the cornea, and gently and slowly withdraws it and a portion of the iris at the same time. An assistant, standing

20. *Hydrophthalmia. Anterior Hydrophthalmia. Dropsy of the Aqueous Chambers.* This is a frequent consequence of corneitis, and consists of a morbid accumulation of watery fluid in the aqueous chambers. It may also follow other affections of the eye.

The *symptoms* are as follows: The cornea is uniformly larger or more prominent than usual; sometimes it increases in diameter and becomes thinner, instead of projecting; it may be transparent, a little cloudy, or opaque. The sclerotica around the corneal margin will be distended, thinned, and of a bluish color, with enlarged, tortuous vessels on the conjunctiva. The iris appears dark, dull, more or less immovable, sometimes tremulous; the pupil is in a medium state between contraction and dilatation, with its internal margin sunk backward, and the lens more or less opaque; the lids close over the eyeball with difficulty; and the patient complains of pressure and distension in the eye, with short-sightedness, and muscæ floating before the eyes.

As the disease advances, the iris contracts adhesions to the opaque capsule, becomes torn and absorbed from dilatation of the surrounding parts; objects appear multiplied; the eye, at first hard to the feeling, becomes flexible from thinning of the cornea and sclerotica; the globe is moved about with difficulty; amaurosis, and even total blindness may supervene; the retina becomes insensible; and the eye atrophied. The *prognosis* is almost always unfavorable.

The *treatment* consists in purgatives, diuretics, sudorifics, Compound Tar Plaster alternately behind the ears, and to the nape of the neck, solution of Chloride of Gold and Soda, on page 1405–6 to the eye, and moderate diet. Jumping or anything else that will give rise to a shock, blows, etc., should be avoided, as the eye may thereby be ruptured, from the distended and thinned condition of the cornea. Paracentesis oculi, or puncturing the eye has been advised, but I have little confidence in it. The general health of the patient must be improved by every appropriate means.

21. *Dropsy of the Vitreous Body. Posterior Hydrophthalmia.* The symptoms in some respects resemble those of the preceding dropsy. The eye is very hard to the touch; there is pain in the eye from

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ready with a pair of fine scissors, cuts through the iris, in the required direction, and close to the hook or further from it, as the orifice is designed to be small, or large. Any portion of the iris which may hang in the corneal wound is carefully returned into the aqueous chamber, by means of a little spatula, and the wound soon heals. Many instruments have been recently devised to facilitate this operation, and dispense with the necessity for an assistant.

the commencement, which increases in severity, and extends to a great distance in the neighboring parts; the aqueous humor is diminished; the iris pressed forward, perhaps in contact with the cornea; and loss of sight occurs.

The *treatment* is the same as recommended in the preceding section, but it will rarely be of service, from the fact that the vitreous humor is in a dissolved state. As the dropsy is generally connected with an impaired or scrofulous condition of the system, the remedies should be especially addressed to the condition present; and to afford relief to the patient from his excessive pain, the vitreous humor may be diminished in quantity by tapping the eye through the most prominent part of the sclerotica and choroid, or else, about two lines beyond the margin of the cornea; after the tapping, gentle pressure should be kept for some time upon the eye by compresses moistened with a solution of Muriate of Ammonia. Continuing the other treatment.

22. *Hypopium. Hypopion.* This is a collection of pus or purolymph in the anterior chamber of the eye. It is frequently observed in corneitis and iritis. The matter is of a yellow aspect, and, being heavier than the aqueous humor, it sinks to the bottom of the anterior chamber, its superior surface forming a horizontal level line; when not too thick and viscid, it will shift its position as the head is moved from side to side. *True* hypopium is where the pus proceeds from the walls of the aqueous chambers; and *false* hypopium where it proceeds from a rupture inward of an abscess of the cornea. But there is hardly a reason for this distinction. In *onyx* the exudation appears nearer the surface of the cornea than in hypopium, and is never movable. Hypopium and Onyx may, however, exist together at the same time.

Hypolympha is a term applied to an effusion of lymph instead of pus, in the chambers of the aqueous humor, and which sometimes occurs in iritis.

Hæmophthalmos. Hypæmia, or a sanguineous effusion into the eye, more commonly results from blows, injuries to the iris, etc., and is recognized by a red mass floating in the aqueous humor, which is more or less speedily absorbed, according to the healthy condition of the eye. This effusion may also be vicarious of menstruation, or be due to syphilitic or rheumatic inflammation, etc., and, at times, may occur without any attributable cause. It has also occurred in purpura hemorrhagica.

The *treatment* of *hypopium* and *hypolympha* rests entirely upon the

removal of the inflammation giving rise to it, which, when accomplished, will, as a general rule, be followed by a disappearance of the matter. Should this fail, the eye should be bathed with the Gold Collyrium on page 1405–6; counter-irritation should be applied to the nape of the neck and behind the ears, alternately; the eye should be exposed for ten or fifteen minutes daily to the vapor of hydrocyanic acid, or of bisulphuret of carbon; the bowels be kept regular; the skin be attended to; and either Bromide or Iodide of Ammonium be administered internally. The cornea should by no means be punctured, as has been recommended; beside, if this were done, the matter being so thick it would not flow out. But, if there is so much matter as to threaten rupture and entire destruction of the eye, by giving exit to it, we relieve the patient, and preserve a form of the eyeball that will admit the wearing of an artificial eye.

In *hæmophthalmos* absorption may be favored by cold applications, Arnica, St. John's Wort, etc., with purgatives, and internal use of Bromide or Iodide of Ammonium. Keeping the eyes shaded, the pupils under the influence of Belladonna, and employing the proper measures for the constitutional conditions. Very rarely, puncture of the cornea is admissible. In those effusions coming on spontaneously, vicariously, or from disease, the prognosis is apt to be still more unfavorable than with the others, as, frequent recurrences terminate in destruction of more or less of the structures of the eye.

Cysticercus is the name applied to a worm or hydatid observed in the aqueous humor. It is of very rare occurrence, and almost invariably destroys vision.

DISEASES OF THE CRYSTALLINE SYSTEM.

1. *Cataract.* This is a partial or complete opacity of one or several of the parts composing the crystalline system. Its *causes* are numerous. In some instances, the opacity is the result of a prick, a blow, or a violent concussion of the eyeball, and is then termed *traumatic cataract.*

More frequently, it is developed without any attributable cause, without being preceded by an inflammation of the eye, and, in a word, without being able to associate it with any substantial cause. Considerable obscurity is still connected with the etiology of cataract. It is undeniable that it is hereditary; all observers agree on this point. Climate also appears to exert an influence in its pro-

duction, as the inhabitants of the East, and particularly those of Egypt, are very subject to it; it is also met with more frequently in the northern parts of France than in the southern. Again, old persons are more frequently affected with it than young. Infants are not free from this malady, as it is sometimes met with among them from birth, and is then termed *congenital cataract.* A European physician has thrown out the opinion, based upon his anatomical investigations, that cataract is intimately associated with atrophy of the anterior part of the choroid, the same as lesions of the vitreous body are under the direct dependance of atrophy of the posterior portion of the same membrane. It is to be hoped that this first step toward a knowledge of the morbid changes of the internal eye will lead to important results in the way of treatment.

The *objective symptoms*, supposing for clearness of description that the cataract is fully formed, are as follows: The first thing which strikes our sight is a speck situated behind the pupil, generally of an ash color, steel-gray, or bluish-white, more opaque sometimes at its center, at other times at its circumference. In the second place, if we place the patient obliquely near a window, we will observe a blackish circle delineated upon that part of the opacity corresponding to the pupillary orifice. This phenomenon, called *shadow thrown by the iris*, is easy to explain; if we place a ring of iron, for instance, between a lamp and a sheet of white paper, at a certain distance, and then look at it obliquely, the shadow of the ring will be seen upon the paper; in the eye, the pupil may represent the ring, and the cataract the white paper. As will be observed hereafter, this phenomenon, which is appreciable in certain kinds of cataract, is incomplete or wholly wanting in some others, especially in soft and fluid cataracts. These symptoms, the opaque spot and the shadow thrown by the iris, always indicate the presence of cataract. The existence of the subjective symptoms will render the indication still more certain.

The *subjective symptoms* are as follows: Sometimes, the patients state that their affection commenced by a disturbance of vision, which caused them to discern objects, at first, as it were, through a thin cloud, but which gradually became thicker. At other times, they say it commenced by seeing spots of various forms and colors floating for some time before their eyes, as, a thread, a hair, a fly, a spider's web, etc., which disappeared and returned at indeterminate intervals. Patients have also been heard to complain that their sight was worse in the morning, or on a bright sunlight day, and better toward evening, or in the shade. There are also some who observe that if they look at the flame of a lamp or candle, it appears

to them as if surrounded by a circle of fire of a much larger size than the flame itself.

As the opacity increases, the visual sensations gradually become more and more confused, distant objects can not be perceived, and ultimately the patient can only tell day from night. These symptoms are the most common, and are those to which the attention of patients is usually given, and which demand the consideration of the oculist.

The *progress* of cataract is very variable. With some subjects the opacity becomes complete in a very little time, even suddenly; with others, on the contrary, it is not matured until two, three, or even ten years have passed. It has also been observed that the disease progresses more rapidly in one eye than in the other, and there are some with whom the cataract will be complete in one eye, while it has hardly commenced in its congener. This great variability in the progress of the disease renders the prognosis very difficult.

We have defined cataract to be an opacity of one or several of the parts composing the crystalline system; this consists of the crystalline lens, the anterior capsule, and the posterior capsule. Each of these parts may become singly or simultaneously opaque, giving rise to the several varieties following, viz.:

A. Lenticular or *True Cataract.* When the term cataract is made use of without any designation, lenticular cataract is ordinarily meant. It presents three different examples, which it is very important to know, as, *hard*, *soft*, and *fluid cataracts.*

a. Hard Cataract is more frequent among old persons than adults. It is generally of small size, is rather distant from the pupil, which last preserves all its movements and free action, and the shadow thrown by the iris is very apparent upon the cataract. The opacity almost always commences in the nucleus of the lens, and gradually diffuses itself toward its circumference. It is dark ash-colored, or greenish-yellow; occasionally it has been found black. It progresses slowly; vision in this, is relatively less disturbed than in the other varieties, for more commonly the patient preserves for half a day the faculty of distinguishing small objects when very near to him. The green, gray, black, bony, and stony cataracts of some authors may be ranked in this first category.

b. Soft Cataract may occur also among old persons, but it is still more frequently met with among adults and children; it progresses in an inverse direction from the preceding, that is to say, the opacity extends from the peripherical layers to the central. Ordinarily it commences by one or several opaque striæ, emanating from the surface of the lens, like rays emanating from the center

of the circumference of a circle. At first, these striæ only are opaque, but the portions of the crystalline substance comprised between them, and which yet preserve their transparency, become turbid at a later period, and assume a tint analogous to that of the striæ. At length, the nucleus itself participates in the morbid change; the soft cataract is then matured or complete, and presents a uniform, general, bluish-white, milky, or sometimes yellowish-gray, color. Its size is considerable; the posterior chamber exists no longer; the iris is pushed forward, and its movements are difficult or even wholly abolished; and, lastly, the shadow thrown by the iris is either partly or completely wanting.

The progress of this variety of cataract is more rapid than that of the hard kind; though, sometimes, it may require a number of years before it becomes completed. Vision is but little disturbed at the commencement; but, if the opacity advances, it diminishes slowly, and terminates in total abolition, so that the patient can hardly distinguish day from night. Cataracts with three branches, striated, stellated, dehiscent, dotted, barred, glaucomatous, etc., make part of this second type of lenticular cataracts.

c. Fluid Cataract. In this form, the opacity always commences at the circumference, or at least throughout the whole extent of the lens. Its color is uniform, and ordinarily of a dull white, milky, or yellowish, without striæ or rays. Its size is very considerable; the uveal circle is very apparent, the iris is strongly projected forward, the movements of the pupil are impossible, and there is no shadow thrown from the iris. The progress of this form of cataract is slow at first, but, after a little time, when dissolution of the substance of the lens is somewhat advanced, it is rapid. It often results from a traumatic cause.

The disturbance of vision is very considerable. Sometimes, when the cataract is wholly fluid, the complete absence of sensibility to light, and immobility of the pupil, may cause one to believe it complicated with paralysis of the retina; but a phosphenic examination will aid in dissipating doubts and enlightening the diagnosis. In this third category are ranked Morgagnian or interstitial, cystic, and purulent cataracts.

The following is a resume of the differential characters of the preceding cataracts:

LENTICULAR OR CRYSTALLINE CATARACTS.

HARD CATARACTS.

They more generally develop themselves among old persons.
They are of small size.
The shadow thrown by the iris is very apparent upon them.
The uniform opacity progresses from the center to the circumference.
They are never whitish, but grayish-blue or dark ash-colored; in some cases, greenish or black.
Sight is less disturbed than in the other varieties.
The pupil is very mobile.
The progress of the disease is slow.

SOFT CATARACTS.

They more generally develop themselves among adults.
They are of considerable size.
The shadow thrown by the iris is hardly apparent.
The opacity is not uniform; it is more frequently striated, and progresses from the circumference to the center.
It is milky-white or bluish.
The sight is more disturbed.
The pupil is less movable.
The progress of the disease is variable; sometimes it is very rapid.

LIQUID CATARACTS.

They are more generally developed among children.
They are very large.
The shadow thrown by the iris is null; the black uveal circle is very apparent.
The opacity is milky-white.
The anterior surface of the capsule appears convex.
Vision is very much disturbed.
The pupil is restrained, and often immovable. The progress of the disease is much more rapid than the preceding.

B. CAPSULAR CATARACT has its seat either in the anterior or posterior walls of the crystalline capsule. It is almost always the result of an exudation of plastic matter emanating from the surrounding parts, and especially from the iris. This cataract is, also, frequently complicated with adhesions of the iris, and, in its progress is subordinate to the causes which produced it.

a. Anterior Capsular Cataract. The opacity is presented under the form of a chalky or pearl-white spot, with an unequal surface, and speckled with small vegetations or rugous asperities of various tints, sometimes brilliant, and especially appreciable when the eye

is examined by oblique light. This spot appears to be very close to the iris, on a level with the pupillary margin, the iris is often decolorized, carried backward, with its pupillary margin adherent to the capsule of the lens (synechia posterior). The pupil is often deformed, and rarely free in its movements. If it is wholly free, the shadow thrown by the iris exists fully, especially if the cataract is complete, an exceptional case, because capsular cataract almost always consists of a white, opaque point, situated on the surface of the anterior capsule. The vision becomes disturbed in proportion as the opacity extends.—A variety of this cataract is sometimes met with, especially among children who have been attacked with purulent ophthalmia, called *pyramidal* cataract, a serious variety, because the operations for its removal are very seldom successful.

b. Posterior Capsular Cataract. This has been denied by some authors. The particular characters assigned to it, are, its concave form, and its depth behind the iris. To diagnose it, the pupil must be largely dilated with some mydriatic solution. It seldom involves complete loss of vision, the patient being able to read letters of medium size, or with the aid of a lens. It is more rarely met with than the anterior variety.

DIFFERENTIAL CHARACTERS OF CRYSTALLINE CATARACTS, AND CAPSULAR CATARACTS.

CRYSTALLINE CATARACTS.	CAPSULAR CATARACTS.
1. The *opacity* is never preceded by inflammation.	1. The *opacity* is always preceded by inflammation.
2. It is gray, dark, green, black, or bluish-white, presenting striæ converging toward the center.	2. It is chalk-white, and is never striated regularly.
3. Its surface is always smooth.	3. Its surface is unequal, presenting asperities, and morbid excrescences or growths.
4. Its size is very large or very small.	4. Its size is always small.
5. The iris presents no adhesions.	5. The iris is often adherent and deformed.
6. The shadow thrown by the iris is complete, or null.	6. The shadow thrown by the iris is almost always null.
7. Sight is lost, but is often better in the shade.	7. Light is fully perceived.
8. Its progress is unceasing, and invasive.	8. It is stationary.

C. Capsulo-lenticular Cataract presents at the same time the characters of lenticular and capsular cataract. It is *complete* or *incomplete* according as the opacity is confined to a spot of limited

extent, or as it invades the whole of the capsule and lens. In this case, the capsule being wholly opaque, it is impossible to be assured of the condition of the lens; this is an exceptional case.

a. Partial Capsulo-lenticular Cataract is central, and consists of a chalk-white, limited, opaque spot, which may remain thus for a lifetime, without changing. It is met with among children, rendering them myopic, and so deficient in sight as not to be able to read or write. It is often congenital, and complicated with retinal insensibility; the sight is then wholly lost. This variety, common to newborn children, is frequently accompanied with an oscillatory movement of both eyes which does not always disappear, even after a successful operation; an operation, however, is rarely required. When this variety of cataract attacks only a single eye, strabismus is apt to be caused.

b. Complete, or Common Capsulo-lenticular Cataract is almost always the result of a wound of the capsule, a fall on the head, or a blow in the vicinity of the eye, accidents which may occasion a suppurative inflammation. The lens is then completely fluidified, and the cataract presents the characters of a fluid cataract. . . . . A few words may be said concerning the following varieties which are of interest to the oculist:

a. Siliculose or *Siliquose Cataract* is a very rare affection, and is hardly met with except among children; it is due to interrupted nutrition in the crystalline apparatus, or to absorption of the lens, leaving the two capsular hemispheres wrinkled and juxtaposed in the form of a thick, hard, and opaque membrane. Some authors suppose that convulsive diseases, so frequent among young children, are the most common causes of this form of cataract. In the adult, it is the result of an injury following which the aqueous humor penetrates into the lens, and dissolves the external softer layers of the lens, leaving only the central nucleus. It is then accompanied with diffluence of the vitreous body. It is of small size, brilliant aspect, and a golden yellow color.

b. Tremulous Cataract is characterized by more or less marked oscillatory movements from right to left, left to right, or from in front backward. It is due to hydrophthalmia, softening of the vitreous humor, displacement of the lens from a violent shock, etc. Sometimes the motions of the lens are hardly perceptible; at others, the oscillations are so distinct that the lens may be observed to nearly touch the posterior surface of the cornea.

c. Black Cataract has already been referred to. Its symptoms are those of hard cataracts, and its diagnosis rests wholly upon an ophthalmoscopic examination. Some authors have attributed its color

to the presence of iron, or manganese, and others to a peculiar mode of condensation of the crystalline molecules.

D. COMPLICATIONS OF CATARACT. Although cataract is often exempt from complications, it is of importance, however, to carefully examine the visual organ, when it is proposed to operate, to ascertain that it is in conditions favorable to success. The complications are of two orders.

a. Local Complications, as ophthalmic inflammations, films or specks, staphyloma, etc. When they are recognized, the oculist should endeavor to remove them by proper treatment before undertaking the operation.

Adhesions between the iris and the capsule may also be met with, a complication which may be known by the existence of bands or bridles thrown out between the pupillary margin and the capsule, by the irregularity and disfiguration of the pupil, and by the difficulty in its movements. We should bear in mind that these disorders may reveal the existence of an inflammation not yet wholly removed; and we should ascertain the extent of these bridles, and also whether the capsule is not wholly adherent to the iris, in order to form a more or less unfavorable prognosis.

Softening of the vitreous humor is also an untoward complication, and which we may determine by the softness or hardness of the eyeball, by the prominence of the iris forward, and its tremulousness when the eye is moved. This complication will influence the oculist in the choice of the method for operating.

A still more serious complication is that of *glaucoma*, which is, fortunately, very readily recognized. In this instance, the cataract is of a sea-green color, of considerable size, the iris is pushed forward, and sometimes projects considerably into the anterior chamber; the pupil is irregular, dilated, and immovable; the iris pale, discolored, and often covered with grayish, slate-colored or somewhat grape-colored spots; the sclerotica is lead-colored and bluish, often staphyloma ous, the conjunctiva is varicose, the cornea insensible, and the eyeball hard to the touch. The patient also states that the disease has been preceded or accompanied by severe pains and photopsy.

Another complication is *paralysis of the retina*, which is very difficult to recognize at its commencement; but which, when complete, may readily be detected by a phosphenic examination.

b. General Complications. These are very numerous, but are less important than the preceding, at least as far as the prognosis is concerned. The principal ones are scrofula, rheumatism, syphilis, gout, etc, Some authors have pointed out characters by which it

may be possible to distinguish a rheumatic cataract from a scrofulous one, a syphilitic from an arthritic, etc., but this is of no practical service. The antecedents of the patient, and the actual condition of his constitution can alone lead to any correct views in this respect.

E. DIAGNOSIS OF CATARACT. The diagnosis of diseases of the crystalline system has at present reached such a degree of precision, that it is almost impossible to confound even a commencing opacity with the various conditions heretofore designated by the generic name *amaurosis.*

When the cataract is confirmed, exercising the eye will suffice to diagnose it without artificial aid; but when it is commencing, it is accompanied with a group of phenomena which may cause it to be mistaken for an affection of the choroid, or of the retina, and thus the patient be submitted to the severe treatment required for these affections. In all cases, no opinion should be formed, nor treatment instituted until the eye has been examined carefully, while the pupil is fully under the influence of belladonna.

In difficult cases, the ophthalmoscope is of great value, especially during the commencing morbid changes in the lens. These changes, which give rise to *lenticular cataract*, appear at first under the form of blackish striæ or dark lines, sometimes radiating from the poles or surface of the lens, at other times under the form of three dark lines, starting from the center of the lens, as in the cataract with three branches. By means of the reflector, these concentric or excentric opaque striæ can not escape observation. They are shown so clearly, as it were, on the red fundus of the eye, that if the pupil be largely dilated and the light be somewhat intense, they become delineated in such a manner as to render it impossible not to perceive them. All these opacities upon or in the lens are fixed; the direction of their curves indicates their situation in the front or back part of the lens. Between the striæ the lens may be transparent or hazy; or there may be a general haziness with few or no striæ.

In *capsular cataract*, the reflector projecting the light directly into the eye, will show blackish spots disseminated here and there, as it were, on the red fundus of the eye. If, on the contrary, we throw the light obliquely in the eye, the spots appear whitish, dotted, rough, and sometimes slightly prominent. These opacities consist for the most part of lymph and uveal pigment derived from the iris. The lens itself is transparent.

The slightest lesions of the crystalline system may be recognised by the ophthalmoscope; but in order to perfect the diagnosis, we

must ascertain if any of the complications, heretofore referred to, exist. We commence by examining the eyelids, the conjunctiva, the cornea, the iris, etc., and if the opacity is not complete, we will search for complications in the deeper-seated structures, as softening of the vitreous humor, various morbid changes of the retina, papilla, choroid, etc., all of which lesions have a major importance in the diagnosis and treatment.

If the cataract is complete, the lesions which may exist in the posterior hemisphere of the eye are not appreciable; they are concealed from our means of direct investigation; however, we may still interrogate the *sensibility* of the eye by the phosphenic examination, and by exploration with the taper.* These two explorative

* The examination with the *taper* is based on the fact that in cataract, where the retina still remains sensible, the flame of a candle, when moved at some distance before the eye, can be distinguished to a certain extent. The patient being seated in a dark room, a lighted candle is held in front of the eye under examination, at about three or four yards distance from it. If the patient sees the flame or illumination from it, we may conclude that the central portion of the retina is sensible. The candle is then to be placed in other directions, requesting the patient to follow it with his eye. The points at which the flame is not distinguished correspond to the points where the retinal sensibility has undergone an abnormal change.

This method of examination not only renders certain the seat of a morbid change in the retinal sensibility, but it also enables us to determine the exact degree of this change, according as the patient can more or less distinguish the light at variable distances.

Dr. J. B. Nevins, in speaking of Sanson's catoptric test, says:—"As commonly described, this test is, however, likely rather to confuse than to assist the surgeon who has only occasional opportunities for using it; though when properly employed it is easy of application and of the greatest possible value. In the first place, the observer must be on his guard that he does not expect to see too much. It is usually said that when the lens is transparent there is a bright, erect image from the cornea, and another erect image from the front of the lens; and lastly, that there is an inverted image reflected from the posterior surface of the lens; and the surgeon therefore naturally expects to see two erect images in a healthy eye, and one inverted one. Now the fact is, that he will scarcely ever be able to detect the second erect image if the eye is sound, and it will require no small care to find the inverted one at all; and even when found, not one observer in twenty can see whether it is erect or inverted. What may be really looked for is the following: When the room is darkened, and the pupil widely dilated by Atropia, the flame of a clear, bright, burning taper should be held as near the eye as can be done without giving pain, and a bright erect image will be seen without any difficulty. If, however, the observer looks with great care into the pupil, and keeps moving the taper about, he will at length discover an *extremely small spot* of pale light, which will move in the opposite direction to the candle. If this is carried to one side of the eye the minute speck of light moves to the opposite side If the flame is raised the speck descends, and if the candle is lowered the image ascends; and by this means the observer at length gains certainty that it

methods ought always to be employed, because they aid in determining the existence either of a diminished sensibility of the retina, due to a deep-seated lesion, or else, of a rare but possible complication, termed *amaurosis*, that is to say, a more or less complete impairment of vision without any material morbid change.

The catoptric condition or reflecting qualities of the lens may also be tested by causing a concentrated pencil of light to play obliquely on it. This is best done as follows: Having the pupil dilated with Atropia, darken the room, and shade the face of the patient, who must be seated with a lamp placed at his side, the flame being on a level with the eye. Now, take one of the convex magnifiers belonging to the ophthalmoscope, and concentrate the light obliquely upon the eye. By successively moving the convex glass, the concentrated rays of light may be focussed upon any part of the surface or depth of the crystalline and its membranes, and can so accurately light it up as to enable us to discern the slightest deposit, whether plastic or pigmentary, and to note the earliest traces of central or circumferential opacity. This plan will likewise be found valuable in examining the condition of the cornea, iris, etc., when diseased.*

The *prognosis* of cataract varies according to the particular kind, its complications, age and general health of the patient, the length

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is an inverted image he is looking at; but he will probably never recognize the difference between the base and the apex of the flame in the image, and as there is no visible reflection whatever of the candle itself, he will have nothing to guide him as to its erect or inverted character except the direction of its motion being opposite to that of the taper itself. So long as the lens and its capsule remain transparent this inverted image may be discovered, and accordingly we shall decide upon the absence of cataract when it is present, and shall have no doubt of the existence of an opaque lens or false membrane if it is absent.

"This is all that we shall generally see if the eye is healthy; but if glaucoma is present, or the vitreous humor is becoming milky, we can then see the second erect image, very pale and indistinct, and looking more like a ghost than a candle, behind the first bright erect one. This second image is somewhat larger than the first, so as to extend beyond it in every direction; and it is so pale and indistinct that it is generally only recognized as being erect by its moving in the same direction as the candle. If then the inverted image is seen without the second erect one, we are sure that there is no cataract, and the tissues are healthy; but if the second erect image is tolerably distinct, it is evidence of some morbid change going on in the structures of the eye, though not of a cataractous nature."

* According to Desmarres, "all doubtful cases of cataract can be diagnosticated with certainty by the ophthalmoscope. For this purpose the convex lens is not required; and the light in examining the lens should be moderate, as a very strong light prevents faint opacities from being readily visible against the vivid red of the choroid. The light being thrown upon the eye by the mirror, the faintest speck or streak of opacity stands out as a dark mark upon the red field

of time since vision was lost, etc. The practitioner should be very reserved, and always guard against assuming any responsibility.

When the lens is thoroughly dense, a careful examination of the retinal phosphenes by pressure, will prove valuable in certain advanced cases, tending to define the utility of extraction in given instances. When all the phosphenes are produced, the augury as to the healthy condition of the retina is very favorable; and in proportion as they are feeble, or partially present, or altogether absent, is the prognosis unfavorable.

The *treatment* of cataract is entirely surgical, and therefore not within the limits of this work; however, a few brief remarks relative thereto, may not be amiss.—Three conditions may be presented to the practitioner, viz.: 1. The cataract may be just commencing; 2, it may be almost complete or fully matured without any serious complications; or, 3, the cataract may be complete or incomplete with serious complications.

For the *first condition*, a medical treatment may, probably, be successful, and concerning which more will be said hereafter. For the *second condition*, an operation is required, as extraction, depression, or division; the particular mode must be determined upon by the operator, according to the circumstances connected with the case. For the *third condition*, the disease complicating the cataract, must be treated, if it be susceptible of cure. Then, if there are no contra-indications, we operate. Operations for cataract should not be performed during the hot summer and autumnal months.

After-treatment. After the operation, in order to keep the eyelids still, and to prevent the patient from attempting to use his eyes, strips of court-plaster should be carefully placed obliquely across them, but not so as to interfere with the flow of tears, or keep the eye too closely covered. The patient should then be placed in a large, airy room, at first lying upon his back, with his head slightly raised, and light compresses moistened with cool water, be kept upon the lids for four or five days, unless the eye feels cool and easy. During the first and second day, these should be changed every half hour; on the third day, every hour, and afterward every two or three hours, not allowing the eye to become to much heated or loaded by them. In some instances the "Donna Maria Gauze," secured on either lid by collodion, as recommended by Dr. Goddard, will be found preferable. The patient should be kept neither too

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of the choroid, and its situation, whether on the anterior or posterior surface of the lens, may be determined as follows: The patient should be directed to throw his head very much backward; if the opacity be posterior it becomes concealed behind the lower segment of the iris; if anterior, it still remains visible."

warm nor too cold, should not be allowed to exert himself in dressing, going to bed, or in anything else, should avoid coughing, laughing, or crying, and should be watched upon awaking lest he suddenly moves the eye or applies his hand to it; the food should be fluid, so that mastication may be avoided. It is better not to have an alvine evacuation until after forty-eight hours from the time of the operation. Every means should be adopted to keep down inflammatory action, and favor adhesion of the wound, without restraining the patient unduly. If everything goes on favorably for five or six days, and an examination of the eye shows everything progressing satisfactorily, the patient may be allowed a little more freedom; in ten or twelve days the eye may be exposed to a weak light, gradually increasing its strength, and allowing the patient to walk out doors with a shade and very dark glasses.

At about the end of a month, neutral-tint cataract glasses should be worn, either double-convex, plano-convex, or menisci, of a focus adapted to the particular case under treatment. The weight of them should be as light as possible; and if the glasses be placed in a metallic diaphragm of a small diameter and colored black, this will remedy the aberration of sphericity, and consequently give a much clearer image at the center. Two pairs should always be used, one for ordinary vision, and the other for reading and writing; generally those of a focus of two inches to one and a quarter are required for reading, and those of a focus of six to four and a half inches for distant objects. The patient should act prudently in commencing the use of his glasses; and not definitely fix his choice upon any particular focal number until the sensitiveness of the eye to light has completely disappeared.

Medical Treatment of Cataract. With regard to the medical treatment of cataract, there is, and has been, considerable difference of opinion, although, heretofore, the prevailing view in the profession has been that cataract was not affected by therapeutical treatment, and that the cases which have been reported as cures, were not true cataracts, but lymphatic effusions on the surface of the capsule, or glaucoma, etc. Recently, however, some of our most eminent oculists have suggested that, probably, under some circumstances, cataract may be curable by other means than a surgical operation.

Thus, Dr. Richardson, of London, having corroborated the views of Dr. Mitchell, of Philadelphia, relative to cataract being caused by an osmotic action, and which were published in *Am. Jour. Med. Sci., July*, 1860, *p.* 257, suggests the idea that an evacuation of the aqueous humor, followed by a refilling of the chambers

of the eye with distilled water, might aid in effecting the removal of an incipient cataract. Not long after these statements, Prof. Sperino, of Turin, announced that he had effected cures of cataract by puncturing the cornea, introducing a small probe into the wound to prevent it from healing, and thus keeping up a constant discharge of the aqueous humor. It has also been stated by other eminent physiologists, that detraction of the water from the body, as, by the introduction of sugar or sulphate of soda into the intestinal canal, causing the water of the blood to flow into the intestines, has produced a loss of transparency in the lens, with convulsions, etc. It has also been ascertained that these pathological conditions are removed by the addition of water to the blood; also, that when the introduction of water exceeds a certain limit, its beneficial results cease, and morbid changes occur.

In accordance with these views, we find that cataract is apt to occur among persons who have had a lessening of the water in their system, as, among old persons, and those laboring under diabetes, profuse leucorrhea, diarrhea, or other excessive discharges. A very interesting article on this subject, by Dr. Hays, of Philadelphia, may be found in the *Am. Jour. Med. Sci.*, *July*, 1863, *p.* 119, who expresses a hope that cataract, in its incipient state, or among young persons, may find a cure in some treatment based upon the above facts; senile cataract, however, he does not suppose will ever be amenable to any therapeutical measures.

Again, a local and general treatment designed to produce alkalinity of the fluids of the system, has, it is stated, effected cures of cataract. This treatment was based upon the following facts: If three saline solutions be prepared, one *neutral*, another *alkaline*, and the third *acid*, and we place in each of these solutions a normal beef's eye, it will be observed, after a few hours, that the eye placed in the acid solution has become wholly opaque, while those in the other two solutions retain their transparency. If we place the crystalline cataract in the alkaline solution, the lens returns to its normal transparency in the course of twenty-four hours. In consequence, therefore, an alkaline treatment, consisting of Iodide of Potassium internally, and constant applications of a solution of Muriate of Ammonia applied upon the eye, with free use of water and a vegetable diet, is said to have proven successful. I will state here, that, with three diabetic patients under my treatment, affected with opacity of the lens so as to materially interfere with vision, the opacity disappeared while the patients were under the influence of Nitrate of Ammonia,—fifteen grains in a tablespoonful of water being given for a dose, and repeated three times daily.

Since having prepared the above, Prof. A. Von Gräfe, of Berlin, Prussia, has presented a new and very successful method of operation for the extraction of cataract, to which I can merely call the attention of the profession. The operation briefly consists in an incision through the sclerotica, just above the margin of the cornea and parallel with it, having a length of from four and a half to four and three-quarters lines; then iridectomy, or the removal of a portion of the iris, in order to allow the lens to escape readily, and also to prevent any subsequent iritis; then laceration of the capsule; and finally, removal of the lens, by gentle pressure, a double hook, or a spoon. The instruments required for this operation are eight in number: an adjustable speculum, a peculiar, long, narrow and delicate knife, spring forceps, a very small, straight pair of iridectomy forceps, a pair of iris scissors, a cystitome armed with a fleam, a peculiarly-formed, blunt hook, and a wire scoop. The operation is termed "modified linear extraction."

DISEASES OF THE VITREOUS HUMOR.

1. *Synchysis.* The vitreous humor is rarely, if ever, primarily affected; its softening or dissolution, termed *synchysis*, is almost always due to an inflammation of the choroid. This peculiar state of the vitreous humor may be determined by the touch, which detects a great softness or considerable flaccidity of the eyeball; the ophthalmoscope will reveal very delicate, gauze-like webs of the broken dissepiments of the hyaloid membrane, and these flocculent shreds move very rapidly to the lowest place, being tossed about by the communicated movements of the eyeball. The fundus of the eye presents a dull, yellowish-white appearance, and the papilla and yellow spot are more or less obscured; this, however, is not always the case. When the softness is advanced, the iris will be found pushed forward, and tremulous, especially when the eyeball is moved rapidly, and there will also be slight myopia. In the *ophthalmoscopic* examination of the vitreous humor, a diffused light, and the plane reflector, will show the changes much better than the convex reflector. Minute, sparkling plates, resembling gold spangles, may sometimes be observed, moving up and down in the eye, which are crystals of cholesterine. This is called *sparkling synchysis*, or *synchysis scintillans.*

Synchysis hardly admits of being remedied; the *treatment* must be directed to the cause under the influence of which it has been produced. Vision is not always seriously interfered with by synchysis,

although the patient will complain more or less of spots, flakes, or shreds floating before his eyes, (*muscæ volitantes*).

2. *Other lesions* in the vitreous humor may be observed by the ophthalmoscope, as whitish filaments, exudative patches, opaque floating bodies, clots of blood, parasitic animalcules, etc., and which are sometimes seen better by oblique illumination. These conditions are ordinarily symptomatic of deep-seated lesions, for which no successful treatment has yet been laid down.

A condition of the vitreous humor, termed *jumentous*,* has been described; it is characterized by a turbid and muddy appearance of the substance of this humor, due to very tenuous, yellowish-red corpuscles which float and move in all directions under the influence of the movements of the eye. The deep-seated membranes are hardly to be seen, and the papilla seems covered by a cloud. The sight is impaired, and the patient complains of muscæ volitantes. This morbid condition is susceptible of being removed; when the vitreous body returns to its original transparency, and vision becomes better.

The *treatment* consists in the use of collyria, and frictions with iodurettted preparations, together with the internal use of alteratives.

DISEASES OF THE CHOROID.

1. *Posterior Staphyloma. Posterior Sclerotico-choroiditis.* (*See Note to Strabismus*, on page 387.) This is a disease of common occurrence, especially among short-sighted persons, and which, since the discovery of the ophthalmoscope, has become well known. It is an atrophy of the choroid at its insertion around the optic nerve, and is characterized by a thinning of the sclerotica and choroid, and an abnormal conical projection at the back part of the eyeball, on the outer side of the optic nerve. The disease usually manifests itself at the period of puberty, among those young subjects whose eyes have been exposed to too great a degree of activity. It is frequently met with among literary persons, jewellers, engravers, printers, embroiderers, and persons who labored under ophthalmic affections in childhood. Myopia predisposes to it; indeed, when posterior staphyloma occurs without myopia being present, it is an exceptional case.

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* *Jumenteux*, Fr., turbid and yellowish. | *Corps vitr jumenteux*, turbidity of the vitreous humor. (*Desmarres.*)

The disease appears also to be transmitted. "There is usually a predisposition, perhaps hereditary, to this affection in the congenital formation of the eyeball, but the exciting cause appears to be the state of congestion of the eye produced during accommodation for near objects; during such accommodation, a certain pressure upon the eye, and increased intra-ocular tension always occurs, the venous circulation within the eye becomes retarded, and a more or less considerable state of mechanical congestion is produced." (*J. S. Wells.*)

Symptoms. The eyeball often appears larger, more prominent, and of an ovoid shape, the eyelids being more widely apart, which is particularly noticeable when only one eye is affected. The shape of the eyeball is changed, it appears lengthened in its antero-posterior diameter, it is more oval and the infundibulum or hollow which appears in the normal eye between the outer canthus and the globe (when the eye is much turned inward), has disappeared, so that the posterior segment of the eyeball looks lengthened and square, showing often also a bluish tint. If the disease is considerable, the lateral movements of the eyes are often somewhat curtailed.

At the commencement, the patients complain that their eyes are easily fatigued, that they weep as soon as they attentively fix them upon an object, and that they experience at the bottom of the eye a painful tension and fullness, as if the eye was too large for its socket. At the same time, as they are generally myopic, they complain that they are near-sighted, that they can not read for a short time without the letters becoming enveloped in a mist, and what annoys them the most is, that they can not find any spectacles to remedy their condition. It is by no means uncommon for them to experience deep-seated, vague pains in the eyeball. With others the myopia is the first and only symptom announcing the commencement of the disease. This pathological state is often accompanied with dilatation of the pupil, and a considerable augmentation of the anterior chamber.

Phenomena like these with a young subject, should arouse the attention of the oculist; the *ophthalmoscope* alone will reveal the existence of the staphyloma. By it, we will find that the center of the eye has preserved its transparency, that the deep-seated membranes present their normal color; but the papilla or optic disc will appear deformed or jagged, larger in its transverse than in its vertical diameter, of a yellowish-red color, and its outer side elongated in the form of a crescent, apparently prominent, but in reality concave, of a pearly or brilliant white color; it is by no means rare to find a slight congestion of the retina, or of the choroid, at the same time. These symptoms may be called those of the *first stage.*

In the *second stage* there is an increased myopia, painful twitchings as soon as the patient attends to labor requiring any efforts of the eyes, perception of sparks or bright spots, flames, and various muscæ volitantes, and, finally, a thick mist before objects upon which they fix their gaze. At this period, the *ophthalmoscope* will reveal that the pupil is dilated and sluggish in its movements, that the anterior chamber is enlarged, and that the fundus of the eye presents a brilliant white reflection. At the same time, the crescentic spot, referred to above, extends by its convexity in the form of a cone, the base of which embraces the semi-circumference of the papilla, and the apex of which is directed toward the inner side of the eye. The circumference of this cone is sometimes covered over with a small black or dark-gray band, irregularly indented, formed by the accumulation of pigment; at other times, this dark band or line is regular, which indicates a disposition on the part of the disease to cease further progress. The conical spot of pearly appearance, indicates that the normal elements of the choroid are deficient or have disappeared at this place; it being formed by the sclerotica. This stage of the disease may remain stationary for a long time, and the oculist, by proper attentions and treatment, may prevent it from passing into the third stage.

The *third stage* of posterior staphyloma is attended with very unfavorable symptoms. The patients complain of considerable dimness of sight, a great difficulty in recognizing very near objects, an extreme sensibility to the light, and a perception of flashes of light, bright stars, luminous spots, or of black spots of variable forms. An examination of the eye will show the iris dull, without lustre, the pupil very much dilated and almost immobile, and the anterior chamber deep; if we have the patient turn the eyeballs strongly inward, we may perceive a bluish reflection situated deeply and posteriorily, corresponding with the staphylomatous projection. The *ophthalmoscope* will detect more numerous and more advanced lesions than in the fomer stages; the vitreous humor will be liquefied, holding in suspension some filamentous and opaque bodies, and presents the jumentous aspect heretofore referred to. As to the white spot, it has now changed its form; it has become very large, extending even to the region of the yellow spot or macula lutea. Its margin becomes jagged, irregular, and bordered by blackish lines of pigment, more or less discolored. Finally, another white and brilliant spot appears on the inner side of the papilla, smaller than the preceding, and which is the indication of the continued development of the disease. It is by no means rare to observe disseminated here and there other small

whitish or yellowish spots of less development, which indicate a general abnormal condition of the choroid; this is the last stage of the staphyloma, and the patient is blind.

Sclero-choroiditis posterior may be complicated with opacities of the vitreous humor, infiltration of pigment in the retina, detachment of the retina, or, opacity at the posterior pole of the lens.

"Sometimes this disease is progressive, causing serious injury to vision; more commonly it remains stationary after having merely altered the focus of the eye. If we observe that the eyes of a short-sighted person are convergent, that the sclerotic is of a bluish color, and slightly prominent when the eye is turned inward, and that the concave glasses which he uses are rather deep, we may have a strong suspicion that he is affected with sclero-choroiditis posterior; and this suspicion will almost amount to a certainty, if we find that the vision is becoming shorter, that there are *muscæ volitantes*, photophobia, etc. The ophthalmoscope will at once decide the point." (*J. Hogg.*)

The progress of the disease is always slow. If it be properly treated, we may keep it in the first or second stage, that is, preserve sufficient vision for the patient to walk about and attend to business; if, on the contrary, we abandon it to itself, and if the patients who are affected with it do not avoid the conditions under the influence of which it is developed, it constantly progresses and terminates by becoming complicated with incurable morbid changes which destroy the function of vision. More frequently both eyes are affected at the same time, but in different degrees; the right eye is that in which the disease attains its greatest development.

The *prognosis* of this disease is always unfavorable, and it is only by constant attention, and well directed measures, that we can expect to improve it and check its further advance. "When the myopia is progressive, and the vitreous opacities are considerable, we should be very guarded in our prognosis. It becomes still more questionable if the choroidal changes make their appearance about the macula lutea, if the vitreous opacities are very diffuse, and if the upper or lower portion of the field of vision becomes clouded, for the latter is premonitory or symptomatic of detachment of the retina." (*J. S. Wells.*)

Staphyloma posterior has been for a long time known as *amaurotic amblyopia*, until the ophthalmoscope revealed the true character of its lesions. Its symptoms are so well marked that it can not be confounded with any other disease. An examination of the eye, and the efficacy of well chosen concave glasses will prevent us from confounding it with a very prominent myopia.—In the third stage,

when the pupil is immovable and dilated, the eyeball hard and deformed, and the sight nearly gone, it may be mistaken for glaucoma. But the ophthalmoscopic symptoms are so different that it is impossible for an experienced observer to entertain the least doubt as to the character of the affection.

The *treatment* of sclerotico-choroiditis posterior is principally hygienic. Patients should absolutely avoid fatiguing their eyes, working for any length of time at near objects, or with their head bent forward, for venous congestion within the eye is thus easily produced. It is also very injurious to read in a recumbent position, or to expose the eye to the direct glare of the light. Indeed, if it can be done, it is better not to employ the eyes at all, for a time, in reading, writing, work, etc. The myopia which attends this malady renders the use of concave glasses indispensable but they should be employed as seldom as possible; their use is injurious, as they increase the refractive power of the eyes, and consequently their faulty conformation, as well as the obstruction to the circulation.

Sinapisms, or very active stimulating, or rubefacient liniments, to the temples, behind the ears, and to the nape of the neck, will relieve the showers of bright stars and flashing lights complained of by the patient. And to protect the eyes from sunlight, or too intense a light of any kind, and avoid the "dazzling," which often annoys the patient, cobalt-blue spectacles should be worn, of not too dark a tint. It is the orange ray and not the red that irritates the retina, and blue excludes the orange ray. The feeling of heat in and around the eye is best allayed by evaporating lotions, and frequently douching the eye with *cool* water, or water to which a few drops of Arnica Tincture have been added. Or, the eyelids, eyebrow, forehead, temples, and side of the nose may be bathed several times a day, with the following mixture: Take of Aromatic Vinegar five drops, Spirit of Nitric Ether one drachm, Water five ounces and seven drachms; mix, and apply with a small piece of clean soft sponge. The bowels should be kept free, which will aid in overcoming biliary and venous congestion. The following will be found very useful for this purpose: Take of Podophyllin, Leptandrin, Scammony, each, half a drachm, Extract of Belladonna ten grains, Syrup of Ginger a sufficient quantity; mix, and divide into sixty pills, of which one may be taken every night and morning.

Another preparation, employed in Europe, has been highly recommended. It is prepared as follows: Take of Resin of Jalap, Scammony, each, forty-six grains, Cream of Tartar one grain, Extract of Belladonna nine grains, Extract of Stramonium seven and a half grains, Syrup of Chicory, a sufficient quantity; mix, and

divide into sixty pills, to be taken the same as the preceding pills. The advantage of these preparations is that they operate without causing fatigue or weakness, removing any obstinate constipation which may be present, keeping up a constant gentle derivation from the digestive tube to the advantage of the visual organ, causing a permanent expansion of the muscles of the eye, in antagonism to their tendency to contract, arousing the arterial circulation in this organ, and hence counteracting the further progress of its deformity.

Frequent bathings of the surface, and the use of the Spirit Vapor Bath, once or twice a week, but not to cause fatigue or debility, will also prove very advantageous.

If the constitution of the patient is weakly, strumous, or lymphatic, or if there is any syphilitic taint, the appropriate constitutional treatment must be added to the one above named; and any complications will require the treatment adapted for their removal.

Section of the ciliary muscle is stated by Hogg and others to have effected great benefit, and even cures, in this disease; it certainly is worthy of a trial in cases not too far advanced.—Since the discovery of the extraordinary efficacy of many medicinal agents in solution, by means of subcutaneous injections, it is to be hoped that some article may be discovered that will, at least, permanently arrest the further progress of posterior staphyloma in any given case. I have found considerable benefit to follow the hypodermic use of a Solution of a mixture of Sulphate of Morphia and Sulphate of Quinia; as well as of Solution of a mixture of Acetate of Morphia and Acetate of Strychnia.

Oculists have sought to discover the principal cause, the nature of posterior staphyloma. Sichel attributes it to a choroiditis that produces atrophy, a thinning of the sclerotica which then yields to muscular pressure. Jœger considers its commencing point to be a sclerotitis; Gräfe to a sclero-choroiditis; Curlt to a mechanical distension produced by the muscles during the efforts at accommodation; and others, to an augmentation of activity of the external and internal muscles of the eye during the efforts at accommodation, when the subjects are predisposed to the disease by age, anterior diseases of the eye, diatheses, and a more or less marked myopia.

2. *Glaucomatous Sclerotico-choroiditis. Glaucoma.* This is a disease which was very imperfectly understood, previous to the discovery of the ophthalmoscope, which reveals as the characteristic signs, excavation and alteration of the papilla or optic nerve-entrance, and pulsation of the central vessels. Glaucoma is a form

of blindness, attended with peculiar morbid changes in all the various tissues of the eyeball; it is a disease common among persons advanced in years, seldom being met with previous to middle life. It is a much more common affection in Europe than in this country. It has been divided into two stages, *acute* and *chronic*.

According to Gräfe, the elder, glaucoma is an irido-choroiditis with serous intra-ocular hypersecretion, which increases the interior pressure, compresses the retina, and determines the characteristic phenomena; according to others, it is a sclero-choroiditis, and the symptoms accompanying it are due, not to an intra-ocular pressure, but to a concentric pressure which results from a particular mode of morbid alteration of the sclerotica, characterized by its thickening and retraction, and which is effected by a congested or inflammatory condition of the choroid. It appears to be much more common among rheumatic and gouty subjects than among others. Dark-eyed persons are more disposed to it than those having blue or gray eyes, and myopia is often present with glaucomatous patients. Sometimes it is met with at the cessation of menstruation, among females; or, following the cessation of a hemorrhoidal flow; and again, it may accompany a disturbance in the abdominal venous circulation. It almost always appears successively in both eyes. "Glaucoma comprehends a series of morbid changes, which, in general, develops itself only in the course of years, to involve at last all the structures of the eye." (*Mackenzie.*)

"Donders supposes that the influence of certain nerves produces an increase of secretion of the fluid contents of the eyeball. . . . I intend to show that nervous influences produce contraction of the branches of the retinal artery, and that by the diminution of the quantity of blood in the vessels, or by the diminution of lateral pressure in the arteries, a partial vacuum is produced, which in its turn induces hypersecretion of the choroid." (*J. Homberger.*)

The *symptoms* in the *acute* form sometimes come on spontaneously and suddenly, so that vision may become wholly extinct after a few hours of agony, and all the inflammatory changes in the several tissues of the eye, except the opacity of the lens, be apparently completed within a few days. At other times, on the contrary, the glaucoma comes on more gradually, being preceded by prodromic symptoms, as an appearance of sparks, flames, bright flashes, or colors passing before the eyes; a transient dimness of sight, appreciable especially in the latter part of the day; a marked presbyopia; photobia; and pains which shoot from the fundus of the eye toward the forehead and temple. These neuralgic pains

are increased by various influences, as, strong emotions, from heat of the bed, moisture of the atmosphere, etc.; they disappear after some time, and then after an indeterminate period suddenly return, especially during the night, and terminate by leaving, after their cessation, a more or less considerable disturbance of sight. Such are the phenomena which sometimes precede the formation of glaucoma.

In all cases, if the disease is developed, the conjunctiva becomes injected, the pupil dilated, deformed, and immovable, the iris loses its natural brilliancy, and becomes dull, the eyeball hardens, feeling like a marble, and presents a greenish tint, deeply seated back of the pupil, the cornea becomes less convex, dull and loses its sensibility, the field of vision becomes diminished, and finally the patient loses his sight permanently.

If the *ophthalmoscope* be used, we will observe some ecchymoses on the retina, suffusions on the choroid, a well-marked excavation of the optic papilla, spontaneous pulsations in the retinal arteries from over-tension, and a peculiar displacement of the vessels, which appear to sink down and curve over toward the papillary circumference, out of their usual course.

The *chronic* form of glaucoma comes on very insidiously, the pain and dimness of vision are at first evanescent and separated by long and complete intermissions, but finally become more frequent and last longer, until at length they are never entirely absent; the eyeball becomes harder, feeling like marble when pressure is made upon it through the lids; the symptoms are of less intensity than in the acute form. The patient complains of seeing bright flashes or colors passing before his eyes, though not in all cases; there may, or may not, be a dull pain in the eye or head; if there is pain, a faint vascular zone will be seen in the sclerotica around the margin of the cornea; a remarkable contraction of the field of vision occurs; the humors become cloudy; the iris becomes dull, of a slaty tint, gradually loses its briskness of movement, and enlarged veinlets are often visible upon it; the pupil dilates, not uniformly, but so as to assume an irregular, instead of a circular form. This may continue for several months, when the convexity of the cornea diminishes, its surface becomes dull, sometimes vesicated, and its sensitiveness reduced to a minimum; by this time vision is reduced to a slight quantitative perception of light, or is wholly extinct. Then opacity of the lens comes on slowly, the lens and iris gradually advance toward the cornea, and large, dark, purple veins, manifest themselves on the surface of the sclerotica. "The lens is sometimes rather milky-looking, and indistinctly stri-

ated. Its threefold division is often very well marked, as if, by undergoing maceration in water, it had swollen up, and were about to burst its capsule. It may be grayish or greenish-drab, dirty yellow, or dull orange, and marked with opaque, earthy patches or streaks." (*Dixon.*)

If, previous to the opacity of the lens, while it is still transparent, it be viewed by transmitted light, it, and especially its nucleus, will be found of a more or less deep amber color; if by reflected light, it will present a greenish color.*

As in the acute form an *ophthalmoscopic* examination will detect ecchymosed patches, whitish spots due to fatty degeneration of the retina, exudative patches, papillary excavation or cupping, displacement of the vessels, and spontaneous arterial pulsation. In the last stage, the lens will become opaque, the retinal arteries atrophied, the veins dilated, the cornea ulcerates and becomes perforated, and the disease terminates by atrophy of the eyeball.

The *prognosis* of glaucoma is decidedly unfavorable; in the acute form, favorable results may be hoped for by an appropriate treatment; in the chronic form, it is generally incurable, though treat-

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* With regard to the color of the lens, Dr. Jas. Dixon remarks: "Even before the middle period of life, the lens always acquires a yellow tint, which gradually deepens, until it assumes in old persons a decidedly amber color; and this quite irrespective of any cataractous change.—The fundus of the healthy adult eye is, as we know, from ophthalmoscopic observation, of a more or less reddened bluff tint, except where the optic nerve presents its white disk; and the rays of light, reflected from such a surface, and transmitted through the yellowish lens, appear to the eye of an observer as a grayish or drab-colored spot. This reflection it is which the inexperienced, or those upon whom experience is thrown away, so often mistake for the opacity of cataract. Dilatation of the pupil with atropia, by admitting a greater flood of light to the retina, renders the spot still more distinctly visible; and a patient, who may perhaps really require nothing more than a pair of spectacles, is told that he is the subject of 'Incipient Cataract.'

"The student can not be too soon made aware of the fact—that pure and absolute blackness is not, under any condition, the characteristic of the pupil in elderly persons; a knowledge of this will save him from falling into constant errors of diagnosis. Any whitish deposit on the surface of the retina will increase the intensity of the reflection; and if, at the same time, the contractility of the iris be diminished, and vision impaired, the phenomena of 'Glaucoma,'—in the sense so commonly attached to the term—will all be present.—A well-marked, grayish, drab-colored, or bottle-green reflection from the pupil of a patient's eye, may, then, co-exist with good sight; but, if the reflection is accompanied by impairment, or even total loss of vision, still, the reflection is not the essential sign or characteristic of the disease; nor is the case to be set down as one of *Glaucoma*—however *glaucous* the pupil may be deemed,—unless other very marked changes be present in the eye."

ment may arrest the progress of the disease, and, perhaps, improve the vision to a certain extent.

Dimness of vision toward the close of the day, or under the influence of emotion, vague pains in the eye and about the brow and temple, occasional flashes, the appearance of a halo around the flame of a lamp, and rapidly-increasing presbyopia, are the forerunners of glaucoma; when these symptoms are present, prompt measures should be taken to check the further advance of the malady.

The *treatment* of glaucoma in the acute stage consists in the employment of means to relieve the pains, and to remove the phenomena of congestion and intra-ocular pressure; for this purpose, anodynes, intestinal derivatives, counter-irritation, etc., will be required; the treatment being similar to that named on page 1416, for Rheumatic Ophthalmia, but conducted more energetically. The patient must keep his eyes in a state of rest, use a moderate diet, avoid the use of alcohol, tobacco in any form, and coition, and keep the skin, bowels, and kidneys, in as healthy a condition as possible. The following will be found an excellent preparation: Take of Sulphate of Quinia one scruple, Sulphate of Morphia fifteen grains, Alcohol three fluidrachms, Elixir Vitriol one fluidrachm; mix, dissolve the alkaloidal salts, and then add Tincture of Black Cohosh twelve fluidrachms, Tincture of Aconite Root two fluidrachms. The dose is ten or twenty drops every hour or two, in a tablespoonful of water. If the patient be anemic, small doses of some preparation of Iron must be given, as soon as the more active inflammatory symptoms have subsided. The use of a solution of Atropia to keep up dilatation of the pupil, will be serviceable; and, if it does not occasion a dazzling of sight, increased haziness, etc., a drop or two of the solution may be placed in the eye every day or two. In both the acute and chronic forms, hypodermic injections of solutions of Morphia, Atropia, etc., should not be neglected; they should be made in the temporal region of the affected eye, and be repeated once or twice daily, if the urgency of the case requires. If this treatment does not completely re-establish the functions of the eye, it has been recommended to relieve the internal pressure by puncturing the sclerotica and choroid, and thus take off the pressure of the accumulated fluid (dissolved vitreous humor) on the retina; and which, undoubtedly, affords a transient relief. The operation of iridectomy has also been recommended. It should be performed as soon as the glaucoma becomes complicated with an inflammatory attack. Should iridectomy, or iridodesis, be found, hereafter, the true remedy for glaucomatous

affections, it will immortalize its discoverer, who, at present, considers it the correct and only successful mode of treating these diseases. Hancock, however, has recommended section of the ciliary muscle as much preferable to, and less dangerous than, the above operations. So far, however, iridectomy has been preferred by the majority of the most eminent oculists. Perhaps, a timely and proper employment of subcutaneous injections may render either operation unnecessary.

Mackenzie considers a removal of the lens as a means of checking the progress of the disease, and preserving vision; the operation should be performed only at that period when the lens assumes a muddy-green color, the pupil being sluggish, the vision more or less obscured, and the eyeball rather firmer than natural. The operation will prove unsuccessful if incomplete amaurosis also be present. This operation, however, is now superseded by iridectomy.

The treatment above named may also be pursued in the early period of the disease, before it has assumed a definite acute or chronic form. In the chronic form, the treatment is wholly therapeutical, all surgical measures proving useless. It principally consists of measures to combat the presumed causes of the affection, or the prominent diathesic condition, as gouty, rheumatic, etc. Cimicifuga, Aconite, Colchicum, Bromide of Ammonium, Iodide of Potassium, Iodide of Ammonium, etc., are the principal agents to be employed. A Compound Tar Plaster should be applied alternately to the nape of the neck and behind the ears; the bowels and skin should be properly attended to; an occasional Spirit Vapor Bath should be taken; and, every few days, dry cupping should be performed along the whole length of the spinal column, or, Firing. The system must be sustained by tonics, or chalybeates if anemia be present; and the diet should be of a nutritious character. The eye should be kept in a perfect state of quiet, and also be protected from the too intense rays of light by wearing cobalt-blue spectacles. Of course, in the more advanced stages, the blindness will be permanent.

Section of the ciliary muscle including also the triangular canal of Schlemm, (in all cases where the operation is performed), has been found of much advantage in acute glaucoma. "In more advanced cases, also, of chronic glaucoma, the improvement, if more gradual, is most decided and gratifying. The fixed, immovable pupil resumes its natural size and functions. The cupping of the optic nerve disappears, the general congestion of the fundus and the turgid varicose appearance of the retinal vessels also subside; the tension of the eyeball becomes normal; and sight, previously perhaps all but lost,

is again restored." (*J. Hogg.*) The operation is stated, by some oculists, to be superior to and more successful than iridectomy, but should not be undertaken in long-standing cases where the ophthalmoscope reveals a very advanced state of atrophy of the papilla or optic nerve and its central vessels.

In this operation, the only instrument required is an ordinary Wenzel's knife, which is introduced about the tenth of an inch from the outer margin of the cornea, where it joins the sclerotica. An incision obliquely backward and downward is then made of little more than one-eighth of an inch in extent, cutting through the triangular canal of Schlemm, the ciliary muscle, and the fibres of the sclerotica. It is not necessary to the success of the operation that either the aqueous or vitreous humors should be invaded, although fluid sometimes escapes by the side of the knife.—This operation, however, has not met with much favor.

3. *Irido-choroiditis*, Cyclitis, or inflammation of the ciliary body, is a disease frequently met with, presenting itself under a great variety of forms. It may follow an iritis, or a choroiditis.

Beside the *causes* occasioning an iritis or a choroiditis, I may refer to two, that exist more frequently, viz., wounds, and the sympathetic action that one inflamed eye exerts upon the other. The greater portion of eyes that become atrophied after having been wounded, have passed through the phases of an irido-choroiditis. The more extensive the wound the more readily is the disease developed, and especially when a portion of the substance occasioning it remains in the eye, as, a piece of percussion-cap, grains of powder, small shot, fragments of stone, etc. A foreign body in the eye is almost always a source of danger to this organ; and we recognize its presence in an eye affected with choroiditis, by the persistent and often very intense ciliary pains; the sensibility of the eye to the touch, even when a manifest atrophy has commenced, and the occurrence of which, in ordinary cases, gives complete relief to the pains; by the exaggerated tension persisting in the globe until the termination of the disease, at which period in ordinary cases of irido-choroiditis the eye has a certain flaccidity from the commencing atrophy, or from a retinal detachment.

The presence of a foreign body in the eye, not only proves destructive to the organ in which it is lodged, but also sympathetically exerts a very deleterious influence upon the other eye, occasioning in it, amblyopia, amaurosis, opacity of the transparent media,

cataract, functional changes, inflammations, irido-choroiditis, etc. How this sympathetic excitation is effected is not known.

Sympathetic irido-choroiditis is very variable as to the period of its appearance, with regard to the degree and the age of the inflammation determining it. It differs in no respect from any of the other varieties, though it more frequently affects the serous form. The plastic exudation is generally absent at the commencement, and only slowly appears at a quite advanced period of the disease. One of its essential characters is its malignity, and its extreme obstinacy to all therapeutical measures. It may not only follow an irido-choroiditis of the other eye, but also other inflammations of the deep-seated membranes, in which the products of exudation or the neoplastic masses become incrusted with calcareous salts; and often in these cases, even fifteen or twenty years may elapse without any disturbance in the healthy eye, when suddenly, and without any appreciable cause, it becomes very painful, and sympathetically irritated. The first symptom of this influence is, in many cases, a diminution in the range of accommodation, and fatigue from using the eye steadily for a short time only; then, a tendency to weeping, with an extreme sensibility of the eye to the action of light. This is followed by a rose-colored injection around the cornea from the slightest irritation, and a slight turbidity of the aqueous humor and the vitreous body, which renders vision as if interfered with by a more or less thick cloud.—In other cases, the irido-choroiditis comes on suddenly, and soon after the accident to the other eye.

Spontaneous irido-choroiditis may arise from a hereditary predisposition, and may be complicated with scrofula, syphilis, and rheumatism. It frequently occurs among females at the turn of life. Indeed, there exists a certain correlation between the condition of the uveal tractus and that of the uterine system.

Irido-choroiditis is consecutive to an iritis, especially when a total synechia prevents any communication between the chambers of the eye; in which case the anterior parts of the choroid are unceasingly subject to twitchings; the equilibrium between the pressure of the fundus and of the chambers of the eye is interrupted, in consequence of the interposition of the diaphragm formed by the adherent crystalline and iris, and the internal tension becomes considerably changed. If we puncture an eye attacked with a total synechia, only an incomplete discharge of the aqueous humor occurs, and the lens does not become placed directly against the posterior face of the cornea, as happens in the normal state.

As soon as the periphery of the iris bulges and projects forward, the symptoms indicating the participation of the choroid in the

iritis soon manifest themselves. The ophthalmoscope will discover, (provided the pupillary field is not occupied by plastic exudations), very fine opacities, especially in the anterior parts of the vitreous body, which ultimately become filamentous or membranous; a hypopion may also be observed in the anterior chamber, the very rapid and sudden appearance and disappearance of which indicates its origin in the anterior parts of the choroid.—The vessels enlarge, especially the veins of the iris; the large vessels around the cornea, in the vicinity of the episcleral tissue, also manifest themselves more distinctly. The touch (through the closed lids), discovers much tenderness around the cornea, in the ciliary region. The field of vision gradually becomes smaller. In the acute stage of the disease, the eyeball is hard to the touch, but it gradually becomes softer, owing to detachment of the retina.

When the irido-choroiditis commences in the choroid, the disturbances in the functions of the eye generally precede the symptoms of inflammation of the iris, and this membrane does not present the mark of a primitive inflammation. Abundant effusions may occur in the vitreous body, with detachment of the retina, and opacities in the lens; and when a plastic exudation occludes the posterior chamber, and the iris projects forward, an atrophy of the eyeball may be the result. Even at an advanced period of the disease, it is often possible to tell its commencing point.

There are three symptoms that should guide us in this research, viz.:—1. A preservation of the integrity of the tissue of the iris in disproportion with the functional disturbances of the eye. 2. The very frequent presence of opacities in the lens, without the iris even becoming the seat of an abundant exudation. 3. The considerable diminution of the acuteness of central vision, or the absolute loss of a part of the visual field, (from retinal detachment), which is much less frequent when the disease proceeds from iritis, in which case, the visual field contracts, but without disturbing central vision to any considerable degree.

There are three principal varieties of irido-choroiditis, as follows:—*a. Plastic irido-choroiditis* which is very difficult to diagnose, the affected parts of the choroidal surface, and the ciliary body being inaccessible to an examination, even when the pupil is strongly dilated. Attention is first called to a more or less considerable injection around the cornea, and which can not be attributed to the condition of either the cornea or the iris. The iris may be discolored and manifest a marked hyperemia; sometimes we may observe a certain number of vessels in it, and also from time to

time, quite a considerable increase in the depth of the anterior chamber; but at this period, little or no plastic exudation appears in the pupillary field, and at a further advanced stage, the symptoms of the iritis become more apparent. The injection around the cornea, the vascularization of the iris, the increase in the depth of the anterior chamber, the sensibility of the eye to the touch, and at a later period, disturbances in the vitreous body, are the only symptoms of plastic irido-choroiditis.

b. Serous Irido-choroiditis presents a less marked injection around the cornea, *very slight opacities in the anterior part of the vitreous body appear suddenly*, and at the same time symptoms of a serous iritis supervene; the posterior surface of the cornea becomes covered with many small points barely perceptible by the lens and oblique light. There is an increased tension of the eye, the anterior chamber becomes considerably deeper, and the iris loses much of its mobility. Vision is disturbed, and it is by no means rare for the disease to suddenly become transformed into a plastic, or, suppurative choroiditis.

Parenchymatous, or *suppurative irido-choroiditis*, presents a very decided injection around the cornea, complicated with a slight chemosis, which remains for several days, without our being able to account for its presence. Vision is altered but little or not at all; the iris performs its functions well,—aside from the hyperemia and a feeble vascularization of which it is the seat, this membrane undergoes no apparent modifications. No exudation occurs in the pupillary field. Suddenly, a considerable hypopion appears, and after a time wholly disappears; it may be reproduced, and then remains more and more in the anterior chamber,—after which vision becomes considerably disturbed, the vitreous body becomes flocculent, the iris decidedly inflamed, and in its tissue and in that of the anterior parts of the choroid, we may determine a purulent inflammation associated with a hypergenesis of the cellular elements.

Irido-choroiditis generally progresses as follows: The inflammatory phenomena may gradually disappear, and the hypopion be absorbed, leaving only a slight opacity on the posterior surface of the cornea. If, on the contrary, the disease advances, plastic and purulent exudations may form in the substance and upon the surface of the choroid, and, becoming organized, constitute vascular patches or crusts, sometimes quite thick. Gradually they reach the posterior parts of the iris, and become readily inflamed under the influence of the least direct irritation of this membrane. In consequence of the compression which its vessels undergo, the irian tissue

becomes successively atropied, and the nutrition of the vitreous body and of the eyeball is gradually so obstructed that this organ becomes atrophied.

In an advanced period of the disease, there will be a general choroiditis, with more or less atrophy of the nervous elements of the retina, which is sometimes infiltrated with pigmentary granulations, at others, it is detached by the products of serous exudation, and projects into the vitreous body, which is reduced in volume, and filled with opacities, or, globules of pus, if it be a suppurative cyclitis.

The *prognosis* of irido-choroiditis is very unfavorable in the plastic and parenchymatous forms; it is more favorable in the serous form, and in the early stage of the suppurative. It is a lengthy, insidious disease, may suddenly change its character, and, from the reiterated inflammatory attacks, greatly discourage both the physician and the patient. Purulent cyclitis is more serious when it follows the operation for cataract, than when it occurs spontaneously, without the presence of a purulent iritis.

There are few diseases of the eye that require so much experience, skill, and perseverance in its *treatment* as irido-choroiditis. This is so much more true, because the greater part of patients, either from carelessness, or because they entertain no apprehensions regarding the commencing symptoms, do not consult an oculist until at a period when considerable changes have already been effected in the tissue of the iris and of the choroid; and when the vitreous body is filled with numerous opacities indicating a considerable alteration of its nutrition.—Whenever active inflammatory symptoms present themselves, the usual means for their removal must be pursued, the same as for acute iritis or choroiditis; not forgetting hypodermic injections of Muriate of Morphia, or other sedatives, in the temporal region, and around the eye. These injections have already proved very valuable in nearly all the acute and chronic inflammatory conditions of the various coats and tissues of the eye, as well as in most painful affections of this organ.

In *plastic irido-choroiditis* frequent perspirations will be found to have a good effect. In the absence of active inflammation, the Iodine or Bromine Salts may be used, together with occasional hypodermic injections around the eye of dilute solution of Chloride of Gold and Soda. When the disease presents either multiple synechiæ or a total posterior synechia, we must not lose time by trying a medical treatment, but should immediately perform iridectomy, comprising, in the excision, a considerable part of the iris. And as soon as the iridectomy is finished, we must ascertain if the

site of the new pupil is not partly obstructed by exudative masses, because we will then run the danger of seeing it become obliterated. The margins of the new pupil become inflamed, as well as the neoplastic and vascular masses that occupy the opening made by the operator. As soon as the new pupil is obliterated, we must resort to a second, and sometimes, with certain subjects, to several successive operations, to attain the desired object; and if we attain it, not only does the disease become arrested, but the alterations it has produced begin to disappear.

Serous irido-choroiditis, which is often accompanied by an increase of the intra-ocular pressure, requires, on this account, a careful supervision. In addition to the means already named for the active inflammatory symptoms, cold applications over the eye, and leeches to the temples, will often be useful. Beside, we must be ready to perform reiterated paracenteses, or even iridectomy, if symptoms of glaucoma supervene.

Purulent irido-choroiditis is less amenable to treatment when it follows an operation. Especially in aged or feeble persons, warm compresses or cataplasms, as well as a tonic medication, will be found to have a better influence than any other treatment. When the cyclitis is kept up by the presence of a foreign body (as for instance a depressed crystalline) all other treatment is useless if we do not remove the injurious cause. With this object, we are often obliged to excise a portion of the iris and extract the lens, if the foreign body is lodged there, or has wounded it in penetrating the eye. If this can not be done, the eye is irrevocably lost, and then it only remains for us to do all in our power in order to prevent the destructive influence which this condition of the eye may exert upon the other.

When all other means fail to lessen morbid action in the diseased eye, it must be removed, in order to save the healthy eye. But all eyes are not to be enucleated; only those that present certain dangerous symptoms. The rules for resorting to enucleation of the lost eye are:

1. In all cases in which the healthy eye remaining completely intact, the other suffers from intolerable pains, unyielding to palliatives, and thus threatening the healthy eye.

2. In all cases in which the lost eye provokes even a very feeble irido-choroiditis in the other, for this operation will be the only method of curing the latter affection.

3. In all cases in which the remaining sound eye becomes affected with amblyopia, even in a slight degree; in which its range of accommodation rapidly diminishes; and in which this eye, very

irritable under the action of strong light, can not undergo a prolonged application, these last symptoms being often the precursors of irido-choroiditis. It will be so much the more urgent to perform enucleation, when an attentive examination can discover, either in the eye itself, or in the general condition, no other origin for these derangements than the sympathetic influence heretofore referred to. Beside, in cases of doubt it is much better to operate too early than too late, for we have often had occasion to observe the inutility of the enucleation, when the irido-choroiditis was fully confirmed.

In some cases, iridectomy is of no service, the new pupils become successively closed by exudative masses or vascularized neoplastic formations, forming, as it were, a second diaphragm, and of such a resistance that quite strong forceps or crotchets, introduced through a linear section, can not tear them. Beside, a crystalline cataract is frequently found behind the exudative crusts. The cornea has its nutrition deranged, from the obliteration of a more or less considerable number of the vessels of the ciliary body, and becomes reduced in its diameters. The whole plane of the iris bulges forward, not from a collection of fluid behind it, but from the hypergenesis of the cellular elements of the irian substance, and of the thick exudative deposits which crowd upon it; and the anterior chamber is very small.

In these cases, when a close examination authorizes us to believe that there is a sufficient preservation of the nervous elements of the retina, this membrane not being detached, instead of iridectomy, we may extract the lens and remove a portion of the iris with the crusts of exudation attached to it. We will, in most instances, have to make a new artificial pupil, after the performance of the above operation. (*Wecker.*)

4. *Apoplexy of the Choroid* proceeds from the rupture of one or several of the vessels of this membrane. It is produced without any appreciable cause, but more frequently after prolonged night watchings, violent paroxysms of anger, blows on the head, cerebral apoplexy, or a very chronic congestive condition of the choroid. When choroidal apoplexy is produced, the blood is effused into the most dependent part of the eye and detaches the retina at this point, or else, it perforates this membrane and enters the vitreous humor, where it coagulates in the form of a dark and diffuse-red patch. At other times, when the effusion is somewhat considerable, it occupies all the continuity of the retina, and forms at the bottom of the eye a thick veil which interferes with the light.

The *diagnosis* may be readily made out by an *ophthalmoscopic* examination, which will reveal retinal sanguineous patches; there may be several of these of different size, scattered over the fundus, and they may traverse the retina and pass into the vitreous humor, where they may become diffused or appear as distinct clots. These clots may be absorbed more or less rapidly, and when this process is going on, they lose their bright-red appearance, and become more or less brown; but those which remain unabsorbed a long time, often retain their primitive-red color, and character. The impairment of vision depends upon the situation of these deposits; if they involve the immediate vicinity of the macula lutea, vision will be very much interfered with; but considerable bloody deposits may exist in other parts, and be more or less permanent, without materially impairing vision. White patches may often be seen, indicating the disappearance of pigment. When the patches are from effusion in the retina, the retinal vessels will be seen in front of them, and at no point of their tract can blackish points, indicative of the rupture of a vessel, be seen.

The *prognosis*, always unfavorable, varies according to the abundance, and the seat of the effusion.

The *treatment* consists in active revulsive and counter-irritating measures, and the internal use of agents to promote absorption, as, Iodide of Potassium, Bromide of Ammonium, etc.

5. *Atrophy of the Choroid* is a concomitant or a consequence of many of the internal inflammations of the eye, and is always a grave symptom. The *ophthalmoscopical* appearances differ according to the particular portion of the membrane. If it affects the first layer, the fundus instead of the usual rose-color, presents a pale orange-yellow or brown tint, and perhaps we find brownish patches and streaks, giving the appearance of a scratched picture. Secondly, where the arterial layer (*chorio-capillary*) has become affected, we have obliteration of the capillary net-work, and we see the larger vessels beyond with unusual distinctness. Thirdly, where the venous layer has become involved, we find pigmental deficiencies and accumulations in such a manner, that the fundus has a spotted appearance, like that of a tiger's skin. *Treatment* is rarely of service.

6. The choroid may also be affected by various kinds of *tumors*, or, it may become the seat of various *degenerations*, which may be

diagnosed by the ophthalmoscope, but which are not amenable to treatment.

DISEASES OF THE RETINA.

1. *Pigmentary Retinitis. Choroido-retinitis Pigmentosa.* This is a peculiar form of choroido-retinal inflammation which is characterized by commencing near the ora-serrata, from which it creeps backward toward the optic disc, in a very gradual manner. It is frequently met with and is *caused* by whatever produces ocular congestions, such as, the sudden impression of brilliant light, prolonged study of near and small objects, etc. It also appears to be hereditary, and to manifest itself more especially among the offspring of consanguineous marriages.

Sometimes it commences suddenly, at other times, on the contrary, it begins in a slow and insidious manner, by a slight dimness of vision, twitchings in the eyeball, and various luminous appearances. After a longer or shorter time, the sight grows weaker, the extent of the visual field becomes narrowed, the recognition of objects placed laterally is difficult, and the patient, whose eyes seem agitated by a continual trembling, is obliged to direct his looks immediately toward an object presented to him, in order to see it; night-blindness also occurs. Nothing is learned from the outward aspect of the eye, until amblyopia occurs, when the pupil becomes large and sluggish.

The *diagnosis* is determined wholly by an *ophthalmoscopic* examination, which reveals, upon the surface of the retina, blackish specks and flakes of every conceivable shape, at first scattered, but subsequently, as they become more abundant, running together into a tangled web, the stronger lines of which often accompany the retinal vessels, which are much reduced in size. These specks first appear near the ora-serrata, and spread very slowly backward upon the bottom of the retina, and even on the papilla. The choroid in the meshes of this web is poor or wholly deficient in pigment; from the various abnormal changes it undergoes it presents exudations, atrophic spots, bloody specks, etc. The vitreous body itself participates in the disease, becomes softened sometimes, and contains blackish flakes proceeding from the depigmentation of the choroid. The optic nerve eventually becomes atrophied.

The prognosis of this disease is very slow, frequently extending over several years; and sometimes it remains stationary for a long period. Its *prognosis* is unfavorable, as it almost invariably involves a gradual loss of vision even to its complete extinction.

The *treatment* is rarely efficacious. It consists in the proper use of the means applicable to choroidal congestions, or choroiditis.

2. *Sub-retinal Dropsy. Serous Detachment of the Retina.* Under the influence of an inflammation of the deep-seated membranes of the eye, an effusion of serous matter may form between the choroid and the retina, detaching the latter and pushing it forward. This pathological condition is termed sub-retinal dropsy, and may be caused by choroiditis, retino-choroiditis, irido-choroiditis, a choroidal hemorrhage, etc. Under these circumstances the effusion occurs slowly, and is accompanied with other lesions observable with the *ophthalmoscope*, which will always clear up the diagnosis; at other times, the serous detachment is produced suddenly and without any secondary lesions, as, after an exposure to cold, an erysipelas of the face, or during the course of an albuminurous disease, in which case the effusion may detach the whole surface of the retina, or only a portion, generally the most dependent. We will examine these two conditions.

a. General Dropsy, or *Complete Detachment*, which may be recognized by direct or oblique light; but the *ophthalmoscope* will afford the best indications of its presence. The fundus of the eye will present the appearance of an opaline surface traversed horizontally by folds and minute projections of a pearly appearance, and furrowed by vessels of a larger size than in the normal state. The papilla can not be distinguished any longer, and if the patient moves his eye in various directions, the retina can plainly be seen undulating from the communicated movement of the eyeball, and under the influence of the agitation of the effused fluid; the ramifications of the retinal vessels may likewise be seen. It is by no means rare to observe hemorrhagic spots upon its surface, floating bodies in the vitreous body, and at a more advanced period, false membranes which obstruct the pupillary field and conceal the retinal detachment, or else, an ordinary soft and incurable cataract. These lesions always produce a total blindness.

b. Partial Dropsy, or *Partial Detachment*, will present under the *ophthalmoscope*, at the dependent portion of the retina, a floating mass of a white or grayish tint, furrowed with the flexuous vessels; the sudden curvature of which, produced by the passage of the portion of the detached retina from the healthy portion, as well as the contrast between the normally-colored fundus and that where the image of the choroid is damped, or wholly obscured by the detached

retina and the serum behind it, indicates the extent of the detachment. As to the other parts of the retina, they preserve their normal aspect; and sometimes, the papilla may be readily discovered. A retina which has been long detached is pearly white, but this color may be modified by the admixture of blood with the serum which is behind; and in rare cases it glistens with cholesterine.

The first physiological symptom resulting from this disease is an interruption or mutilation of the field of vision corresponding with the seat and extent of the detachment, and as this usually occurs at the inferior part of the fundus, objects which ought to form an image in this part (lying in the upper part of the field of vision) are not seen, and the field appears cut through by a horizontal line, which is commonly more sinuous than straight; this is called *hemiopia*. This obscure veil which hides a part of objects varies in position with every movement of the patient, because the effusion undergoes an undulation each time, which produces a variation of its relations with the visual field.

The progress of retinal dropsy is very slow. The separation often creeps on so insidiously, being unattended with pain or any external signs of mischief, that sometimes the lower hemisphere of the retina is stripped off from the choroid before the patient is aware that anything is wrong with his eye; and indeed the discovery is sometimes made accidentally by closing the sound eye. In some cases the effusion remains stationary for a long time and then disappears, being followed by an improvement of vision; while in other cases, the detachment goes on, becomes general, is complicated with various abnormal changes, the globe atrophies, and the patient is incurably blind.

The *treatment* in the early stage consists in the use of agents directed at the same time against the cause of the disease, when we can determine it, and to favor absorption of the effused matter. As, Iodide of Potassium, Bromide of Potassium, Chloride of Gold and Soda, hydragogue cathartics, Compound Infusion of Parsley, counter-irritants behind the ear and to the nape of the neck, and collyria containing Iodine and Belladonna. A very good collyrium may be composed of Iodine half a grain, Iodide of Potassium four grains, Sulphate of Atropia two grains, Distilled Water two fluidounces; mix. We may favor the action of these agents by exerting a gentle pressure upon the eyeball. A complete detachment of the retina is incurable; if it be partial, treatment may prevent it from becoming complete.

3. *Hemorrhage of the Retina. Apoplexy of the Retina and Papilla.* Hemorrhage of the retina is occasioned by a rupture of one or several of the vessels of this membrane; when it occurs suddenly it is termed "apoplexy of the retina." In some instances it complicates congestive, pigmentary, and albuminurous retinitis.

The *symptoms* are, a sensation of weight in the eyeball, a sudden obscuration of vision, varying in kind and degree with the extent and locality of the clot. The external appearance of the eye may be healthy. Its invasion is sudden, and instances have occurred where persons going to bed well have awakened blind.

Under the *ophthalmoscope* the *diagnosis* may be readily made out. Large reddish-brown patches are observed, sometimes a fine speckled appearance, analogous to the sanded appearance or red points observed in certain cerebral affections, and, at other times, a true clot which has undergone modifications corresponding with the period since it was formed. In some instances, a hemorrhagic spot occupies the papilla wholly concealing it; in others, the region of the yellow spot will be the seat of the lesion. Fresh blood spots have a rich crimson color, deepest at the center and fading off toward the edges; older ones are blacker, or brownish-red, rusty, or buff. The retinal vessels will be deformed, and at some point of their track will be seen one or several minute patches of black or dark-red blood which indicate the seat of their rupture; but, generally, we will be obliged to wait until some absorption has taken place before we can detect the exact point of rupture. Sometimes the vitreous humor is penetrated by a certain quantity of blood, which is very slowly absorbed. The clots do not present the crimson color in which they appear by reflected light out of the eye, but are dark, or even black, in consequence of the small amount of light that they reflect, affecting the observer's retina much less sensibly than the flood of light which sweeps past the clots from the fundus around.

The progress of these sanguine effusions, ordinarily retrogressive, may be followed by the *ophthalmoscope*, which we use to determine the gradual absorption of the blood, and which, after a certain time, shows the blood spot replaced by an atrophic white spot, often surrounded by a fringed border; as a general thing, vision is then recovered.

The *prognosis* of this affection is always grave; it varies according to the amount of effusion, its seat, and its duration.

In the *treatment* there are three indications to fulfill, viz.: 1, To diminish the hemorrhagic tendency; 2, to overcome any existing congestion; and, 3, to adopt means to favor the resorption of the

effused blood. To fulfill the first, the bowels must be kept regular, the skin be attended to, and diuretics be given, and which also assist in removing congestion. To fulfill the last indication, cold douches to the eye, ioduretted lotions, and a slight pressure exercised from time to time upon the eyeball, will be found beneficial. The following pills will be of service: Take of Bromide of Potassium two drachms, Podophyllin half a drachm, Guaiac Resin one drachm, Extract of Aconite one drachm, Extract of Black Cohosh a sufficient quantity; mix, divide into sixty pills, of which one may be taken for a dose, repeating the dose two or three times a day.—If the hemorrhagic tendency be due to a general cause, it should be treated by the proper hygienic and therapeutical means.

4. *Anemia of the Retina* is a pathological condition characterized under *ophthalmoscopical* examination by a pallor of the optic disc, or a dull whiteness, with a diminution of the number and size of the retinal vessels, and even by their complete disappearance. The arterial branches sometimes appear empty, contracted, and thread-like, and the veins more or less collapsed. *Atrophy of the papilla* or optic disc* frequently accompanies it, and which is indicative of

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* *Progressive Atrophy of the Optic Nerve, by Dr. Quaglino, of Milan.* "Progressive amaurosis, following atrophy of the optic nerves, is an affection which is, unfortunately, too often met with in practice. By means of the ophthalmoscope we may recognize it from its commencement, and follow it through its progress to its complete development.

"It is a fact well known to ophthalmologists, that, when the papilla of the optic nerve becomes whiter at any point, or over its whole surface, and at the same time the arterial vessels are less developed in the white part, there is a commencing atrophy of the papilla and of the optic nerve. When the papilla presents a pearly, tendinous aspect, strongly reflecting the light, and the arterial vessels have become filiform; when its center is sunken or hollowed, and its form irregular, we may, without any fear of being mistaken, affirm that the patient is already hemiopic, amblyopic from diminution of the extent of the visual field, or, amaurotic. In this last phase of the disease, experience has demonstrated that art is almost always powerless, and that the blindness is irremediable.—It will, then, be very important to determine both the exterior and interior causes which may lead to this extremity; in a word, to point out precisely the morbid process which is its proximate cause, that an efficacious treatment may be undertaken at its very commencement.

"Atrophy of the optic nerve is the disappearance of the nervous substance of its fibres, which is superseded by hypertrophy of the connective tissue, and converted into a fibrous substance, which ordinarily contains fatty globules. But what is the determining cause of this progressive metamorphosis?—Observation has demonstrated that the defect of nutrition and the compression of the nervous substance, produced directly by neurilemmitis, or pia-meningitis, are

some serious disease, as, a compression of the optic nerve by a cerebral or extra-ocular tumor. It may be known when examined by the

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well-known causes of the atrophy. Beside, the last is the more frequent. Let us now point out the causes which may, in a more or less direct manner, impede the nutrition of the optic nerve. A diminished arterial circulation, a sudden loss of blood from any hemorrhage whatever, an imperfect hematosis, as in chloro-anemia and hydroæmia, an insufficient nourishment, are very frequent causes of atrophy of the vessels and nervous substance of the papilla. These cases are far from being rare in practice, and they are not serious, when we can recognize them and treat them from the commencement; heretofore, these cases have been termed 'asthenic amauroses.'—Defect of nutrition may also be caused by a compression exercised upon the ophthalmic arteries, or, upon the optic cord, by tumors at the base of the cranium, or of the cerebrum, by specific periostitis, orbitoceles, or abscess of the orbit; but we will not dwell upon these cases.

"The most common *causes* of atrophy are congestion or inflammation of the membranes of the brain, and of the neurilemma of the optic nerve, or even of the spinal cord.—Hemorrhage and softening of the cerebral optical centers, as well as epilepsy, may also lead to the same alterations.—Beside the causes already pointed out, we have met with atrophy of the optic nerve as a consequence of long-standing neuralgia of the superior branch of the fifth pair, of venereal excesses, too sustained application of the eye, deep sorrows and prolonged watchings. Among old persons, there is a progressive atrophy of the optic nerves, which appears to be the result of atheromatous degeneration, and of dilatation of the arteries of the anterior circle of Willis, which produce a compression upon the optic nerves. We have never observed atrophy with persons poisoned by lead, nor after emboly of the central artery of the retina.

"Inflammation of the optic neurilemma, primitive or secondary, from an extension of phlegmasia of the retina, or of the cerebral membranes, is, as already stated, the most frequent cause of atrophy, and may be easily determined from the commencement by means of the ophthalmoscope.

"From what has been stated, it is natural to conclude that atrophy of the papilla and of the optic nerve is rarely an idiopathic disease of the nervous pulp; it is rather a consequence of pathological changes which it is of the highest importance to determine. The diagnosis will rest upon the appreciable characters of the papilla, upon the constitutional symptoms, and upon an exact commemorative account.

"There are two stages of this affection; the one acute, congestive, or inflammatory; the other chronic, with atrophy of the nervous fibres, anemia, and paralysis. The acute stage, which precedes the atrophy, and which presents an optical neurilemmitis, is only of short duration, and, if the amaurosis is already advanced, the symptoms of compression of the papilla will almost always have disappeared. Succeeding them, will soon appear the atrophic process of the optic fibres, resulting from the compression and from the degenerations which it develops in the nervous cellules. Almost always, notwithstanding the efforts of art, this alteration pursues its progress more or less rapidly. It is this regressive morbid process, independent of any congestion or inflammation, which we call *progressive atrophy of the optic nerve.* (1.)

"The amaurosis which manifests itself in this affection, whether it be present at the period of the meningitis or of the neuritis, or whether it exists with that

ophthalmoscope, by its tendinous or brilliant pearly-white appearance, by being generally small and arched in the middle, and by

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of the atrophy, almost always presents a group of symptoms, which we will describe in a few words. The disease may be developed in one eye, or in both at the same time. When it is associated with a unilateral neuritis, the alterations of vision may be limited to a single eye; but, if the point of departure is in the general weakness of the constitution, in a disease of the spinal cord, or a meningitis of the cerebellum, the disorder almost invariably affects both eyes at the same time. In both cases, the amaurosis commences by a diminution of the visual field, more commonly peripherical, with suppression of the corresponding phosphenes.

"Sometimes the retina becomes insensible to a feeble light, and presents the phenomenon of symptomatic hemeralopia, while the visual field contracts more and more, until the sight is wholly lost.—When hemiopia is present with both eyes at the same time, it often occupies the external side with one eye, and the internal side with the other; sometimes, on the contrary, it is the two external sides of the rĕtina which are affected. Perhaps, in the first case, there will be only a single nerve affected, while, in the second both will be involved. This fact will find its explanation in the partial decussation, generally admitted, of the fibres of the optic nerve.—In some cases, the perception of color is deranged; the patients see small globules of different colors, red, yellow, blue, especially during the night; while, during the day, the pavement and all the surrounding objects often appear dazzling white.—The patients have alternations of feeling well and ill; certain days they are quite well, and on others complaining; sudden atmospheric variations are apt to cause more disturbance of vision, as well as mental troubles, prolonged fasting, and an insufficient light. During the evolution of these symptoms, vision is gradually extinguished by paralysis of the optic fibres, and the patient preserves only a faint perception of light on the internal sides of the retinæ, which are always the last points struck with anæsthesia.

"The progress of this disease is very slow; it often remains stationary,—and may require months, and even years, to run through its fatal cycle.—A very limited vision is sometimes preserved at the internal side of the retina; the course of the disease will be more rapid only when bad hygienic conditions, or excessive labor, add their unfavorable influences.

The external membranes of the eye present only very insignificant indications; indeed, the pupils almost always preserve a certain degree of contractility; among old persons, we have almost always observed myosis.—Mydriatic dilatation of the pupil is rarely met with, except in the acute atrophy which accompanies hydrocephalus, violent meningitis, eclampsia, and neuralgia of the fifth pair caused by a rapid and intense compression upon the quadrigeminal bodies, the optic bands, and upon the roots of the third pair. In slow and progressive atrophy of the optic nerve, the patients sometimes experience transient lancinating pains in the bottom of the orbit, the temple, or in the nape of the neck.

"The general symptoms vary according to whether the commencing point of the atrophy is in the cerebral centers, or in the spinal marrow. When the disease is seated in the sensorium, we almost always observe giddiness, ringings in the ears, hardness of hearing, vertigo, weakness of memory, and a certain degree of hebetude.—When the disease commences by that affection of the spinal marrow, termed *ataxie locomotrice*, the patients complain of very acute, lancinating,

the retinal vessels being small, some branches obliterated, or, somewhat dilated, and of a varicose aspect. When not due to pressure,

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shooting pains, located in various places, following the track of the crural nerves. They experience cramps, a kind of feebleness of the inferior extremities, which is due to a want of co-ordination of their movements. There will be incontinence of urine, obstinate constipation, often very extensive paralysis, seizing, for instance, a whole member, or being limited to the hands, the feet, the extremities of the fingers, etc.; impotence is likewise frequently observed.

"The affection of the spinal marrow, which induces atrophy of the optic nerves, is almost always the result of venereal excesses, of abuse of liquors, and tobacco, and of mental troubles. In many instances, the myelitis is a consequence of typhus, miliary fever, or pellagra,—constitutional syphilis, erratic rheumatism and gout, are etiological elements which play a considerable part in the generation of atrophy of the optic nerves. Wounds of the head, the forehead, coup de soleil, sudden passage of lightning before the eyes, sleeping during the night with the head near a recently built wall, or on moist earth, as often happens to soldiers, are also, frequent causes of the atrophy under consideration.—When this affection is congenital, it almost always depends upon an intrauterine hydrocephalus.

"From what has been said, it follows that the treatment must vary according to the period of the disease, and the cause which determined it. If there still remains any congestion of the papilla, which may lead us to suspect the existence of a congestion of the cerebral membranes, or of a neuritis, we will employ a moderate antiphlogistic treatment, or else, we must produce a revulsive action on the bowels, by means of purgatives, aloes, etc. We may also employ contro-stimulants (*sedatives*), such as cherry-laurel water, extract of belladonna in small doses, especially if there is photobia with erethism. In those cases where the spinal cord is involved. which will be recognized by the special phenomena common to this affection, or, if the cause is a weakness of the ganglionic and vascular nervous system, due to venereal excesses, to anemia, mental sufferings, etc. great advantage may be drawn from a regular hydrotherapic (*hydropathic*) treatment, consisting of tonic excitant douches applied the length of the spinal column, and on the eyeballs themselves.

"When the atrophy is well-marked, presenting the papillary symptoms, and instead of congestion a diminution and decrease in size of the arterial vessels, and even exhaustion of the innervation, we must be very careful not to bleed, nor to weaken the constitution by a debilitating medication, as such a course would be dangerous to vision, and would only precipitate the amaurosis. Ferruginous waters, cinchona, bitter tonics, strychnia, camphor, arnica, electricity, pure healthy air, good diet, absolute rest of the eyes, will often arrest the disease, and maintain the hemiopia or the amblyopia in the stage which they have reached. If the disease be due to a specific cause, as syphilis, we must insist upon an anti-syphilitic medication. When the disease is of long standing and associated with a well-marked arthritic diathesis, treatment has always failed in our hands.

"The atrophy which supervenes with neuralgia of the fifth pair, is sometimes arrested in its progress by a proper tonic treatment; but if there exists at the same time a constitutional syphilis, amaurosis is unfortunately the rapid and inevitable result. We may say as much regarding the atrophy observed among old persons.

"Paracentesis of the cornea, which we have sometimes attempted in the

it may frequently be removed by attention to hygienic measures, aided by tonics and chalybeate preparations. If due to tumors, etc., it will continue progressing, and terminate in permanent blindness, unless the mechanical causes can be removed.

5. *Cysticercus of the Retina.* The parasite cysticercus tenuicollis has been occasionally met with in the eye. It is distinguished at the fundus of the eye by a tumor or small translucent projection, of an oval or button-like form, bluish-green, and giving off a more or less elongated portion which is its head. This singular affection involves morbid changes in the tissues of the eye, followed by loss of sight almost invariably. The choroid around the parasite becomes grayish-yellow, the neighboring retina becomes raised by serum, and the vitreous humor becomes turbid or opaque. The movements of this entozoon also reveals its character. There is no successful treatment known for it. A cataplasm composed of finely-powdered Balmony, White Indian Hemp, Pomegranate and Assafetida, worn over the eye, might possibly be of service in destroying the vitality of the entozoon; or a solution of the same frequently applied to the eyeball.

6. *Encephaloid of the Retina, and of the Optic Nerve. Intra-ocular Cancer.* This affection also termed *medullary sarcoma, fungus hæmatodes* is more common among young persons than adults, and is rarely met with in old age. It commences with a more or less dilated, sluggish, and irregular pupil, through which is seen, by the

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treatment of atrophy, in cases where there were tension and abnormal hardness of the globes, has not produced the hoped-for result, although it appeared to produce a slight amelioration in some cases. This was manifested immediately after the escape of the aqueous humor, and which we attributed to the return of blood in the atrophied and anemic vessels, the consequence of the kind of vacuum which the sudden evacuation of the aqueous humor produced.—Iridectomy has given no successful results, although it was performed in one case where there was tension of the globes and evident pulsation of the arteries of the papilla."

(1.) ["Atrophy of the papilla, consecutive to retinitis, whether simple, syphilitic, or of any other nature, or, to posterior atrophic choroiditis, may easily be distinguished from primitive atrophy of the optic nerves caused by neuritis or an affection of the nervous centers, if we will pay attention to the morbid changes which are produced in the retina, and the choroid, such as pigmentary degeneration, maceration of the pigment, and atrophy of the choroid.—Glaucomatous atrophy, caused by the internal compression exerted by the vitreous body on the papilla, is distinguished from those which result from retraction of the optic nerve, by the pulsations of the central artery, the abrupt interruption of the veins at the periphery of the papilla, the flattening, paleness, and diminution of the caliber of the arteries."]

ophthalmoscope, a yellowish-gray or reddish-yellow patch upon some point of the retina, somewhat resembling that in the eye of a cat. This patch enlarges, assumes an amber color, becomes unequal and embossed or nodulated, and eventually occupies the whole of the fundus. In this condition, if the eye be explored by twilight, or by a weak light, a deep-seated opacity will be seen, which gives a brilliant reflection like that of a brass or copper-plate; it will be seen more satisfactorily when the pupil is dilated. The other parts of the eye may be still healthy, there being only some visual disturbances; sometimes hemeralopia, and a slight sluggishness in the contractions of the pupil. At times strabismus is first noticed; or blindness may occur from the commencement. Ordinarily, there is no pain or inflammation in the early stage. Sometimes the disease will remain stationary for two or three years, but as soon as it begins to advance from the bottom of the eye it progresses rapidly.

In the *second stage* the fungous growth invades the vitreous humor, advances toward the iris, destroys the lens, and makes its appearance behind the cornea; the pupil becomes enlarged, the iris almost disappears, the sclerotic assumes a leaden color around the cornea, the cornea is increased in diameter, the eyeball becomes enlarged and misshapen, the eyelids swoln and pervaded by enlarged veins, with more or less severe pains, various inflammatory symptoms, and constitutional disturbance.

In the *third stage* the fungus destroys the cornea, a fetid, bloody, yellowish fluid is discharged, together with the lens, and the tumor protrudes and grows with great rapidity in the form of an encephaloid mass, which ulcerates, bleeds, and sloughs, and is accompanied with such exhaustion, painful, and grave phenomena, that the patient sinks in an agony of torture and suffering, or else expires comatose or convulsed. The only chance is extirpation of the eye at a very early period; but this is by no means uniformly successful.

7. *Albuminurous Retinitis. Albuminurous Amaurosis* or *Amblyopia.* This disease often coincides with the appearance of symptoms which characterize albuminous nephritis, as, swellings of the face and the inferior extremities, headaches, convulsive attacks, etc.; at other times, on the contrary, a disturbance of vision is the first manifestation of the albuminous affection. Patients then become fatigued after a slightly-prolonged reading, they complain that their sight is weak, has become shorter or longer, and no glasses can be found to improve the condition of their eyes; they experience interruptions in the field of vision, are annoyed by muscæ voli-

tantes, sparks, various optical illusions, and ultimately they become blind.

At the commencement we notice, by means of the *ophthalmoscope*, only a slight hyperemia of the papilla, (redness, vascularity, and, in severe cases, an indistinctness of the papilla), which soon disappears and presents nothing characteristic. At a later period, many pathognomonic lesions are observed; as, irregular red apoplectic patches scattered upon the retina, either around the papilla, or along the tract of the vessels; as the disease progresses the fundus of the eye becomes more and more confused, the pupil dilates, and the retina loses its normal color, becoming dull and appearing œdematous. The papilla soon participates in this infiltration; it appears larger and more prominent, and its outlines become less distinct; and, in the last stage, fatty degeneration of the retina is still more marked, and the surface of this membrane is studded with bright, yellowish-white spots, which form a ring around the papilla; these spots enlarge, from large (fatty) yellowish-white patches which cover nearly the whole of the retinal surface, and which are separated only by some very small vessels. In some instances, we may also observe, as where the choroid becomes the seat of secondary lesions, pigmentary patches, yellow atrophic spots, exudations, etc. The existence of all these lesions results in total blindness.

The progress of albuminurous retinitis is very irregular. Sometimes it commences suddenly and disappears in the same manner, to re-appear again; but more frequently the fatty transformation commences, and weakness of vision follows in a slow and progressive manner up to its last terminal stage.

The *diagnosis* is easy under an ophthalmoscopic examination; sometimes, we may throw great light upon the nature of the disease by an examination of the urine, especially if diabetes be also present.

The *treatment* consists in the employment of such agents as will remove the nephritic affection. (*See Treatment of Bright's Disease, and of Diabetes.*)

When symptoms of local congestion are present, the preparation of Aconitina and Hydrocyanic Acid, on page 1276, may be rubbed in around the orbit, and the following preparation may be given in doses of a teaspoonful two or three times a day: Take of Tincture of Digitalis one fluidounce, Tincture of Aconite half a fluidounce, Tincture of Opium three fluidrachms, Spirit of Nitric Ether three fluidounces and one fluidrachm; mix.

When the period of cogestion has passed away, pursue the treatment necessary for the nephritic disease, as above remarked.

8. *Morbid changes in the Papilla of the Optic Nerve*, or in the *Optic Disk*. The optic papilla is frequently the seat of lesions which, added to those discovered in the retina and choroid, reveal various affections, which, from being formerly unknown, were classed with amauroses. In some cases, an examination of the papilla alone by the *ophthalmoscope* will suffice to detect modifications in its form, color, extent, etc. These morbid changes, which are the frequent indices of deep-seated affections of the brain, of the spinal marrow, or of the optic nerve reflecting upon the functional phenomena of the organs of vision, give rise to peculiar symptoms which characterize a class of amauroses known heretofore by the name of "cerebral," or "extra-ocular amauroses." They are as follows:

a. Changes of Form. Instead of being round, as in its normal state, the papilla sometimes presents a somewhat angular and indented border, and is then usually accompanied with exudations, pigmentary accumulations and blood spots. Sometimes, it is sloped or somewhat concave, and its outline appears less distinct; in this instance it nearly always coincides with a posterior staphyloma.

b. Changes of Color. In *hyperemia of the papilla*, this disk assumes a very red tint, and is pervaded by turgescent vessels. In *apoplexy of the papilla*, extravasations of blood are observed, in the form of irregular reddish spots or specks. In *anemia of the retina*, which is often the commencement of *atrophy of the papilla*, we will observe this disk dull-whitish, with a diminution in the size and number of its vessels; in atrophy, it assumes a tendinous, brilliant, white, pearly aspect. Greenish papillæ are indicative of cerebral affections.

c. Changes of Extent. A diminution of the extent of the papilla characterizes *atrophy of the papilla*, as well as *of the retina*. The *ophthalmoscope* will show the papilla white and pearly, but smaller than natural, while the arteries and veins have lessened in diameter or are obliterated and replaced by whitish tracks. This group of lesions generally indicates compression of the optic nerve by a cerebral tumor.—The *atrophy* may also be symptomatic of a chronic affection of the membranes of the eye; but in this case we will also observe deposits of pigment, yellow spots, exudations, or floating bodies in the vitreous humor, etc., which will assist the diagnosis. As to the smallness of the optic disk when unaccompanied by a change of color, excavation, or other symptoms already pointed out, it is not of itself sufficient to evidence disease, and may coincide with perfect vision.

d. Changes of the form of the Papillary Surface. The alterations undergone by the surface of the optic disk are, excavation or depression, and an abnormal projection or elevation. *Depression* is

the more common, and is one of the pathognomonic characters of glaucomatous sclero-choroiditis; but we must not mistake for an abnormal depression, the slight hollow which naturally exists where the retinal vessels pierce the papilla. This excavation may also be met with when extra-ocular tumors have, by their pressure, effected an atrophy of the optic nerve; and, in this instance, the papilla will appear sunken, and its vessels seem to become bent or crooked after having passed through to the surface of the retina. Papillary excavation effects a progressive weakness of vision, and even its total loss.

Elevation of the papilla almost always coincides with its enlargement and its œdematous infiltration. It then appears large, swoln, projecting forward, of a dirty-yellow color, its outlines irregular, and its veins having a varicose appearance. This condition is found in albuminurous retinitis, and in some cases of œdematous infiltration of the papilla and retina caused by the compression of a cerebral or orbital tumor upon the optic nerve. This is always a grave lesion.

These alterations of the papilla being nearly always indications of an affection of the brain, spinal marrow, or orbit, etc., when they have been recognized by the ophthalmoscope, we must endeavor to ascertain all the local and general symptoms which are present, and which may enable us to positively diagnose, a softening, a cyst, an abscess, or tubercles in the brain, dropsy of the optic nerve, atrophy of the optic nerve, or any infra-orbitar tumor whatever. The lesion being determined, we must adopt the most rational treatment for it.

9. *Muscæ Volitantes. Scotomata. Myodesopia.* This is an affection in which a person observes floating before his eyes various objects, frequently called motes, and which are often very annoying, giving rise to much uneasiness and anxiety. They are of various appearances, being described as resembling small particles of soot, black spots of various sizes, sometimes straight lines, or waved, twisted, etc., and often with a luminous edge. At other times they resemble a convoluted string of beads, convoluted tubes, transparent bladders, luminous chains, or assume the figure of a small worm, spider, web, etc. These little bodies move in every direction with the movements of the eye, and then as soon as this organ is at rest, they slowly float across the field of vision. Vision is seldom, if ever, affected by the floating muscæ, and, although not removable by any treatment, they do not indicate any serious disease of the eye. They are more distinctly observed when the eyes are exposed to a strong light, as looking long at white objects well illuminated,

at flame or at a clear sky. They may likewise be rendered more distinct, or be brought into view when not before apparent, by looking through a pin-hole at the clear sky. Those who are myopic or presbyopic are often relieved from the annoyance of these spots, at least to a certain extent, when they use the proper glasses to render vision distinct. Those who are subject to them experience them in greater abundance after loss of sleep, overexertion of the eyes, fatigue, dissipation, sexual excesses, etc. The causes of these floating muscæ are very imperfectly understood; though supposed by some to be due to certain vascular conditions of the retina, or to bodies floating in the vitreous humor near the retinal surface. Mr. Hogg considers them as being due to detached granules or nodulated masses of pigment, or to an irregular arrangement of the pigment cells, in many instances.

As long as the sight continues good, the iris being perfect, the pupil of a natural color, and the patient can discern minute objects, there is no cause for alarm; vision is in no danger. But when they are accompanied with a failure of vision, which can not be attributed to myopia or presbyopia, or other changes observable by the eye of the observer, or under the ophthalmoscope, then we may fear the commencement of a cataract or amaurosis.

The best treatment for them, is, regularity of the bowels, moderate diet, rest of the eyes, regular habits, and frequent douching the eyes with cool or tepid water. No other medical treatment is required.

Fixed muscæ volitantes are those which, when observed, are always in the same position with regard to each other, as well as to the optic axis. Their motion is only apparent, depending on the motion of the eyeball. Sometimes there will be but one black spot, surrounded with a halo or outer ring, or there may be several of them. In reading, they appear like specks on the paper, or dance along as the eye moves, keeping constantly in the point of the field of vision, frequently in its center. The spots are generally black, though their color often changes.

Fixed muscæ are owing to insensible spots of the retina, frequently at its central part, and are indicative of commencing amaurosis, cataract, or posterior internal inflammation of the eye. Microscopists sometimes are troubled with these fixed muscæ, which are very troublesome when making examinations under the microscope, interfering with the view of objects in the center of the field, or at whatever part of the field of vision, the spots are stationed. Sometimes these spots are quite large from the first; at other times, from

a minute speck, they gradually increase in size until objects can no longer be seen.

When fixed muscæ are present, the eye should be carefully and thoroughly examined, and such medical measures adopted as the symptoms discovered will indicate. And, at all events, if no disturbances in the eye can be discovered, the progress of the muscæ should be carefully watched, and the eye be examined with the ophthalmoscope from time to time, keeping the patient upon a hygienical course of treatment calculated to check or postpone the presence of any serious symptoms. And, as soon as any lesions are observable, the necessary therapeutical means, as indicated by the lesions, must be promptly pursued.

10. *Atrophy of the Eyeball*, and *the Adaptation of an Artificial Eye.* Atrophy of the eyeball is a pathological condition characterized by a diminution of its size. Sometimes it is *passive*, as when it succeeds the evacuation of intra-ocular humors, from destruction of the cornea, penetrating wounds, rupture of the eyeball, and phlegmon of the eye. In this case, the membranes become weak and the eye retracts or shrinks into a small stump at the bottom of the orbitar cavity. At other times it is *active*, and follows an inflammation of the iris or of the choroid which is accompanied with absorption of the effused inflammatory products and of the normal fluids. Several degrees of active atrophy are distinguished, as, when the eyeball is somewhat soft with a slight diminution of its size, or, when the ocular walls become flaccid and retract within the orbit in the form of a nucleus, of variable size.—Atrophy involves loss of sight and deformity, and is incurable. The deformity may be overcome by the use of *artificial eyes.* Neuralgia of the ocular branches of the fifth nerve often attends atrophy of the eye; it may be benefited by the internal use of Aconite, Belladonna, Quinia, etc., and, if severe, by counter-irritation behind the ear.

An artificial eye is a light, thin, concavo-convex shell of enamel, perfectly smooth on both of its surfaces, the convex one being prepared so as to exactly, or nearly so, resemble the natural one. It should not be worn until the atrophied eyeball has perfectly cicatrized, and is free from inflammation and morbid sensibility; its use should occasion no pain or uneasiness, and it ought to move in harmony with the natural one, more especially from side to side. When worn, it should always be removed at night, and wiped clean, as the secretions from the eye ultimately roughen it, and impair its polish, and when this occurs to such an extent as to irritate the eye

when worn, it should be either repolished, or a new one be used, else troublesome growths will arise from the shrunken eye. With a little care, an artificial eye may be made to last eight or ten years, during which time it may require repolishing some three times. An artificial eye should not be allowed to remain in water, as this softens, and may crack it. After removing it, it may be dipped in tepid water, and then be gently wiped quite dry, with a soft rag. Great care should be observed in procuring an artificial eye, that it be neither too large nor too small, that it perfectly corresponds with the natural one in appearance, being neither too convex nor too flat. Patients can procure good eyes of this kind for about twenty or twenty-five dollars each. The best artificial eyes are made by Boissonneau of Paris.

To introduce the artificial eye, dip it in water, then raising the upper eyelid, slide the longest end, or that which is to correspond to the external canthus, up behind the lid as far as possible; then, turning this end toward the outer canthus, draw down the lower lid and make the lower edge of the artificial eye slip into the lower palpebral sinus, after which allow the lower eyelid to rise. At first, the eye should be worn only an hour or two at a time, and, as the parts become habituated to its presence, several hours, or all day. It should never be worn during the night, nor while sleeping through the day.

To remove the artificial eye, draw down the lower eyelid, and pass the head of a large pin, or a piece of wire bent like a hook, under and behind its lower edge, the eye-shell will, upon being slightly drawn forward, drop out. In order to prevent its falling on the floor and breaking, it will be better for the person to incline his face over a soft cushion or a bed, at least, until he is able to safely secure it in his hand at the time it drops out.—Both before introducing it, and after its removal, the person should bathe his own atrophied eye with cool or tepid water.

ABNORMAL CONDITIONS OF THE OPTICAL REFRACTON AND ACCOMMODATION OF THE EYE.

In the normal state, the eye possesses a faculty belonging to no other optical instrument, namely, that of adjusting itself almost imperceptibly and unconsciously to a distant, close, or medium distance. This faculty is called the "faculty of accommodation to different distances," and is due to certain conditions of the dioptric apparatus of the eye, to wit:

1. Contraction of the pupil. 2. The projection forward of the pupillary margin of the iris. 3. The increase of convexity of the anterior surface of the lens. 4. A slight increase in the posterior surface of the cornea, a phenomenon which appears to be under the direct dependance of the ciliary muscle, and, perhaps, also of the external muscles of the eye. 5. Certain asymmetries of the cornea and lens, which will be referred to when on the subject of *astigmatism.*

When these several conditions so affect the refractive power of the eye as to prevent objects situated at divers distances from being brought to a focus upon the retina, various disturbances in vision result, and which will be referred to hereafter.

The distance of *perfect vision* with a normal eye has been fixed at ten inches, and all persons who, at this distance, can see small objects or fine print very distinctly, are said to possess perfect vision. It must be recollected, however, that this distance will vary according to the size of the objects, and the sight of each person. Beside this perfect vision, the eye, by virtue of its faculty of accommodation, also perceives in a distinct manner both beyond and within the limits of this fixed distance, ten inches; and in these limits, only, the sight is *distinct* instead of *perfect*, that is to say, the person sees objects very well, but the details, the color, etc., lack that distinctness which constitutes perfect vision, and which is due to the luminous rays being dispersed upon the retina instead of exactly forming their focus there, as occurs when the objects are placed at what is termed "the distance of perfect vision."

The limits of perfect vision vary among different persons, being for ordinary printed letters, from four to sixteen inches. Beyond or within these limits, the sight may be distinct, but it is no longer perfect. This extent of four to sixteen inches, expresses then the *field or range of accommodation* for normal sight. If the objects are larger they will be seen more distinctly farther off, and the range of accommodation will be more extended. With myopes, this range is restricted, for they can distinguish small objects only at varying distances of a few inches. On the contrary, it is more extensive among presbyopes.

As to the limits of distinct vision in the sense of distance, they depend upon the degree of sensibility of the central part of the retina, and the perfect transparency of the dioptric apparatus, and which condition we may ascertain by placing before the eye, a card in which a pin-hole has been made, and looking through it, successively, at near and distant objects. By this experiment, we annul the effect of the lens, and suppress the faculty of accommodation,

and all objects in front of the aperture in the card, form a focus upon a point of the retina and are seen in a distinct and perfect manner, allowing, however, for the diminution of the luminous intensity due to distance. If, then, an object placed at twenty inches, for instance, is seen dim and confused (with the eye); but, on the contrary, is observed distinctly by means of the perforated card, we may conclude that the sensibility of the central part of the retina, and the transparency of the dioptric apparatus are perfect.

We may ascertain the individual differences of the faculty of accommodation, that is, the *range of distinct vision*, by placing before the eye under examination a card perforated with two pin-holes, at a distance from each other less than the diameter of the pupil, and also placing very fine print at various distances from the eye. At four inches from the eye, for instance, suppose the image is made behind the retina, then, the rays which pass through the two holes will make an impression upon the retina before intersecting each other, and the sight will be double; but at ten inches, if the rays meet each other upon the retina and at the same point, the sight will be simple; ten inches then will represent the nearest limit of distinct vision. If we remove the characters to an indefinite distance, the image will remain distinct if vision be perfect; but if the accommodating power, as usually happens, has a limited distance, at twelve, fourteen, or sixteen inches, the double images will re-appear.

The extent, then, comprised between the four and sixteen inches is the measure of the limits of the accommodating power. These limits vary, they are sometimes nearer, as two to ten inches, sometimes further off, as eight to twenty inches, sometimes very near, as two to two and a half inches, and in this case there is more or less complete paralysis of the accommodating power. The greatest power of accommodation varies between three and twenty-four inches.

The best eye is that which possesses the greatest accommodative power, with a perfect sensibility of the retina, and a complete transparency of its dioptric organs. However, as both eyes take part in the visual act, one condition, still, for perfect vision, is, that the movements of convergence for the vision of near objects, and of divergence for that of distant objects, be in harmony with the internal changes due to the accommodation. Now, this degree of convergence of the optic axes, which varies with the distance of objects, ought, in perfect vision, to have no other limits than those of the accommodating power. The limit of the convergence of the two eyes may be estimated as follows:

A black line is traced on a white piece of paper, and placed horizontally before our eyes at a distance of two inches; we observe that this line is bifurcated before starting from a certain point which is the superior limit of the convergence of the optic axes; now, if vision is normal, this point should correspond to the minimum point of distinct vision with a single eye, four inches, for instance. As to the limits of the divergence, it is the parallelism toward infinite distance.

Donders states that "*normal* or *emmetropic* eyes are those, in which, when the eye is at rest, parallel rays are brought to a focus on the retina. When the normal eye is in a state of rest, the focal point of its dioptric system is situated on the bacillar layer of the retina."

Before proceeding further, I will explain some of the signs or expressions made use of by oculists, and which will materially aid the reader in understanding the estimations, etc., made by them:

Positive glasses, or convex, or +.

Negative glasses, or concave, or —.

$-\frac{1}{20}$, means concave glasses of 20 inches focal distance; $-\frac{1}{6}$, concave glasses of 6 inches, and so on.

$+\frac{1}{20}$, means convex glasses of 20 inches focal distance; $+\frac{1}{6}$, convex glasses of 6 inches.

Infinite distance; at or beyond eighteen feet from the eye, or a distance at which the rays coming from an object fall parallel upon the eyes, and are brought to a focus upon the retina without any effort of accommodation.

Finite distance; within eighteen feet from the eye, or a distance at which the rays coming from an object fall in a divergent direction upon the eye, and are not brought to a focus upon the retina, but behind it.

Positive accommodation; adjustment of the eye for near objects.

Negative accommodation; adjustment of the eye for distant objects.

Range of accommodation; the distance between the farthest and nearest points of distinct vision.

a. An ideal lens, (a meniscus), which placed upon the anterior surface of the crystalline lens, would afford to rays emanating from the near point of distinct vision, a direction as though they came from the far point.

A. Range of accommodation. $A=\frac{1}{a}$.

1: A, Absolute range of accommodation.

1 : A_1, Relative range of accommodation.

1 : A_2, Binocular range of accommodation.

r. Far point of distinct vision, = ∞. Or,

r. Absolute far point of distinct vision.

r_1. Relative far point of distinct vision.

r_2. Binocular far point of distinct vision.

r'. Far point, when a convex lens of 6″ or 10″ focus is placed before the eye.

p. Near point of distinct vision, =4″ or 5″. $\frac{1}{p}-\frac{1}{r}=\frac{1}{a}$. Or,

p. Absolute near point of distinct vision.

p_1. Relative near point of distinct vision.

p_2. Binocular near point of distinct vision.

p'. Near point, when a convex lens of 6″ or 10″ focus is placed before the eye.

∞. Infinite distance.

′ Foot.

″ Inch = 1 Eng. in. or 0.94 Paris in.

‴ Line.

S, Acuteness, of vision.

E, Emmetropia.

H, Hypermetropia.

Hm, Manifest hypermetropia.

Ht, Total hypermetropia.

Hl, Latent hypermetropia.

M, Myopia.

Pr, Presbyopia.

As, Astigmatism, of the whole eye.

Ah, Hypermetropic astigmatism.

Am, Myopic astigmatism.

Amh, *or* Ahm, Mixed astigmatism.

Asc, Astigmatism of the cornea.

Asl, Astigmatism of the lens.

in H, in the horizontal principal meridian.

in V, in the vertical principal meridian.

c, Simple cylindrical glasses.

c ⌈, Bicylindrical glasses.

s ⌓, Spherico-cylindrical glasses.

V, Degree of acuteness of vision. $V=\frac{d}{D}$.

d, The distance at which an object, or print, is actually seen.

D. The distance at which an object, or print, is apparent at an angle of five minutes. In Snellen's Test Types, the numbers above

the type or letters express in Paris feet the distance at which the letters are seen, by a normal eye, at an angle of five minutes.

Acuteness of vision, or sensibility of the retina, in the normal eye, has assigned to it, 1, as the standard degree. Thus, if a normal eye distinctly distinguishes No. XX of Snellen's Test Types, at 20 Paris feet, then

$V=\frac{d}{D}=\frac{20}{20}=1$, the normal standard of acuteness of vision.

But, on the contrary, if No. XX can only be seen at 10 Paris feet, then $V=\frac{10}{20}=\frac{1}{2}$, the degree of acuteness of vision.

If No. L can only be seen at 10 Paris feet, then $V=\frac{10}{50}=\frac{1}{5}$, the degree of acuteness of vision, and so on.—If d be greater than D, that is, if No. XX can be seen at a greater distance than 20 Paris feet, or No. L at a greater distance than 50 Paris feet, then the vision is more acute than the normal average.

In this experiment for determining the acuteness of vision, M. Giraud-Teulon prefers that the person look through a pin-hole pierced in a black card, which guards the vision against any influence of accommodation, and, as this may tend to diminish the quantity of light, the test types must be well illuminated, and the eye likewise be protected from all neighboring incident light.

The *range of accommodation* is estimated by ascertaining the far and near points of distinct vision. Thus, if the near point be at 6″, and its far point at an infinite distance, and as $A=\frac{1}{p}-\frac{1}{r}$, therefore, in the present case, $A=\frac{1}{6}-\frac{1}{\infty}=\frac{1}{6}$. If the near point be 4″, and the far point 8″, from the eye, $A=\frac{1}{4}-\frac{1}{8}=\frac{1}{8}$.

1. *Asthenopia; Copyopia; Weakness of Accommodation; Paralysis of the Ciliary Muscle.* (*See note to Strabismus, on* page 1387.) This disease, heretofore considered as the commencement of amaurosis, is only the result of prolonged efforts of accommodation, of too long-continued application of the eyes in reading, writing, sewing, etc., or in performing work with a too feeble or a too intense light, and, perhaps, using improper spectacle glasses. It may also occur under the action of general debilitating influences, such as, loss of blood, prolonged lactation, etc., and all the chronic diseases which exhaust the constitution and enfeeble the energies of the

nervous system. The affection commences in early life, and may remain during the patient's existence; occasionally, but rarely, it commences about middle age. It is frequently due to hypermetropia, and is also met with among the myopic and the presbyopic. It is, however, more frequent among the latter at the close of continued efforts of accommodation in viewing near objects, as with engravers, watch-makers, tailors, clerks, seamstresses, stereotypers, etc. Two degrees of this affection may be distinguished: 1st degree, or asthenopia proper; 2d degree, or paralysis of accommodation.

*a. Asthenopia Proper.** This first degree of the affection commences by the eyes becoming fatigued, and an indistinctness of

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* *Muscular Asthenopia, by A. Von Græfe.* "Although not a rare disease, muscular asthenopia is, however, much less frequent than asthenopia of the apparatus of accommodation, and its study is the more important, as it yields to proper treatment. Patients laboring under it complain of nearly the same symptoms as those affected with ordinary asthenopia; and, although there are certain differences in the subjective symptoms, which will be pointed out hereafter, they are not so clearly marked as to serve as the foundation of the diagnosis. This can be positively assured only by an attentive observation of the objective symptoms.

"The principal points to which attention should be given, are the following:

"1. In ascertaining the nearest points of binocular fixation, we find that it is further off in muscular asthenopia than in the normal condition. However, it is only the more advanced stage of the disease that is thus manifested.

"2. On placing an object at the ordinary distance of reading, and then covering one eye, we find that this undergoes a certain deviation toward the external angle; which evidently proves that, during the fixation (looking steadily at an object), there exists an excessive tension of the internal rectus muscle. The degree of the deviation will equally indicate that of the tension. Although this is a perfectly exact method, it is not applicable to deviations of very slight importance, which escape measurement.

"3. We know that, by placing a prism with its base turned downward, before an eye, diplopia is produced. Simple vision finding itself thus interrupted, the eyes soon endeavor to replace themselves in the muscular equilibrium, which has been suppressed, favorable to simple vision. In muscular asthenopia, we not only obtain superposed images in the vertical line and corresponding to the position of the prism, but likewise images superposed and crossed at the same time. This method may also serve to measure the angle of the muscular insufficiency, the degree of which is indicated by the angle of the prism required to replace the crossed images in the vertical position.

"4. In ascertaining the strongest prisms which the internal and external recti muscles may overcome, as well in the adduction as in the abduction of the eye, we will find a very marked difference in favor of the external rectus, a difference which may be relative or absolute according to the physiological circumstances—the different positions of the eye. This method is complementary of the third; and although this shows us the degrees of the muscular insufficiency, we can calculate its influence in the production of asthenopical symptoms, only by comparing the results of the last two methods.—We have, then, this

vision, which symptoms are more frequently observed in the evening than during the day. They persist for some time; finally, although the vision is good, yet the patients will remark that, after having used their eyes for a short time, in reading, writing, or at work, etc., a sense of fatigue comes on, they are obliged to close their eyelids, to momentarily suspend their occupations, or else experi-

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fundamental law for asthenopia; *that the greater the muscular insufficiency, relatively to the adduction of the eye, the greater will be the asthenopia.*

"The causes of the disease are not yet perfectly known. It appears, however, that the commencing point is a relative preponderance of the external rectus. The exclusion of an eye from the act of ordinary vision appears equally to dispose certain persons to it. Debilitating diseases and certain narcotics also weaken the external muscles. But, undoubtedly, the chief cause is, a disproportion between the force of the external recti muscles and the refraction of the visual organ. Thus, myopic persons require a relatively greater convergence of the visual axes, and if the external recti muscles are not developed in consequence, that is to say, if they are not stronger than in the physiological state, they give rise to *relative astheno ia.*

"As to the treatment, all means should be rejected having for their object gymnastic exercises of the eyes at very close distances, as such exercises must necessarily occasion fatigue to the muscles. The principal remedy is *tenotomy* of the external rectus; and the limits to which the operation should be carried are indicated by the maximum of abduction that the patients can produce with prisms in looking steadily at distant objects; or in other words, the previous trial made with the prism indicates in a very precise manner the degree of the recoil which we must make the muscular attachment undergo." (M. Knapp states, that all other means, except tenotomy, almost always fail in curing the affection.)

"The second method, it is true, is not curative, but it enables the patient to work; it consists in the use of *prismatic glasses* for reading. They must be selected so as to sustain an abduction proportioned to the degree of insufficiency. By diminishing the convergence of the visual axes, these glasses exert an influence on the relative state of the accommodation, so that we are sometimes obliged to combine them with convex glasses, even when these are not required by a co-existent hyperopia or presbyopia.

"The third method consists in giving *weak concave glasses* to the patient, provided that he is myopic and that the measure of the insufficiency demonstrates a very marked diminution of the latter with a moderate separation of the object of vision. We must, however, take into account the causes of the myopia, although the reasons for which we generally hesitate to recommend concave glasses for near work, are less applicable to patients affected with muscular asthenopia, chiefly because, with them, the latitude of the relative accommodation is otherwise disposed.

"The fourth method consists in the *exclusion of an eye.* It is frequently produced spontaneously; but we may facilitate it by different methods. It is the least perfect method, and is not without inconveniences to the eye thus excluded. But, under certain circumstances, especially in excessive degrees of myopia, it is the only resource; for it is impossible to bring the eyes back to the binocular act while there is constantly in operation a convergence of three inches and less."

ence pain from persisting in them. This sensation of fatigue and pain frequently extends throughout the entire frontal region. At a still later period, these symptoms come on as soon as the eyes are fixed a little attentively upon a near object, and eventually terminate by being constant. The eyes of these patients seem dull, heavy and inactive, and are directed toward objects in a weak, indecisive, hesitating manner. Sometimes, the pupils are quite lively, at other times very sluggish in becoming dilated. An *ophthalmoscopic* examination will occasionally detect a congestion of the choroid and retina, due to a want of nervous energy in the blood-vessels, or to some cerebral difficulty.

The *diagnosis* is readily made out; we arrive at it by exclusion, after being satisfied that the dioptric apparatus of the eye is transparent, that the retina is sensible, and the deep-seated membranes are healthy. We *distinguish* it from *amaurotic amblyopia*, or the first stage of nervous amaurosis, by observing that in this latter disease the weakness and obscurity of sight are constant, for small as well as for large objects, distant or near; while in asthenopia the indistinctness of vision occurs only when the eyes have been exerted upon near objects. Again, in amblyopia the objects appear clearer after the patient has fixed his eyes upon them for some time, while, in asthenopy, the longer he fixes his eyes upon them the more confused they appear.

The *prognosis* of this affection is unfavorable, especially if it has existed for a long time, and particularly if it be due to a cerebral disease, or to a lesion of the nerve of the fifth pair. It rarely, if ever, passes into amblyopia, or terminates in blindness, but it frequently causes paralysis of accommodation.

b. Paralysis of Accommodation, is the second or more advanced degree of asthenopia. There is paralysis of this faculty in *myosis* or contraction of the pupil, in *mydriasis* or dilatation of the pupil, and among those who have been operated upon for cataract. It may be distinguished from simple weakness of accommodation, by observing that, in this, the limits of distinct vision are much nearer, while in the first the two limits of distinct vision are almost entirely blended together, and objects are seen distinctly only in a particular, limited space, always invariable in its position. Thus, certain patients can readily distinguish near objects, and can not see those at a medium or far distance, while others can only distinguish them at a medium or far distance.—The *prognosis* of paralysis of accommodation is still more unfavorable than that of asthenopia.

Treatment. In the first degree, there must be rest of the eyes; cessation or diminution of such employments as require a long-con-

tinued use of the eyes, especially on small objects; application of cooling lotions and douches to the eyes, fresh water in particular being used; country air; exercise; promenades; cold bathing; exercise of vision at long distances; and the use of neutral glasses in broad daylight, or by intense artificial light, are the means more commonly pursued. The lotions should be applied upon the lids and brow, and, when pain is present, may consist of Tincture of Aconite, Tincture of Cannabis Indica, or the Hydrocyanic Acid and Aconitina mixture on page 1276. The vapor of Bisulphuret of Carbon, or, of a mixture of one scruple of Iodine dissolved in two fluidounces of Chloroform, should also be directed upon the eyeball, once or twice a day, by means of an eye-cup and bottle, continuing the vapor each time until it occasions a sensation of heat. If there be much contraction of the pupil, *myosis*, a drop or two of a solution of Atropia may be placed upon the eye once a day; and if there be much dilatation, (*mydriasis*), this may be overcome by a drop or two, daily, upon the eye, of a solution of Morphia, or a very dilute solution of the Calabar Bean.

We must second these means by the use of very weak convex glasses, or still better, prismatic or concavo-prismatic glasses of a very weak degree, placing the angle *within* for the presbyopic, and *without* for the myopic. If the asthenopia be due to hypermetropia, the patient must gradually use stronger and stronger convex glasses, until that number is reached which really neutralizes his hypermetropia, which he required when his power of accommodation was paralyzed by atropia. (*See Hypermetropia*). If we wish to permanently cure the patient we must prevent all undue straining of his accommodation, and this can be done only by completely neutralizing his hypermetropia, enabling the eye to see distant objects perfectly, with scarcely any exercise of the power of accommodation.

In the *second degree* the same means will be pursued, in connection with stimulants; thus, Tincture of Camphor, of Arnica, of Prickly-ash Bark, etc., may be added to the douches, and excitant frictions be made upon the eyelids and in the neighborhood of the eye, and electricity or electro-magnetism may also be made use of. Any irritation of the retina occasioned by the circles of dispersion, (blurred vision), caused by the inefficient action of the accommodative apparatus, may be lessened by having the spectacles of a blue tint. But, as all blue and some green-colored glasses increase the chemical action of light, and may augment the excitement of an already overwrought or irritable retina, it is recommended to use for weak sight only *neutral-tinted* glass, without any admixture of blue.

In both degrees constitutional treatment is often necessary, adopting the proper means to overcome any local or general disease present, which may produce or aggravate the asthenopia, as, debility, leucorrhea, seminal emissions, etc. Ordinarily, vegetable and chalybeate tonics will prove very beneficial. As a general thing, counter-irritation will be found of little value. Sometimes solution of Strychnia will prove of great service, taken internally.

Asthenopia from a deficient power of the Internal Rectus Muscle, is described in the selection from Gräfe, *in the Note* on page 1517. I may briefly remark here, that although this variety of asthenopia, is principally met with among myopic patients, yet it may occasionally be observed in hypermetropes. The character of the asthenopia may be determined by the following symptoms: 1, The nearest point of binocular fixation is further off than in the normal state; 2, if we have the patient to look steadily at an object, placed at the ordinary distance of reading, and then cover one eye, we will observe that the covered eye deviates toward the external canthus; from whence we must conclude that, during the steady gaze, there exists an excessive tension of the internal rectus muscle; 3, we place before the eye a prism with the base directed downward,—the eyes resume their muscular equilibrium which had been interrupted during the exercise of simple vision,—and the patient complains of seeing double images, not only *superposed in vertical lines* and corresponding to the position of the prism, but also *crossed* at the same time; the diagnosis is completed, by ascertaining the strongest prisms that the external and internal recti muscles can sustain, without vision ceasing to be simple. This test will give a marked difference in favor of the external rectus. The cure is effected by total or partial division of the external rectus muscle.

2. *Myopia*, or *Near-sightedness*. Myopia is due to an imperfection in the accommodation of vision, which permits one to see perfectly only at a very short distance, a distance less than that constituting normal vision; and is more common among males than females. It presents variable degrees, according to the persons, some of whom can only see at a distance of one or two inches, while others can see distinctly at two or three inches, or even six or seven. These differences establish the various degrees of near-sightedness. (*See note to Strabismus*, on page 1387.)

This imperfect state of the accommodation is due either to an increase of the antero-posterior diameter or axis of the eye, or to an

increased refractive power of the refractive media, so that, in either case, the parallel rays emanating from distant objects are brought to a focus before reaching the retina in consequence of which, a confused and indistinct image of them is formed upon the retina. But when the objects are brought nearer, the rays from them becoming more divergent as they are approached toward the eye, (and consequently do not form a focus so soon), the indistinctness of the image becomes less and less, until at a certain distance from the eye, the image is formed upon the retina; at this point the vision is distinct.

Donders states that "*myopic* or *brachymetropic* eyes, are those, which are adjusted, when in a state of rest, for divergent rays. In this case, parallel rays are, even when the eye accommodates itself for its furthest point, brought to a focus *before* the retina; so that distinct images are formed on the retina only of those objects, the rays from which impinge divergently upon the eye. In the myopic eye, when in a state of rest, the focal point of the dioptric system lies *before* the retina."

This affection is sometimes hereditary, and frequently acquired. Among the *causes* which may produce it, we may name, the necessity required in certain professions of looking at objects very close to the eye, as, watch-makers, printers, proof-readers, engravers, etc.; it may also be produced among scholars who stoop forward in reading and writing, as well as by dwelling in dark places, wounds of the cornea, conical cornea, posterior sclero-choroiditis, hydrophthalmia, intra-orbitar tumors which compress the eyeball laterally, strabismus, and the prolonged use of concave glasses, gradually increased in strength which, some young men are in the habit of wearing to avoid being drafted into the army. Von Roosbroeck's researches tend to establish the fact that *posterior staphyloma* is present with nearly all myopes, nine times out of ten.

Myopia is rare in the country and among sailors, because country people and seamen seldom fix their looks upon near objects, their vision being carried almost always to considerable distances; in cities, on the contrary, the kinds of business pursued therein, nearly always require the exercise of vision at short distances. Young folks read, write, or draw from morning to night, frequently employing strong lens, and commence at an early period to assist vision by using badly-selected or improperly-adapted concave glasses, which they renew from time to time, and which, instead of correcting their defect of vision, constantly aggravates it.

In general, myopes have large and projecting eyes; the cornea and the sclerotica are prominent; they readily wink, appear as strangers to those around them, and can not pay attention to the

looks of those with whom they are conversing, on which account their eyes, as well as their features, often present a dull, stupid appearance.

To determine if a person is myopic, it is sufficient to know that he is obliged to hold his book close to his eyes, or at a distance of from one to three or four inches, in order to read, or distinguish characters, and, that beyond six or nine inches he can not read at all, nor distinguish characters; and if, under these circumstances a concave glass enables him to distinctly read or distinguish characters at a considerable distance, we may pronounce him to be myopic; and the number of the glasses indicates the degree of the myopia. If, instead of improving vision, concave glasses disturb or confuse it, the patient is then affected with *amblyopia.*

A more difficult question to determine is whether the myopia be pure or complicated. It is frequently met with in connection with posterior sclero-choroiditis, in which case amblyopia is apt to be present.* Sclero-choroiditis is always a dangerous complication, and is apt to be present when the far point of distinct vision is less than five inches, and occasionally ten or twelve inches from the eye. Simple myopia can be completely corrected by suitable concave glasses; if amblyopia be present this will not be the case. A person suffering from a simple myopia should, with the proper concave lens be able to read the same print at the same distance as the normal eye, that is, No. XX and No. XV of Snellen's test-types at a distance of twenty feet. If, however, with the most carefully-selected glasses he can only read No. XX at that distance, he is also amblyopic. The less the concave glasses correct, the greater is the

* Donders makes the following important remarks: "During youth, every myopia is, perhaps more or less progressive; the progress of the affection is then accompanied by symptoms of irritation, which, according to Von Græfe, may even assume the character of sclerotico-choroiditis posterior. This is the critical period for the myopic eye; if the myopia does not at the same time increase too much, it may remain stationary; or, at a more advanced age, even decrease. If, however, it becomes greatly developed, we shall find it almost impossible hereafter to arrest its progress. At this stage, we must therefore avoid everything that may cause determination of blood to the eye, and thereby tend to increase, not only the sclerotico-choroiditis, but also the tension within the eye. I can not lay too much stress upon this. *Every progressive myopia is threatening to the eye.* If it remains progressive, the eye will soon become less and less usable, (troublesome symptoms at the same time showing themselves), and not unfrequently vision is irrevocably lost at the age of fifty or sixty, (if not sooner), through detachment of the retina, extravasation, or atrophy and degeneration of the yellow spot." Hence, young people having myopia, should not engage in pursuits requiring too close an application of the eyes, as, to reading or writing, at short distances, to watchmaking, fine writing or engraving, reading fine print, etc.

degree of the co-existing amblyopia, and *vice versa*. It must, however, be recollected, that hypermetropia interferes with distant vision, as well as myopia.

Myopia may also be complicated with a diminution of the sensibility of the retina, or acuteness of vision; indeed, this is the case with most myopes. If the person, in looking at distant objects, through a pin-hole in a blackened card, can see them distinctly, the retinal sensibility is normal. An evidence of diminution of the retinal sensibility is, that very small circles of diffusion occasion a disturbance of vision, that is, the myope having selected the appropriate number of concave glasses to distinctly read letters at the distance he selects, by removing these letters only a short distance further, his sight becomes confused.—Posterior sclero-choroiditis, obscurities of the dioptric system, hyperemia of the retina, etc., affections which sometimes complicate myopia, may be determined by an examination under the ophthalmoscope, or by means of oblique light.

Myopia may be recognized under the *ophthalmoscope*. If we examine the myopic eye without any convex lens in front of it, the fundus will be seen, as it were, at some distance from the eye. If we look at one of the retinal vessels, or the papilla, and move our head to one side, we will observe that the image moves in an *opposite direction;* if we move to the right it moves to the left, and *vice versa*, so that we get a reverse image of the fundus. Again, in order to obtain a distinct image of the fundus, we must place a concave lens behind the mirror, (the greater the myopia the stronger must this concave glass be, and the nearer must we approach ourself to to the eye); the field of vision will appear smaller, and the image nearer the eye of the observer, than in the normal eye. The image is less bright in color, and less illuminated, but apparently larger; for we can not, as in the normal eye, (the size of the pupil being equal), overlook the whole optic disc at a glance, but only a portion of it.

The *progress* of myopia is variable, on which account we should accurately determine its degree, so as to be able to judge at after periods whether it has remained stationary, or has progressed. The most favorable cases are those in which it remains stationary; when it progresses, it is unfavorable, and is a source of danger to the eye. It may, though not generally, diminish with age, and cases have occasionally occurred where persons who during the first period of their life used strong concave glasses, were in the latter period obliged to employ very weak convex ones. On the contrary, instead of improving, the myopia often becomes increased, which is indica-

tive of some deep-seated lesion of the eye, which may, at the age of fifty or sixty years, lead to a complete loss of sight.

The *treatment* of myopia is palliative and curative. The *first* consists in properly-selected biconcave glasses; and it is recommended always to choose the weakest or lowest power possible, that will enable the person to see objects distinctly, and in their natural proportions. Glasses which lessen the size of objects looked at should never be worn.—The biconcave glasses should never be used for near vision, as they fatigue the eyes, and dispose them to deep-seated congestions. If the myopia is very marked, two pair of spectacles should be obtained, one, very weak for near objects,—the other, stronger, for distant objects; and in cases where the vividness or brilliancy of the light fatigues the eyes, slightly-neutral glasses should be employed.

As a general rule myopic persons may be allowed glasses for the purpose of seeing things a few feet off, or for reading the notes when playing on the piano, etc.; but, they should not use them for reading, writing, sewing, or other purposes of near vision, except in those cases where there is a tendency to posterior staphyloma, or sclerotico-choroiditis, because, they soon increase the myopia. And when spectacles are allowed in the cases referred to, the patients should always read, write, or sew, etc., with their head well thrown back, so as not to determine an increased flow of blood to the eye, and the desk upon which they write, should be sloping.—It must be borne in mind, however, that concave glasses do not always absolutely correct myopia. The myope may, by means of proper glasses, be enabled to see objects at a short distance, but, at the same time, can not find glasses that will permit him to see distant objects. Again, certain myopes find it impossible to procure concave glasses that will enable them to distinctly see beyond a certain distance, and for vision at a greater distance they are obliged to use an opera-glass.—In myopia of a very high degree, it is often impossible for the patient to read simultaneously with both eyes, because the book must be brought so close to them, that a sufficient amount of light can not be thrown upon the printed page, and the two optical axes can no longer coincide at this short distance; in such cases, the patient usually employs but one eye, and the other being inactive and unemployed, loses more or less of its retinal sensibility.

When we are consulted by a myopic person regarding the selection of proper glasses for his sight, we determine this by the following calculations: Suppose he can read with the naked eye at a distance of six inches, and wishes to procure glasses to enable him to read at the distance of twelve; we multiply these two numbers

together, $6\times12=72$, and then divide the product by their difference, $6—12=6$, so that $6\div72=12$, which represents the number of inches the focal length of the glass required should be, which may be between twelve and fifteen, as it is best to make use of the lowest power consonant with distinct vision. If the glasses make the objects appear small and very bright, cause straining or fatigue of the eyes, or produce dizziness, or confusion of vision after laying them aside, they are too concave. Having once fitted himself, a person should not too hastily change his glasses, although they may appear not to enable him to see quite so clearly as when he first begun their use.—The nearer the object to be seen or read by a myopic person is to the eye, the weaker must be the concave lens.

Donders' method of determining the degree of myopia, the range of accommodation, and the focal length of concave glasses required, is as follows:

Suppose, a myopic person can read No. I of Snellen's, or Jäger's types at a distance of ten inches, his far point lies at 10″, and his myopia $=\frac{1}{10}$, and he would require ten inch focus concave glasses to unite parallel rays, or rays from a distant object, upon the retina. But in order, at the same time, to favor the accommodation of the eye for its far point, he will for practical utility require somewhat weaker glasses, say of 12″ or 13″ focus. We can readily determine whether or not these glasses accurately suit his sight, in the following manner: place No. XX of Snellen or Jäger at twenty feet distance from his eyes, and tell him to read this with the above-named glasses of 10″; he can do so, and can also see but indistinctly the next lowest number of type. We now place before his spectacles a low power convex glass, say of 60″ focus, and find that this renders the letters clearer, convex 50″ improves his vision still more as he can read No. XVIII with it, while convex 40″ renders it more indistinct. The concave glass 10″, is therefore too strong for him, and to exactly suit his sight we must deduct 50″ from it, thus $\frac{1}{10}-\frac{1}{50}=\frac{1}{12\frac{1}{2}}$, the amount of his myopia. We now give him concave 13″, and find that neither concave nor convex glasses placed before them render any improvement,—he is therefore accurately suited.

To determine the range of accommodation, Donders gives the patient those glasses which neutralize the myopia, and enable him to see distant objects distinctly, by means of which he can, therefore, unite parallel rays upon the retina. Let us again suppose that concave 10″ is the weakest glass with which he can read No.

XVIII or XIX of test type quite distinctly and sharply at twenty feet distance. His far point, therefore, with concave 10″, lies at infinite distance (∞). With the same glass we now try how near he can read No. I comfortably and with ease; let us suppose that this be at five inches, his A therefore $= \frac{1}{5}$, for $r = \infty$, $p = 5$, and

$$A = \frac{1}{5} - \frac{1}{\infty} = \frac{1}{5}.$$

Von Gräfe gives a good method for testing the range of accommodation, and also for quickly discovering whether the eye is myopic, hypermetropic, or presbyopic.—A convex lens of 6″ or 10″ focus is placed before the eye, with which the patient reads No. I of Jäger's or Snellen's types, and his far and near point noted. The far (r') and near point (p') thus found stand in such a relation to his real far (r) and near point (p), that the rays coming from r' are refracted by the lens as if they came from r, those from p' being also refracted as though they emanated from p. With convex 6″, r' would in the normal eye lie at 6″ from the eye, for rays from an an object at 6″ distance, falling on this lens would be rendered parallel by it, and would, consequently, impinge upon the eye as if they came from an infinite distance (the normal far point). The near point (p') would lie at about $2\frac{2}{3}$″. This varies according to the eye of the patient.

The range of accommodation is therefore easily found by the formula $A = \frac{1}{p} - \frac{1}{r}$. The lens, and the distance from the eye (about $\frac{1}{2}$″) is omitted in the calculation. If, with convex 6″, the far point (r') lies at 6″, and the near point (p') at 3″, then

$$A = \frac{1}{3} - \frac{1}{6} = \frac{1}{6}.$$

Again, if with convex 6″, $r' = 5$″, and $p' = 3$″, the eye is myopic, for it is not adjusted for the normal far point 6″, but for a nearer one, the rays from which impinge in a divergent direction upon the eye:—and $A = \frac{1}{3} - \frac{1}{5} = \frac{2}{15} = 7\frac{1}{2}$.

Now what glasses are required for infinite distance? By means of our strong convex lens (6″) we have changed this eye into a very myopic one, in fact, into a myopia of $\frac{1}{5}$, for we should have to place a concave glass of 5″ focus before concave 6″ in order to enable it to see at a distance; for this concave glass would render parallel rays so divergent as though they came from 5″ distance. In order, therefore, to find the proper concave glass for infinite

distance, we deduct concave 5″ from convex 6″, thus $\frac{1}{6}-\frac{1}{5}=\frac{1}{30}$, hence, the proper concave glass will be of 30″ focus, or No. 30.

If with convex 6″, $r' = 8''$, and $p' = 3''$, the eye is *hypermetropic*, for its far point lies beyond the normal far point 6″; its range of accommodation would, therefore, be $A = \frac{1}{3}-\frac{1}{8}=\frac{5}{24}=4\frac{4}{5}$. (*J. S. Wells.*)

A very important indication is, to determine the distance of distinct vision with each eye, separately, as, sometimes, the degree of myopia in one is more marked than in the other eye, If this distance is not the same with both eyes, we must give to each eye its proper concave glass.

The *curative treatment* of myopia consists in the exercise of vision with the aid of very feeble biconcave glasses. Unfortunately, this treatment requires a length of time, as well as great patience, but it is almost always salutary. A very weak biconcave glass, say No. 24, 20, 16, or 14, is given to the person, and after having placed him against a wall we request him to read large and clear characters at a distance of thirteen or sixteen inches; this exercise is to be pursued every day, once, twice, or three times per day, gradually increasing the distance one-half or three-quarters of an inch at a time, and so on. By degrees, weaker glasses may be used, and eventually the myopia will be corrected by this course. This treatment must be seconded by rest of the eyes, looking at distant objects without glasses, in the open air, and by the local application of cold lotions repeated several times daily.

When, among young people, Nos. 12 or 10 do not suffice, we may suspect the myopia to be the result of a sclero-choroiditis posterior, of which we may be assured by an ophthalmoscopic examination; and in case our suspicions become confirmed by the examination, we must prohibit the least efforts at accommodation, having the eyes kept in a state of quiet, and prescribe neutral glasses, purgatives, cold lotions, mydriatic solutions dropped in the eye, and the other measures named for sclero-choroiditis on page 1481.

If the myopia is the result of a wound, or of a forming cataract, the biconcave glasses should be replaced by biconvex; also, when the myopia is complicated with a commencing insensibility of the retina. In these cases, biconvex glasses almost always improve vision for near and distant objects, because they concentrate the light more.

Several surgeons, believing that the myopia of certain persons is due to an elongation of the antero-posterior axis of the eye, the result of an exaggerated contraction of the muscles surrounding

the organ, or of an original shortness of these motor cords, have proposed and performed section of some one of these muscles; J. Guerin has cut the recti-muscles, by the sub-conjunctival method; Bonnet, of Lyons, prefers cutting the ocular insertion of the small oblique muscle. Considerable success is stated to have followed these operations, the far point of vision becoming considerably increased thereby, without the aid of spectacles.

3. *Presbyopia*, or *Far-sightedness*. Presbyopia is a normal change that occurs in the eye due to advancing years, in which the near point of vision gradually recedes from the eye, and the range of accommodation diminishes. After the power of accommodation has considerably decreased, a slight diminution of refraction gradually takes place.—The change in the eye that gives rise to presbyopia, commences as early as at the tenth or twelfth year, and gradually increases, until it first becomes appreciable at the fortieth or fiftieth year. The diminution of refraction commences at a much later period, and is not distinctly appreciable until at the sixtieth or seventieth year. Presbyopia is not the opposite condition of myopia.

In presbyopia, distant objects continue to be seen as usual, while near objects can not be seen accurately, and have to be removed further and further from the eyes, as the presbyopia advances. Thus, a book, for example, can only be read distinctly by a presbyope when he removes it farther from the eye than formerly; if held within the ordinary distance of reading when the eye was normal, the characters appear indistinct, more or less blurred, double, or running into one another. The various degrees of presbyopia depend upon the various distances at which near objects have to be placed in order to be seen distinctly, or, in other words, upon the distance at which the near point is removed from the eye. This defect of vision is usually first noticed at night, a greater degree of illumination being required, as well as a greater distance of the eye from the object, in order to read, write, see, etc., clearly.*

* I have no doubt that the present sources of artificial illumination tend considerably to produce asthenopia, and amblyopia, as well as to bring on premature presbyopia. The yellow rays from gas or coal oil are certainly injurious to those whose occupations require them to use their eyes at night—gas light, especially, being aided in its mischievous results by its constant flickering. The light from coal oil is the best artificial light to read, write, or work by, as its flame is steady and its light intense; but, in order to protect the eye from its injurious rays, a slight neutral blue-tint shade should be placed over it, and I am much surprised

Presbyopia is supposed to be due to a deficient power of the ciliary muscle, or to an increased density of the crystalline lens, which prevents it from undergoing the same degree of change in its curvature as formerly when subjected to the same amount of muscular action; consequently, parallel rays from near objects, instead of uniting upon the retina, as they do for distant objects, form a focus at some point behind it, but may be brought upon it by a convex lens whose focal distance will atone for the deficiency in the curvature of the lens. Presbyopia bears no relation to the refraction of the eye, strictly speaking, may equally affect normal, myopic, hypermetropic, or astigmatic eyes, and may be brought on prematurely by improper use of the eyes.

Weakness of sight, amblyopia, sometimes accompanies presbyopia, and, may, also be mistaken for it. It may be laid down as a practical rule that the nearer we can approximate, by means of the proper convex glasses, the vision and range of accommodation of a presbyopic eye to that of a normal one, the less is the impairment of sight due to amblyopia, and *vice versa*.

We *diagnose* presbyopia by observing that the patient sees at a distance about as well as formerly, while to see near or small objects he has to remove them further from the eye than previously; that convex glasses enable him to distinctly see near or small objects at about the usual distance of former years, and that he can see clearly at a greater distance with a convex lens than a normal eye can with the same lens.—In order to see a near object more distinctly, the myope leans his head forward, while the presbyope (as well as the hypermetrope) throws his head backward, or holds the near object at arm's length.

The *treatment** of presbyopia consists in the employment of

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that, long ere this, some enterprising person has not prepared neutral blue-tint glass chimneys for coal-oil lamps, and for gas light, in order to preserve the sight of those who use this kind of illumination.

* Relative to presbyopia, Donders remarks: "Persons should be furnished with spectacles as soon as they are in the slightest degree annoyed or inconvenienced by presbyopia. Some medical men think that presbyopic patients should do without spectacles as long as possible, for fear the eye should, even at an early period, get so used to them as soon to find them indispensable. This is, however, an error; for, if such persons are permitted to work without glasses, we observe that the presbyopia soon increases.—The proper glasses for the presbyopic may be readily calculated. A convex glass of sixteen inches focus will bring the near point back again to eight inches from the eye. We must generally, however, give weaker glasses; because, on account of the greater convergence of the optic axes, the near point will, through these glasses (convex sixteen), be, in reality, brought nearer than eight inches. Late in life, when there is some diminution

properly-selected biconvex glasses; and, as a general rule, this selection should be made by the oculist, as there are only a few persons who sell spectacles who are enabled to make a proper and scientific choice. Eyes are often ruined, which might, by scientific and skillful treatment, have been preserved for years; glasses should be selected which, if anything, are rather too weak than too strong, for their object is not to magnify objects, but to enable the wearer to distinctly see things of their natural size.

The first thing, then, in order to select the proper glasses, is to determine the degree of presbyopia present in any given case. According to Donders, presbyopia may be considered as having commenced when the near point of distinct vision is removed further than eight inches from the eye. Then, in order to determine the degree of presbyopia, we must deduct the near point at which we consider presbyopia to commence, 8″ from the presbyopic near point. Thus, suppose the presbyopic near point to be 12″, then $\frac{1}{12}-\frac{1}{8}=\frac{1}{24}$, the degree of presbyopia, in which case, convex glass 24″ focus would bring the near point back again to 8″. Again, suppose the presbyopic near point to lie at 16″, then $\frac{1}{16}-\frac{1}{8}=\frac{1}{16}$, the degree of presbyopia, and in which case a convex glass 16″ would be required. For practical purposes, however, somewhat weaker glasses should be used; and, where there is a good range of accommodation, still weaker glasses may be allowed. In my own case, my near point is 24″, and, in order to read well at 10″ or 12″,

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in vision, the near point should sometimes be brought even to six or seven inches, and the greater the range of accommodation, the nearer should it be brought.

"When hypermetropia exists, the weakest glasses with which No. 1 of the type tests can be distinctly and easily read at about twelve inches distance, may generally be given.—*In choosing spectacles for far-sighted persons, we must also be particularly guided by the range of their power of accommodation.* If this is good, we may give them glasses which bring their near point to eight inches; but, if it is much diminished, weaker glasses should be chosen, so that it may lie at ten or twelve inches from the eye.

"It must be borne in mind that a very rapid increase of presbyopia is one of the premonitory symptoms of glaucoma. If, therefore, a patient tells us that his far-sightedness has rapidly increased within a few months, so that he has had repeatedly to change his spectacles during that time for stronger and stronger ones, our suspicions should be aroused, and we should, without fail, examine him as to the presence of other premonitory symptoms of glaucoma, as rainbows around the candle, periodical obscurations, etc. Von Græfe thinks that this rapid increase of presbyopia is most likely due to an increase of intra-ocular pressure."

I should, according to the above rule, use convex glasses of 24″—as $\frac{1}{24} - \frac{1}{12} = \frac{1}{24}$; instead of which I employ those of 36″ for day, and 30″ for night. I can not use 24″ at all, but will require them after a few years.

The best rule that I can find for glasses, either concave or convex, is, for the person to select those which will enable him, without diminishing or magnifying objects, to see distinctly at the desired distance, say from 8″ to 12″, and which will also enable him, at the same time, to see, more clearly than with other glasses tried, objects at a more remote, as well as at a nearer point. Thus, suppose that with one glass I can distinctly see at 10″, and somewhat indistinctly at a near point of 8″, and at a remote point of 24″, and that, with another, I can also see distinctly at 10″, but it brings my less distinct near point to 6″, and that of my remote to 36″, I should undoubtedly prefer the latter. And this rule I prefer to all others, viz.: to select the glasses of the very lowest power that will enable me to see objects distinctly, comfortably, and of their natural size.

Mackenzie gives the following rules, which result in nearly the same results as those given by Donders: "If a person has a distinct vision of objects *moderately remote*, let him multiply the distance at which he can see minute objects most distinctly, say 20 inches, by the distance at which he wishes to read by the aid of glasses, say 12 inches, and divide the product by the difference between the two, 8; the quotient, 30, will be the focal length of the glasses required. But, if the distance at which he sees most distinctly is *very great*, then the focal length of the glasses required will be equal to the distance at which he wishes to see objects most distinctly."

The range of accommodation of a presbyopic eye is easily found by the formula, $A = \frac{1}{p} - \frac{1}{r}$, already given on page 1527.

Presbyopic persons, wearing spectacles for near sight, should always remove them when they are not thus employing vision, and should, as much as possible, practice looking at distant objects of considerable size, so as not to be obliged to use feeble glasses for seeing at a distance, which increases the presbyopia, and will require them to wear stronger glasses for near objects, in a very short time.

When, after having worn convex glasses for some time, it becomes difficult to read at the usual distance, having to hold the book farther off from the eye in order to distinguish the words, it

will be proper to select a pair of stronger glasses, being guided by the rule heretofore given. White, clear glass should always be used for convex glasses, unless there are symptoms of retinal irritability. The spectacle frame should be light, properly fitted to the nose, and the center of the glasses should correspond with the pupil or optic axis.

If presbyopia increases very rapidly, requiring the person to change his glasses every few months instead of every few years, we may suspect glaucoma, and especially when he sees rainbows about the candle, has periodical obscurations of vision, etc.

4. *Hypermetropia. Hyperopia. Over-sight. Hyperpresbyopia.* (*See note to Strabismus*, on page 1387.) This is an affection which is an opposite condition of myopia, and which has only been accurately and scientifically understood within the last few years, since the researches of Von Gräfe and Donders. It is very frequently a cause of asthenopia, which is always present when the degree of hypermetropia is great. According to Donders, hypermetropia is the most common cause of convergent strabismus.

In hypermetropia the refractive power of the eye is too low, or the optic axis (the antero-posterior axis) is too short; or both of these causes may exist together. The effect of these conditions of the eye is, that the focal point of the dioptric system lies behind the retina, so that, even in a state of rest, parallel rays are brought to a focus behind the retina, while convergent rays only are united upon the retina. If the degree of hypermetropia be moderate, and the power of accommodation good, the patient may read or write without much discomfort; but, if the hypermetropia be absolute, he will not be able to see well at any point.

In hypermetropia the accommodative power of the eye is exerted more or less considerably, according to the degree of hypermetropia, in order to unite parallel rays upon the retina; and the exertion increases in direct ratio with the nearness of the object, and also with the diminution of the refractive power of the eye. The eye can not keep up this great strain of its power of accommodation—its ciliary muscle—for any length of time, and hence the inability to continue working at near objects for any long period; hence, also, the whole train of asthenopic symptoms. It does not, however, follow, that all cases of hypermetropia must, of necessity, be accompanied by asthenopia. It may be absent if the range of accommodation is good, and the degree of hypermetropia but slight.

In the *diagnosis* of hypermetropia, the eye appears smaller and

flatter than the normal eye; it does not fill out the aperture of the lids (palpebral aperture) properly; between the eyeball and the canthus, especially the outer canthus, there is only a little space, like a little pouch,—sometimes the space is greater; upon turning the eye very much inward, the posterior portion of the eyeball is seen to be flatter and less rounded than it should be.—The patient states that, after reading or writing for a short time, the letters become blurred, indistinct, as if they run into each other; at a distance, he thinks he can see perfectly, though hypermetropic eyes see worse at a distance than normal eyes.

Under the *ophthalmoscope*, just the reverse obtains to what was seen in the myopic eye. The fundus may be seen in the erect image at a considerable distance, but we obtain an erect image of it, and not a reversed one as in myopia; if we look at the optic nerve or one of the retinal vessels, and then move our head to one side, the image will move in the same direction. If we approach nearer to the hypermetropic eye, the field of vision enlarges, the image becomes smaller and further removed from the eye, while the intensity of its light and color is much increased. If the hypermetropia be considerable, we can take in at a glance, not only the optic entrance, but also a considerable portion of the fundus around it. If our own eye is normal, in order to gain a distinct image, we will have either to place a strong convex lens behind our ophthalmoscope, or else accommodate for a nearer point.

Hypermetropia is sometimes congenital, and frequently hereditary; it is often latent, not manifesting itself until the eighteenth, twentieth, or twenty-fifth year, when symptoms of asthenopia manifest themselves, if the person works for a length of time at near objects, or in reading or writing. These symptoms, and the fact that he can distinguish distant objects much better with convex glasses than without, will arouse our suspicions.

In order to determine the real amount or degree of hypermetropia, we must first ascertain the *manifest* or *apparent* hypermetropia, which is ascertained by observing the number of a biconvex lens required to distinctly read No. XX of Snellen, at a distance of twenty feet, and which we will suppose to be 30″. We now paralyze the accommodative power of the eye, by dropping into it a solution of Sulphate of Atropia, of sufficient strength to completely paralyze the ciliary muscle—say four grains of the Sulphate to a fluidounce of Distilled Water, and which will require two or three hours to act thoroughly. We again place before him No. XX of Snellen's Test Types, at a distance of twenty feet, and find that he can not read at all without the aid of a biconvex lens of 8″; then the *manifest*

hypermetropia is $\frac{1}{30}$, and the *total* $\frac{1}{8}$. The difference between these two shows the extent to which the accommodation had been exerted in looking at distant objects, thus giving the *latent* hypermetropia, which in this case is, $\frac{1}{8} - \frac{1}{30} =$ nearly $\frac{1}{11}$.—The number of the convex glass with which he can see well at a distance, without the use of atrophia, (No. 30) is the apparent degree of the hypermetropia; and that required after the use of atropia, (No. 8) is the real degree of hypermetropia.

Only one eye at a time should be examined with the atropia, as it frequently requires several days for its influence to pass away; after which the other eye may be examined. And in using the convex glasses, they should be held for a few minutes before the person's eyes, in order that he may gradually relax his accommodation, which he has been so constantly in the habit of exercising, even for distant objects.

The range of accommodation of a hypermetropic eye may be readily found, sufficiently accurate for all practical purposes, by the following method: First, change the eye to a normal one by placing before it a convex glass which will allow it to distinctly see distant objects, without scarcely any exercise of the accommodation. Then, while this glass is before the eye, find the nearest point at which No. I of Snellen, can be read distinctly and easily. If, before atropia was dropped in the eye, convex 20″ was required for distant vision, and convex 10″ after it, we should try its nearest point with a glass between the two, say No. 16″. Now, let us suppose that with convex 16″ his near point (p) lies at 7 inches, and his far point (r) has been found to be at an infinite distance (∞); for he can see distant objects well with convex 16″ without much effort, although convex 20″ is best. Then the range of accommodation (A) is found by the formula, heretofore given, $A = \frac{1}{p} - \frac{1}{r}$. Now, in the present case, $p = 7''$, $r = \infty$, hence $A = \frac{1}{7} - \frac{1}{\infty} = \frac{1}{7}$.—We should not test for the range of accommodation, until the effect of the atropia is thoroughly gone off.

How are we to determine what spectacles must be given to a hypermetropic person? We must first discover the amount of hypermetropia before using atropia, by having the patient read No. XIX or XX of Snellen's Test Types at a distance of twenty feet. Let us suppose that convex 20″ is the strongest glass with which he can read No. XIX fluently and distinctly; his manifest hypermetropia, before

atropia, therefore, $=\frac{1}{20}$. We then try the nearest point at which he can read No. I comfortably; this is found to be 7″. He is therefore not presbyopic. In order to find out to what extent he has strained his accommodation in reading No. XIX through convex 20″, and to know what glass will completely neutralize the hypermetropia, we paralyze his power of accommodation, by atropia; after this has acted a couple of hours we examine the patient again. He now requires convex 10″ for reading No. XIX fluently. The real amount of hypermetropia is therefore $=\frac{1}{10}$ He has, however, been so accustomed to strain his power of accommodation that he could not relax it completely, even when there was no occasion for accommodating at all, when we corrected the malconstruction of the eye by means of a convex glass.

Now, what spectacles must we give him? If we prescribe convex 10″ they would be found too strong for distant objects, or even perhaps for reading. He could not all at once relax his accommodation, so as to be able to use the glasses which really neutralize his hypermetropia, and which must ultimately be used if we wish to free him permanently from the annoyances of his affection. We must therefore gradually accustom his eyes to stronger and stronger glasses, until convex 10″ be reached. Let us begin with convex 18″ or 20″. He is to wear them both for reading, writing, and distant objects. Never, indeed, laying these spectacles aside when he is using his eyes. In the course of a few weeks we give him convex 16″, then 14″, 12″, and, at last, after the lapse of a few months, he can wear No. 10″ for reading and for distance. Sometimes it will be required to commence with very weak glasses, gradually exchanging them for stronger and stronger ones, until the proper convex glass is finally reached; if this be not done, great discomfort, a sensation of straining within the eyes, and pain around the orbit, will be the result.

When the degree of hypermetropia is great, or when presbyopia exists, two sets of spectacles will be required, a strong pair for reading, writing, etc., and a weaker pair for distant objects.

A hypermetropic eye may ultimately become presbyopic, while a normal eye may become presbyopic at forty-five, and hypermetropic at fifty or sixty,—being both presbyopic and hypermetropic at the same time, and requiring glasses to neutralize the hypermetropia (or distinct vision of distant objects), as well as glasses to lessen the presbyopia, and enable the person to have distinct vision at a near point. Thus, if biconvex 16″ neutralizes the hypermetropia, and

convex 24″ is required to overcome the presbyopia, he will require for near vision $\frac{1}{24}+\frac{1}{16}=9\frac{3}{5}$. But as convex 10″ would probably be too strong, on account of the influence of the convergence of the optic axes, convex 12″ would be about the required fitting glasses.

5. *Astigmatism. Cylindrical Eye.* Astigmatism is the term applied by Rev. Dr. Whewell to an ametropic (not exact) condition of the eye, in which the rays coming from one point are not united on one point upon the retina, the refracting power of the dioptric media not being equal in the different meridians of the eye, or, in other words, the rays of light which fall upon the eye are not equally refracted to a point. According to Donders, regular astigmatism is met with among all men, but it is not reputed a disease until it has attained a certain degree so as to interfere with perfect vision, and then it may be mistaken for amblyopia. Without being absolutely common, it is by no means rare; it may be estimated at about the one-fortieth of the functional affections of the eye met with in practice.

Astigmatism is due to a congenital asymmetry of the curvature of the surface of the lens, of the cornea, or of both; more commonly of the cornea. Or, it may be due to an obliquity of the cornea and lens with respect to the visual axis. This asymmetry may exist in any of the meridians of the eye, more generally in the vertical and horizontal, or in one nearly approaching them; it may exist for many years during the first period of life, before its presence will prove a source of annoyance. "Astigmatism has nothing to do with accommodation and its anomalies, and is only characterized by a difference in the refractive powers of the different meridians of the dioptric apparatus, and consequently a different degree of ametropia (not exact) in different meridians of the same eye."

Whenever the asymmetry is accompanied with weakness of sight or amblyopia, without any other apparent cause, the astigmatism is pathological; all parts of the focal point are then augmented, and hence the clearness of the retinal image is lost in a proportional degree. "Suppose the curvature of the cornea in the vertical diameter is too convex; then the rays of light entering the eye in this meridian will be too strongly refracted, and will come to a focus in front of those rays which enter in the horizontal meridian (supposed to possess the normal curve); in other words, the patient will be myopic in the vertical meridian of his eye, although his sight is normal in the horizontal meridian; and when looking at a distant

object he will see its lateral edges distinctly, while its lower edges will be blurred. Again, instead of being too convex, the curve in the same meridian may be too flat, when the rays of light in the vertical meridian will come to a focus behind those of the horizontal meridian, and the patient will be hyperopic in the vertical meridian; or, again, the vertical meridian may be normal while the horizontal meridian is either myopic or hyperopic; while, still again, both the vertical and the horizontal meridian may vary from the normal type, both being either myopic or hyperopic, but each to a different degree, or the one may be myopic, and the other hyperopic." (*Dr. J. F. Bumstead.*)

From the above it will be seen that weakness of sight, blurred or indistinct appearance of objects in one meridian which are distinct in a meridian at right angles to it, or, a double image of objects, one being fainter than the true image and overlapping it, are among the principal symptoms of astigmatism.—Snellen, in his Test Types, observes:

"In astigmatism, horizontal and vertical lines can not be seen with equal clearness at one and the same time, because in it the focal distances in the two meridians are unequal. In consequence of this, the squares of a draught-board appear elongated in one direction as gray lines.—The extremes of difference in refraction, in cases of astigmatism, are found in meridian planes which are perpendicular to each other. The direction of these planes, however, usually deviates more or less from the horizontal and vertical."

The *diagnosis* of astigmatism is not difficult; under an *ophthalmoscopic* examination, in all degrees of asymmetry above $\frac{1}{20}''$ we find a marked elongation of the optic disk; by the upright image, (without the use of the collective lens), the diameter of the optic disk appears longest in the meridian of the greatest curvature of the cornea, and shortest in the meridian of least curvature; while the contrary is true when the reversed image (with the use of the collective lens) is employed. When we observe with the reversed image, we must be careful not to hold the collective lens inclined, which renders the optic disk oval. We may be assured that this lens is perfectly perpendicular to our visual line, when the images seen by the reflection of its two surfaces are superposed, a condition which the observer may readily fulfill by slightly inclining the lens. This elongation of the optic nerve-entrance is a very striking and characteristic symptom, except when it is present in eyes affected with posterior staphyloma, in which case, the optic disk appears equally elongated,—but, in most cases, it is caused

not by the asymmetry of the meridians, but by the oblique position of this spherical disk in relation to the visual axis of the observer. We only see the projection of the disk on a plane surface; the ophthalmoscopic visual field appears so to us; and the projection of a circle not parallel to a plane surface is always an ellipse. When we find an apparent elongation of the optic nerve in an eye affected or not with posterior staphyloma, if there is no sufficient morbid condition present to explain the amblyopia, we may be almost certain that the case is one of astigmatism, or pathological asymmetry of the meridians.

Other modes of diagnosis may be also employed, thus: Examine the eye by means of an optometer with fine lines, it will be found that the distance of distinct vision for lines of different direction, will require them to be brought nearer the eye when parallel with certain meridians of this organ, than with others; this examination will also enable us to recognize the principal meridians of the eye, as already indicated by the ophthalmoscope; these are the meridians of greatest and least curvature of the cornea.

Again, when a myopic or hypermetropic subject looks at a distant luminous point, say a coal-oil lamp, through a small circular orifice placed near the flame, say the gauge of an ordinary catheter, the luminous point represents a nearly circular section upon the retina, and the orifice will appear circular. But if the eye be astigmatic, the circle will be replaced by an oval or ellipse, the two axes of which correspond to the two meridians of the eye affected with maximum and minimum curvature. This peculiarity will enable us to determine the direction of these two curvatures, that is to say, the direction of the principal meridians. If, however, the stenopaic slit be held before the eye to look through, a normal circular image will be brought out when this slit is held with the fissure in the proper direction or diameter before the eye.

The stenopaic slit, is a narrow slit cut into an opaque card, having a width of about one-third of a line, and a length of about one-fourth or three-eighths of an inch. Upon holding this slit before the eye, successively in its various meridians, the patient will see objects distinctly when it is held in the normal meridian of the eye, and quite indistinctly when it is held in the abnormal meridian, which is at right angles with the former,—there will also be found more or less indistinctness of vision in the intermediate meridians or inclinations. This plan is now generally adopted by oculists to determine the direction of asymmetry.

The degree of astigmatism may be measured by placing the stenopaic slit successively in the plane of the maximum, and in the

plane of the minumum curvature, and successively presenting to these two meridians the ascending series of positive or negative (convex or concave) glasses; we thus obtain the degree of anomaly of each of them, and the difference of these anomalies in the two meridians is the degree of astigmatism.—Astigmatism may likewise be readily detected and its degree be measured by the astigmatic tests or diagrams of John Green, M. D., St. Louis, Mo. (*See Am. Jour. Med. Sci. January*, 1867, page 117.) These truly useful diagrams have only been made known to the profession while this work was going through the press, hence this short notice of them.

Donders admits three classes of astigmatism, viz.: Simple, compound, and mixed. In *simple* astigmatism, the eye has one of its meridians emmetropic or normal; the other meridian is ametropic or abnormal, and presents an abnormal refraction from excess or defect; it is myopic or hypermetropic.

In *compound* astigmatism, the two meridians present at the same time the same kind of anomaly, but in different degrees; for instance, they are both myopic, or hypermetropic.

In *mixed* astigmatism, we rank the anomalies of refraction which manifest themselves in an inverse direction one from the other, as, where one of the meridians is myopic while the other is hypermetropic.

As to the *treatment* of this defect of the eye, it consists wholly in the selection of proper glasses; we examine which cylindrical lens diminishes the amblyopia the most,—its refractive power represents the degree of the asymmetry, and, if the eye be otherwise normal, this cylindrical glass is the remedy.

But if, the eye is also affected with another disease of refraction, either myopia or hypermetropia, we must also determine its degree in the ordinary manner, and prescribe for the patient a glass which corrects at the same time the two kinds of defect in refraction. The glasses are then spherical, either concave or convex on one side, and cylindrical, concave, or convex on the other, according as the patient requires dispersive or collective glasses. This method of determination is without inconvenience, because in examining the patient all that is necessary is to put together the two required glasses, one against the other, in the lens-bearer accompanying the box of specimen lenses, etc.

Therefore, *simple* astigmatism will be corrected or neutralized by a cylindrical plane glass, the edges or axis of which will be directed perpendicularly to the abnormal meridian. *Compound* astigmatism may be corrected by selecting a *spherical* concave or convex

glass, corresponding to the least degree of the ascertained myopia or hypermetropia; we will thus have completely neutralized this anomaly in the meridian where it is the weakest. But for the meridian where it is the strongest, a certain degree, representing the degree of astigmatism, will remain, and require for its correction a *cylindrical* surface. To neutralize compound astigmatism we require, then, sphero-cylindrical glasses, convex in the hypermetropic, and concave in the myopic compound astigmatism.

To neutralize the double anomaly of *mixed* astigmatism, we oppose to each meridian a plane cylindrical glass, convex for one of the two, concave for the other, and of the degree corresponding to each anomaly,—having care also to direct the axis of each of these glasses perpendicularly to the meridian for which it is designed. By uniting these two glasses into a single one, we obtain bicylindrical, concave, or convex glasses, with intersecting axes, and by these glasses we may correct the ascertained anomalies.

It may be added, that we do not, as for myopia in ordinary conditions, counsel the employment of the glass which absolutely annuls the myopia, but rather that of a weaker glass which permits near vision; so in hypermetropia we do not choose the necessary convex glass to annul the latent hypermetropia; we must leave something for the accommodation to do.

The glasses for astigmatic eyes are not yet manufactured in this country. They may be had of Pætz and Flohr of Berlin, or of Natchez and Son, Paris; to whom the proper foci, and combination of glasses should be fully described, when ordering them.

In relation to the necessity for having these glasses placed at exactly the proper angle in the spectacle frame, Donders observes:

"In employing cylindrical glasses it is of the greatest importance to have the axes of curvature of their surfaces correspond with the principal meridians of the dioptric axis of the eye. The slightest departure from this will occasion considerable trouble, especially when using the stronger glasses. This may be best accomplished by inserting the glasses (which should be round), in a spectacle frame furnished with round supports or eye-pieces. By revolving the glasses the axes of the cylindrical surface may be readily brought into the desired position. By slightly moving the whole frame we quickly ascertain the direction in which the glass requires to be revolved, and we may test that it has obtained exactly the proper position, by slightly tilting the frame to one side or the other, as the slightest motion of this kind renders the correction less complete, the vision less perfect. If the correct posi-

tion for the round glasses be once found, they can be cut into an oval shape, and then set in another frame, the direction of the axes being preserved.

From these remarks it may be understood that a well-fitting frame, which will keep in place without much shifting, is an indispensable adjunct."

For the articles on myopia, presbyopia, hypermetropia, and astigmatism, I am chiefly indebted to Donders, J. S. Wells, and Gräfe.—I will call attention, at this place, to Gräfe's recent Optometer, designed for ascertaining the degrees of myopia, hypermetropia, astigmatism, and presbyopia, and determining the No. of the lenses required to neutralize these several conditions; it will be found a very valuable and useful instrument for the oculist, who should also have, boxes of test lenses, cylindrical lenses, prismatic lenses, and colored glasses; Snellen's test types; Green's astigmatic tests, etc.

AMAUROSIS.

Amaurosis is a more or less complete loss of sight due to a local or general nervous derangement, without any appreciable material lesion of the parts which contribute to the exercise of vision. Under the general term, "amaurosis," are, therefore, necessarily confounded a group of affections entirely different in their cause, their character, and their bearing. Many cases of obscurity or loss of vision, the cause, the extent, form, seat, character, etc., of which, were heretofore wholly unknown, the disease being classed among amauroses, have been satisfactorily determined since the introduction of the ophthalmoscope, and the vague and obscure term, "amaurosis," has been replaced by those terms which are recognized as referring to pathological conditions, always identical, having known causes, producing effects which are readily accounted for, and always requiring a treatment which, in being rational, must necessarily be much more efficacious; these terms, are, choroiditis, retinitis, papillary apoplexy, exudations, atrophy, atrophic sclerotico-choroiditis, etc.

However, there are patients with whom vision becomes more or less obscure, and the cause of which can not be satisfactorily determined by any of our present modes of examination. These cases may be termed, amaurosis, that is to say, a purely functional disease, involving no appreciable lesion of the integrant parts of the eye, and being caused by a partial or general derangement of the nerve-force or innervation. Ordinarily, several periods or stages are ob-

served in amaurosis; it commences with amblyopia or weakness of vision, and, at a later period, terminates in complete blindness. In some rare and exceptional cases, the blindness comes on suddenly. Three distinct stages may be described.

In the *first stage*, the patients observe a weakness or failure of sight, in order to read they are obliged to select a dull light; under the influence of a rather strong light, of a prolonged reading or writing, of any fatigue whatever of the visual organ, the eye becomes injected, tears flow freely, and a weight or heaviness is experienced in the eyelids, as well as pains in the eyes and surrounding parts sufficiently severe to cause the patient to momentarily close his eyes. These frequent pains from the action of light, are owing to an overexcitation of the retina and of the optic nerve which still preserve their integrity, although there is an irregular and pathological action of the iris. Indeed, the retina which is, in this stage, as if it were dazzled, will no longer permit the patient to distinguish objects by broad daylight, and requires a general diminution of light, being only able to normally execute its functions by the light of the night; this phenomenon is termed *nyctalopia*, or *seeing by night*. Upon examining the eye, nothing particular is observed, except that the pupil has but little mobility, is almost always dilated, and that the iris is relaxed and tremulous. Sometimes, however, the pupil will be contracted and irregular. As to the humors of the eye, they will be found transparent, and the membranes (cornea, choroid, retina) preserve their normal anatomical characters.

At other times, the first stage will be characterized by symptoms of irritability of the retina, which would cause us to mistake it for a hyperemia of the retina, if the ophthalmoscopic examination did not remove all doubts,—this stage presents itself with the characters of insensibility. Patients complain that they do not clearly distinguish objects unless they are exposed to a bright light; at night their vision is almost always gone, and the artificial light from lamps or candles, or the light from the moon, enables them to see very imperfectly. In this case, the iris not executing its functions so as to aid those of the retina, this latter membrane, in order to manifest the little sensibility which it preserves, requires a very great quantity of its natural excitant, the light. This condition of vision is termed *hemeralopia*, or *day-vision*. At the same time, the iris is always relaxed and tremulous, the pupil very much dilated, and no pains are present. This form of the initial period of amaurosis is always more serious than the preceding, for the want of retinal sensibility indicates a disposition to, or a commencement of, paralysis.

The *second stage* is characterized by similar symptoms, but they

are more marked. The patients can not apply themselves to any work; their vision becomes disturbed on the least application; they perceive muscæ (*myodesopia*). They often have true spectral illusions, or, fixed black spots (*scotomata*). Some are unable to distinguish certain colors, red from green, pink from blue, etc., (*color-blindness, dyschromatopsia*); others are able to see only one-half of objects presented to them (*hemiopia*); while some again see double (*diplopia*). The gait of these patients is embarrassing, their look uncertain, their countenance calm, impassive, and their head elevated; so to speak, they thirst for light. The known methods of investigation do not enable us to discover any kind of lesion; the internal parts of the eye are transparent, the iris is apparently healthy, the pupil dilated and immovable, there is nothing apparent to which so great a diminution of sight can be attributed. In this stage, there is almost always paralysis of the retina and of the optic nerve.

The *third stage* is marked by a total blindness. The symptoms of the preceding stage are still further augmented, and vision is generally lost. However, there are patients who, for some time, preserve the faculty of walking by themselves, and of distinguishing large bodies, but this state is not permanent. The amaurosis is now confirmed. Its prognosis is serious, and it may be considered incurable. Sometimes, if the attention of the patients is aroused for a time, their eyelids will wink as if they were agitated by convulsive movements. If, on the contrary, one of the eyes only is attacked, it will deviate from its direction, moving outward or inward, upward or downward; from thence, the particular varieties of strabismus. In this last stage there is paralysis simultaneously of the nerve of the fifth pair, of the ciliary and ophthalmic ganglions, of the retina, optic nerve, and all the visual nervous system.

The *progress* of amaurosis is subordinate to a crowd of circumstances inherent to the cause giving rise to its development, to the influences in the midst of which the patient is living, and to the mode of treatment adopted to cure it. Sometimes, the disease progresses rapidly, running through its three stages in a very short time, without anything being able to arrest it; at other times, on the contrary, it advances slowly, alternately becoming better and then worse; and again, it may remain stationary, or tend to a recovery, either because the causes giving rise to it disappear, or, because a rational treatment has been successfully opposed to it.

The *prognosis* is always unfavorable. In the first stage, however, when there are symptoms of retinal hyperesthesia there are some chances for restoring vision to its normal conditions; but in the

second, when paralysis of the retina and optic nerve is evident, we must be much more circumspect in giving an opinion upon the result of the treatment, because although energetic means may sometimes prove almost miraculously successful, the most appropriate and active medications are often without any beneficial effects. In the third stage the prognosis is always fatal,—the blindness is incurable.

The *causes* of amaurosis, like those of diseases of the nervous system in general, are very numerous and enveloped in great obscurity. The disease is met with among the young as well as among the aged, among females as well as men, with the sanguine as well as the bilious; however, nervous and irritable temperaments are more predisposed to it. It may be owing to a congested state of the retina, from plethora, exposure of the eyes to intense light, concussions, strong passions, etc. It frequently appears to be due to a general state of exhaustion of the nervous system brought on by regular bleedings, hemorrhages, prolonged lactation, abuse of study during youth, venereal excesses, onanism, spermatorrhea, prostatorrhea, colliquative diarrhea, assiduous application of the eye to the lens or microscope, as with jewellers, watch-makers, engravers, microscopists, etc., also to prolonged abstinence and want, as well as to the continued use of salted meats without acids or vegetables, as may sometimes be observed among sailors and soldiers.—It must not be forgotten to likewise refer to the numerous causes which, in exhausting nervous action, occasion a violent shock to the whole economy, a deep-seated perturbation, as, cholera, typhoid fever, lead poisoning, so frequent among painters, manufacturers of white lead, and following the use of adulterated drinks. In the same rank may be placed, lively emotions, trouble, fear, convulsions, hysterical crises, hemicrania, etc. Amaurosis may also be developed by a prolonged residence in dark places, in a dungeon, for instance, where the complete inaction of the eyes terminates by destroying the retinal sensibility.

The knowledge of these causes is one of the principal indications which directs the practitioner in the employment of the appropriate medical agents. Unfortunately, we are obliged to confess that too great an importance has very often been attached to phenomena with which the development of the disease appeared to be associated in a very evident manner, and which were in reality only simple coincidences. These few considerations give but a glimpse at all the difficulties attending the treatment.

We now know what must be understood by amaurosis as a morbid entity; we know its symptoms, its progress, and the causes

which may give rise to it; it now remains for us to explain the most interesting and important points, namely, the differential diagnosis, and the treatment.

Differential diagnosis. In order to determine amaurosis, we firstly ascertain whether the obscurity of vision is due to an opacity of the cornea, to a cataract, to a glaucoma, or to an affection of the vitreous humor, as, synchysis, hemorrhagic exudations, cysticercus, etc. For this investigation, oblique light and direct examination of the eye by daylight or by candle-light, will suffice.—If our examination is without any result, we may then endeavor to ascertain if the affection is not due to a disease of the system of accommodation, as, copyopia or feebleness of vision, myopia, presbyopia, etc.; we may assure ourself of this by the aid of the experiment with the card perforated with two holes, (page 1513), which in case of paralysis of the power of adaptation, shows that the two limits of distinct vision are more distant, or much nearer than in the normal condition. Finally, we will ascertain if there is morbid sensibility of the retina, which may be determined by the perforated card for the middle part, and by phosphenic exploration for the peripheral parts.

If we discover that the feebleness or loss of vision be due to a morbid condition of the retinal sensibility, we will search for the causes, as well as for the lesions if any exist. We may learn considerable, at this point, by interrogating the patient; but the investigation is much facilitated by the *ophthalmoscope*, the use of which assists in discovering exudations, apoplexy, or atrophy of the choroid, effusions, detachment of the retina, atrophy, etc., of the optic disc, etc. After the ophthalmoscopic examination, we may complete our investigations by determining the extent of the field of vision ;* a

* The *field of vision* is the extent of the space embraced by the eye when fixed upon a determined point. Thus, if the eye be steadily fixed upon a wafer pasted against a wall, at the same time that the wafer is seen very distinctly, we can, without moving our gaze from the wafer, see objects more or less distinctly around us to a considerable distance. This circle of vision of which the wafer forms the center, is the field of vision, which extends on all sides as far as the unmoved eye can see. It is not of equal extent in all directions, being more extensive outwardly, limited inwardly by the projection of the root of the nose; and is also greater downwardly than upwardly, owing to the projection of the superciliary arch. Above, it comprises a radius of about ten inches; below, of about twenty-one inches; inwardly, of about sixteen inches; and outwardly, of about twenty-three inches,—that is when the eye is about twelve inches from the central object looked at. It will vary some, however, according to the conformation of the parts of the face in the vicinity of the eye.

To ascertain the limits or extent of the field of vision, we place the patient at

diminution of its extent indicates an affection of the retina, as, hemorrhage, detachment, etc. Interruptions of the field of vision, on the contrary, more generally indicate granular exudations, an apoplectic retinitis, an opacity of the vitreous body which is often accompanied with muscæ volitantes.—If the muscæ are fixed, it is indicative of a retinal, choroidal or cerebral affection. In the latter case, the ophthalmoscope will detect anemia, atrophy, œdematous infiltration, or other morbid changes, in the fundus of the eye, and in the papilla especially.

These several methods of examination being successively employed, we exclude all diseases the characters of which we have not found by them, and may then more readily determine whether the feebleness or loss of sight, be due to an affection of the retina, or of the choroid, to a defect in the power of accommodation, or to a cerebral disease. When no morbid alteration has been detected, we may be almost certain that the disease is purely nervous, essential, and that the patient is attacked with amaurosis.

This diagnosis may then be completed by inquiring into the antecedents, avocation, habits, constitution, etc., of the patient, the causes of the disease, and other circumstances connected with the case.

The *treatment* of amaurosis will depend upon the stage of the disease, its cause, surrounding circumstances, etc. In the *first stage* we may have an excess of retinal sensibility, or a want of activity, in a word, the commencement of the paralysis.

The first thing to be done by the practitioner is to remove any morbid accumulations in the intestines, to keep the bowels regular,

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one foot from a blackboard or a large sheet of dead black paper, in the center of which a small white cross is made. Then requesting him to fix his eye steadily upon this cross during the whole examination, by means of a long black handle, holding a piece of white chalk at its end, we mark with a dot, the various points in different directions, at which the patient can see the chalk, and then connecting these dots by lines from one to the other, we form an outline within which is represented the field of vision. One eye should be tested at a time, and a copy of each map or diagram should always be preserved, so as to ascertain in subsequent trials whether the field decreases or augments in size. There are two zones to the visual field, one *central*, in which vision is the clearest; the other peripherical, in which vision is more confused or indistinct.

The field of vision becomes diminished in extent, in chronic glaucoma, atrophy of the optic nerve, and in cerebral amaurosis; in retinal hemorrhage, retinal pigmentation, and certain cases of atrophy of the choroid, it is dark in some part of its extent, or there are dark, fixed spots. In partial detachment of the retina, a dark cloud, a kind of diaphragm appears, more commonly in the upper part of the field of vision. Sometimes this field may become so limited that the patient can only see a single letter of a word, at a time, etc. (*See* page 1350.)

to allay any gastric or intestinal irritation, and to overcome, as much as possible, any symptoms of dyspepsia or abnormal action of the liver. This done, the next thing is to attend to the functions of the skin and the kidneys; bathing with a stimulating fluid every day or two, and using the hot-air bath once in every one, two, or three weeks. Continuing these measures, as may be required, during the whole course of treatment. These points having been attended to, our patient is prepared for therapeutic treatment, as well as to be more readily influenced by it.

If the amaurosis be due to plethora, intoxication, sudden suppression of any habitual discharge, exposure of the eyes to strong heat or light, hard labor in a stooping position, pregnancy, gastric, hepatic, or intestinal irritation, strong emotions or passions, fevers, irritation of the nerve of the fifth pair, etc., there will probably be a congestion of the optic nervous apparatus. In this case, the active form of the disease will require to be treated by diuretics, sudorifics, purgatives, and cupping or leeching, in some cases, behind the ears and to the temples. Artificial leeches have been found very serviceable for the purpose. It is very rarely, however, that I employ either leeching, or cupping.—Sedative or narcotic applications may also be used upon and around the eyes, as, light compresses kept constantly moistened with infusion of Stramonium, Hyoscyamus, or Belladonna, or, Stramonium and Lobelia, etc. The following solution will also be found useful as a local application: Take of Dilute Hydrocyanic Acid ten minims, Distilled Water three fluidrachms; mix.—Frictions may also be made around the orbital regions with one of the following preparations: 1. Tincture of Aconite, Tincture of Lobelia, Tincture of Stramonium, of each, a fluidounce; mix. 2. Take of Aconitina one grain, Dilute Hydrocyanic Acid half a fluidrachm, Glycerin half a fluidounce; mix.—3. Take of Extract of Hyoscyamus two drachms, Extract of Aconite, Extract of Stramonium, each, one drachm, Lard one ounce; mix. 4. Take of Tincture of Arnica Flowers three fluidounces, Tincture of Aconite Root six fluidrachms, Tincture of Gelseminum, one fluidounce and a half; mix. As these agents are apt to give rise to dilatation of the pupil, the light enters the eye freely and gives rise to irritation which must be overcome by having the patient to wear neutral-tint glasses.

The vascular congestion having been subdued, if the vision does not return to its normal condition after a reasonable time, we must stimulate the retina and arouse its nervous sensibility. The same indications are to be fulfilled in the chronic form, *second* and *third stages*, when the disease presents the characters of paralysis.

At first, we must gradually and carefully apply local stimulants lest too great a degree of excitation be produced, under the influence of which, the phenomena of irritation and congestion may re-appear. Frictions or vaporizations may be made over the eyebrows, upon the temples, and outer surface of the eyelids with one of the following preparations,—remembering that the most expeditious and efficient method of improving incomplete amaurosis, is by applying our therapeutic agents so as to act on the frontal nerve, or fifth pair: 1, Take of Tincture of Arnica, Essence of Peppermint, each, equal parts; mix. 2. Take of Tincture of Arnica four fluidrachms, Aqua Ammonia, Ether, of each, one fluidrachm; mix. Put a small portion in a vapor eye-cup, and submit the diseased eye to the vapor from the mixture.

3. Take of Leaves of St. John's Wort, Leaves of Hyssop, Prickly-ash Bark, each, equal parts; mix. Make a strong infusion, and apply it over the eyes on cloths, also let a few drops fall upon the eyes two or three times a day.

4. Take of Bisulphuret of Carbon half a fluidrachm; put this into the vapor eye-glass, and expose the eye to the vapor three times a day, for two or three minutes at a time, or as long as the patient can bear it. Alternate with this, exposure of the eye to the vapor of Hydrocyanic Acid, which may be repeated twice a day; three or four drops of this acid should be placed in a vapor eye-glass, and be used by passing it near the eye just so that the patient may experience its effects *without* bringing the glass in contact with any portion of the eye.

These topical agents should be aided by warm vaporizations of Arnica Flowers, Rosemary Flowers, and other aromatics, as well as by light compresses or bags of linen filled with pulverized Camphor moistened with a few drops of Ether. Also by rubefacient applications to the temples, behind the ears, and to the nape of the neck, as, for instance, the following: Take of Croton Oil, Oil of Turpentine, Oil of Sassafras, Olive Oil, each, three fluidrachms; mix.

If these means effect no beneficial result, or if the amaurosis has been in existence for three or four years, we must employ more active medication, as one of the following:

1. Bisulphuret of Carbon, the vapor of which should be applied to the eye, and around the orbit.

2. Take of Strychnia one grain and a half, Acetic Acid a sufficient quantity to dissolve it, Distilled Water half a fluidounce; mix, and use as a collyrium.

3. Take of Strychnia one grain, Alcoholic Extract of Nux Vomica twelve grains, Simple Cerate one drachm; mix. Apply

with friction around the orbit, and upon the external surface of the lids.

4. Take of Veratria twelve grains, Alcohol a sufficient quantity to dissolve it, Simple Cerate one drachm and a half, mix, and apply similar to the preceding.

5. Take of Strychnia one scruple, Aconitina four grains, Oleic Acid two fluidrachms; mix, dissolve, and add Olive Oil one fluidounce. I have found this a very efficient application in several cases.

6. Vesication may be produced upon the eyelids, brow, or temples, by means of Gondret's Ammoniacal Ointment, or by Cantharidal Collodion, and upon the vesicated surface a very small proportion of Strychnia, or Nitrate of Strychnia, may be sprinkled; repeating the latter every day or two, according to the effects. Gondret's ointment may be used thus: Cut a piece of paper of the size of a silver twenty-five cent piece, and moisten one surface of it with a thin layer of this ointment. Place this upon the part, (the eyelids, brow, or temples), and hold it there for five or six minutes by pressing against it the piece of money serving as the pattern; vesication takes place almost immediately.—It is also in these circumstances where benefit may be derived from the intermittent use of Compound Tar Plaster, applied alternately to the nape of neck, and behind the ears.

In some instances powerful sternutatories will be found useful adjuvants, the shock occasioned by them imparting an energetic stimulation to the eyeballs. Colt's-foot, Bayberry, Bloodroot, Sneezewort, Black Hellebore, etc., variously combined, may be employed for this purpose. Hypodermic injections of very dilute solutions of one of the salts of Strychnia, have been recommended, but I have not yet tried them in this disease, although I believe that they will be found very useful in both the acute and chronic forms of the disease.

Electro-galvanism has likewise been advised in the treatment of amaurosis, and has occasionally proved successful; it should be so applied as to pass along the frontal, superciliary, temporal, and suborbitar branches of the fifth pair,—thus, one of the conductors may be applied upon the closed eyelids, while the other is successively placed upon the forehead, temples, eyebrows, behind the ear, upon the occiput, etc. At first the application should be continued for only a few seconds, at a later period it may be kept up for five, ten or fifteen minutes as the maximum period, at each sitting; indeed, the length of each application will depend upon the degree of irritability of the patient, being very careful upon commencing. Powerful shocks should always be avoided, a slight tingling sen-

sation is all that should be felt by the patient; in many instances, the primary current will answer a much better purpose than the secondary. The sittings may be renewed every day, every other day, every five, ten, or twenty days, according to the effect produced, and the irritability of the parts acted upon. This is a powerful and energetic agent, and when improperly administered will not only fail in effecting favorable results, but will frequently increase the difficulties we desire to overcome. Of course it can not be of any service when the amaurosis is due to disease of the brain, or of the organ of vision, or is the result of diabetes or Bright's disease.

Another method has been advised by Schlesinger, which is to endeavor to excite the retina by the exercise of its natural stimulant, light, for which purpose plano-convex, or biconvex glasses are employed, unless the patient be myopic, when the eye is exercised by concave glasses of less and less strength. Those glasses which are found the best suited to the visual faculties of the patient, are given to him, and he is made to exercise the eyes with them every day, for several hours at a time, or until the eyes begin to feel fatigued. Fifteen days afterward other glasses are employed, having a quarter or a half inch less focus than the first: the patient uses these in the same manner as he did the previous ones, and, when he can clearly distinguish the characters selected as the basis of the treatment, we again change to weaker glasses, and so on. From No. 3¼ to No. 5, we increase only a quarter of an inch more focus each time; from No. 5 to No. 9, a half inch; from No. 9 to No. 12, an inch: from No. 12 to No. 24, two inches; from No. 24 to No. 36, three inches. While this method may frequently be very serviceable, it must be recollected that when the weakness of sight is due to irritation or congestion of the retina, it is very dangerous; it requires great care on the part of the practitioner, and much patience on that of the patient.

If the amaurosis be due to great loss of blood, protracted suckling, seminal losses, especially by masturbation, excessive discharges, depressing passions, low nervous fevers, or any other causes giving rise to general nervous exhaustion, and as a consequence, exhaustion of the optic nervous apparatus, the prognosis will be much less favorable than when it depends upon congestion. Tonic and alterative treatment will be required, as, Sulphate of Quinia, Black Cohosh, Iron, Muriate of Berberina, Iodide or Bromide of Potassium, or of Ammonium, Scrofulous Syrup, etc.; together with means to stimulate the retina, as, Strychnia, Veratria, vapors of Bisulphide of Carbon, Ether, Ammonia, etc., and Electro-galvanism.

Where there has been nervous exhaustion from excessive discharges, as referred to above, the following form very useful preparations:

1. Take of Red Oxide of Iron two scruples, Strychnia two grains, Extract of Conium, Extract of Cimicifuga, each, one scruple; mix thoroughly, and divide into twenty pills, of which one may be taken for a dose; to be repeated two or three times a day.

2. Take of Reduced Iron, Pepsine, Aletridin, Extract of Conium, each, one drachm. Mix thoroughly, and divide into sixty pills, of which one may be taken for a dose; to be repeated three times a day.

3. Take of Phosphate of Iron one drachm, Phosphate of Manganese two drachms, Hypophosphite of Quinia forty-five grains, Honey or Simple Syrup, a sufficient quantity,—adding, if necessary, enough powdered Prickly ash Bark, to aid in forming a pill-mass. Divide into sixty pills, of which one is a dose, and which may be repeated three times a day.

When the amaurosis follows an attack of cholera, low fever, depressing passions, etc., or when tonic treatment does not suffice, we should then employ stimulants, as, for instance, one of the following preparations:

1. Take of Extract of Arnica, one drachm, Pulverized Prickly-ash Bark, two drachms, Extract of Smartweed, one drachm; mix, and divide into sixty pills. The dose is one pill, to be repeated three times a day.

2. Take of Phosphorized Ether three fluidrachms, Tincture of Blue Flag, Tincture of Arnica, each, one fluidrachm, Tincture of Nux Vomica half a fluidrachm; mix. Dose, ten or twenty drops, three times a day.

3. Take of Saturated Tincture of Rhus Toxicodendron one fluidounce, Saturated Tincture of Arnica, Volatile Tincture of Guaiacum, each, half a fluidounce; mix. The dose is forty drops every three or four hours.

4. Take of the Oleo-resins of Prickly-ash Bark, and Blue Flag Root, each, one drachm, Horse-radish two ounces, Sweet Flag one ounce, Whisky two pints. Add the medicines to the Whisky and allow them to macerate fourteen days. The dose varies from a fluidrachm to half a fluidounce, three or four times a day, either alone or diluted with sweetened water.

At the same time that these agents are used internally, stimulating applications should be applied to the temples and eyebrow, as, a liniment or ointment of one or several of the following articles: Rhus Toxicodendron, Arnica, Oil of Turpentine, Capsicum, Oil of Prickly-ash Bark, Delphinia, Veratria, etc.

If the amaurosis be due to pressure on some part of the optic nervous apparatus, as from cerebral tumors, vascular distension, or other disease; if it be due to Bright's disease, or diabetes, or appears to be under the influence of lead-poisoning, hysteria, epilepsy, chorea, anemia, etc., the treatment must be especially addressed to whichever of these abnormal conditions are present; and, after its removal, should vision not be restored, the means already named to excite the retina and visual faculties into action, should then be made use of.

In the treatment of amaurosis it will always be found advantageous to exhibit, as adjuvants, such remedies as are calculated to remove certain diseases with which the amaurosis is complicated; thus, if the liver, stomach, kidneys, or intestines be disordered, the appropriate agents to meet the particular symptoms present must be given; if gout or rheumatism be present, the remedies for these diseases should be administered; if worms, vermifuges; if menstrual derangement, uterine tonics; if secondary syphilis, the proper antisyphilitics; if scrofula, antiscrofulous remedies; and so on with any symptomatic, functional, or organic lesion which may be present simultaneously with the eye disease. An attention to this point will be found very important, the proper measures being frequently followed by a restoration of vision in cases where previously mere local applications to the eye failed to result in any benefit.

In the *third stage*, that is, in confirmed and obstinate amaurosis, the treatment will be the same, but it will almost always be unsuccessful, the blindness being incurable.

APPENDIX.

I. Table for determining the quantity of a medicinal agent required to enter into a definite amount of fluid, which is to be administered in certain doses, each dose holding a given quantity of said agent.

N. B. This Table I have given in our usual weights and measures, and not in the metrical. I have it already made out in metrical weights and measures, as well as the other Tables, which will be given hereafter, when the profession is better prepared for them. The metrical tables herein given will enable any one to convert our American weights and measures into them, and vice versa.

QUANTITY OF MEDICINE REQUIRED IN FLUID

SIZE OF DOSE.	℥ 1.	℥ 4.	℥ 8.	1 Pint.	℥ 20.	℥ 24.	℥ 30.	2 Pints.
Dose.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.
Minims. 5	1 3/5	6 2/5	12 4/5	25 3/5	32	38 2/5	48	51 1/5
" 10	4/5	3 1/5	6 2/5	12 4/5	16	19 1/5	24	25 3/5
" 15	8/15	2 2/15	4 4/15	8 8/15	10 2/3	12 4/5	16	17 1/15
Grn. " 20	2/5	1 3/5	3 1/5	6 2/5	8	9 3/5	12	12 4/5
Drac'm. 1/2	4/15	1 1/15	2 2/15	4 4/15	5 1/3	6 2/5	8	8 8/15
" 1	2/15	8/15	1 1/15	2 2/15	2 2/3	3 1/5	4	4 4/15
1/60 " 2	1/15	4/15	8/15	1 1/15	1 1/3	1 3/5	2	2 2/15
Ounce. 1/2	1/30	2/15	4/15	8/15	2/3	4/5	1	1 1/15
" 1	1/60	1/15	2/15	4/15	1/3	2/5	1/2	8/15
" 2		1/30	1/15	2/15	1/6	1/5	1/4	4/15
Minims. 5	2 2/5	9 3/5	19 1/5	38 2/5	48	57 3/5	72	76 4/5
" 10	1 1/5	4 4/5	9 3/5	19 1/5	24	28 4/5	36	38 2/5
" 15	4/5	3 1/5	6 2/5	12 4/5	16	19 1/5	24	25 3/5
Grn. " 20	3/5	2 2/5	4 4/5	9 3/5	12	14 2/5	18	19 1/5
Drac'm. 1/2	2/5	1 3/5	3 1/5	6 2/5	8	9 3/5	12	12 4/5
" 1	1/5	4/5	1 3/5	3 1/5	4	4 4/5	6	6 2/5
1/40 " 2	1/10	2/5	4/5	1 3/5	2	2 2/5	3	3 1/5
Ounce. 1/2	1/20	1/5	2/5	4/5	1	1 1/5	1 1/2	1 3/5
" 1	1/40	1/10	1/5	2/5	1/2	3/5	3/4	4/5
" 2		1/20	1/10	1/5	1/4	3/10	3/8	2/5
Minims. 5	3 1/5	12 4/5	25 3/5	51 1/5	1 4	1 16 4/5	1 36	1 42 2/5
" 10	1 3/5	6 2/5	12 4/5	25 3/5	32	38 2/5	48	51 1/5
" 15	1 1/15	4 4/15	8 8/15	17 1/15	21 1/3	25 3/5	32	34 2/15
Grn. " 20	4/5	3 1/5	6 2/5	12 4/5	16	19 1/5	24	25 3/5
Drac'm. 1/2	8/15	2 2/15	4 4/15	8 8/15	10 2/3	12 4/5	16	17 1/15
" 1	4/15	1 1/15	2 2/15	4 4/15	5 1/3	6 2/5	8	8 8/15
1/30 " 2	2/15	8/15	1 1/15	2 2/15	2 2/3	3 1/5	4	4 4/15
Ounce. 1/2	1/15	4/15	8/15	1 1/15	1 1/3	1 3/5	2	2 2/15
" 1	1/30	2/15	4/15	8/15	2/3	4/5	1	1 1/15
" 2		1/15	2/15	4/15	1/3	2/5	1/2	8/15

QUANTITY OF MEDICINE REQUIRED IN FLUID

(CONTINUED.)

SIZE OF DOSE.		℥ 1.	℥ 4.	℥ 8.	1 Pint.	℥ 20.	℥ 24.	℥ 30.	2 Pints.
Dose.		Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.
Grn. 1/25	Minims. 5	3 2 1/5	15 9/25	30 1 8/25	1 1 1 1/25	1 16 4/5	1 32 4/25	1 55 1/5	2 2 2 2/25
	" 10	1 2 3/25	7 1 7/25	15 9/25	30 1 8/25	38 2/5	46 2/25	57 3/5	1 1 1 1/25
	" 15	1 7/25	5 3/25	10 6/25	20 1 2/25	25 3/5	30 1 8/25	38 2/5	40 2 4/25
	" 20	2 4/25	3 2 1/25	7 1 7/25	15 9/25	19 1/5	23 1/25	28 4/5	30 1 8/25
	Drac'm. ½	1 6/25	2 1 4/25	5 3/25	10 6/25	12 4/5	15 9/25	19 1/5	20 1 2/25
	" 1	8/25	1 7/25	2 1 4/25	5 3/25	6 2/5	7 1 7/25	9 3/5	10 6/25
	" 2	4/25	1 6/25	1 7/25	2 1 4/25	3 1/5	3 2 1/25	4 4/5	5 3/25
	Ounce. ½	2/25	8/25	1 6/25	1 7/25	1 3/5	1 2 3/25	2 2/5	2 1 4/25
	" 1	1/25	4/25	8/25	1 6/25	4/5	2 4/25	1 1/5	1 7/25
	" 2		2/25	4/25	8/25	2/5	1 2/25	3/5	1 6/25
Grn. 1/20	Minims. 5	4 4/5	19 1/5	38 2/5	1 16 4/5	1 36	1 55 1/5	2 24	2 33 3/5
	" 10	2 2/5	9 3/5	19 1/5	38 2/5	48	57 3/5	1 12	1 16 4/5
	" 15	1 3/5	6 2/5	12 4/5	25 3/5	32	38 2/5	48	51 1/5
	" 20	1 1/5	4 4/5	9 3/5	19 1/5	24	28 4/5	36	38 2/5
	Drac'm. ½	4/5	3 1/5	6 2/5	12 4/5	16	19 1/5	24	25 3/5
	" 1	2/5	1 3/5	3 1/5	6 2/5	8	9 3/5	12	12 4/5
	" 2	1/5	4/5	1 3/5	3 1/5	4	4 4/5	6	6 2/5
	Ounce. ½	1/10	2/5	4/5	1 3/5	2	2 2/5	3	3 1/5
	" 1	1/20	1/5	2/5	4/5	1	1 1/5	1½	1 3/5
	" 2		1/10	1/5	2/5	½	3/5	¾	4/5
Grn. 1/16	Minims. 5	6	24	48	1 36	2 0	2 24	3 0	3 12
	" 10	3	12	24	48	1 0	1 12	1 30	1 36
	" 15	2	8	16	32	40	48	1 0	1 4
	" 20	1½	6	12	24	30	36	45	48
	Drac'm. ½	1	4	8	16	20	24	30	32
	" 1	½	2	4	8	10	12	15	16
	" 2	¼	1	2	4	5	6	7½	8
	Ounce. ½	⅛	½	1	2	2½	3	3¾	4
	" 1	1/16	¼	½	1	1¼	1½	1⅞	2
	" 2		⅛	¼	½	⅝	¾	1 15/16	1
Grn. 1/15	Minims. 5	6 2/5	25 3/5	51 1/5	1 42 2/5	2 8	2 33 3/5	3 12	3 24 4/5
	" 10	3 1/5	12 4/5	25 3/5	51 1/5	1 4	1 16 4/5	1 36	1 42 2/5
	" 15	2 2/15	8 8/15	17 1/15	34 2/15	42 2/3	51 1/5	1 4	1 8 4/15
	" 20	1 3/5	6 2/5	12 4/5	25 3/5	32	38 2/5	48	51 1/5
	Drac'm. ½	1 1/15	4 4/15	8 8/15	17 1/15	21 1/3	25 3/5	32	34 2/15
	" 1	8/15	2 2/15	4 4/15	8 8/15	10 2/3	12 4/5	16	17 1/15
	" 2	4/15	1 1/15	2 2/15	4 4/15	5 1/3	6 2/5	8	8 8/15
	Ounce. ½	2/15	8/15	1 1/15	2 2/15	2 2/3	3 1/5	4	4 4/15
	" 1	1/15	4/15	8/15	1 1/15	1 1/3	1 3/5	2	2 2/15
	" 2		2/15	4/15	8/15	2/3	4/5	1	1 1/15
Grn. 1/12	Minims. 5	8	32	1 4	2 8	2 40	3 12	4 0	4 16
	" 10	4	16	32	1 4	1 20	1 36	2 0	2 8
	" 15	2 2/3	10 2/3	21 1/3	42 2/3	53 1/3	1 4	1 20	1 25 1/3
	" 20	2	8	16	32	40	48	1 0	1 4
	Drac'm. ½	1 1/3	5 1/3	10 2/3	21 1/3	26 2/3	32	40	42 2/3
	" 1	2/3	2 2/3	5 1/3	10 2/3	13 1/3	16	20	21 1/3
	" 2	1/3	1 1/3	2 2/3	5 1/3	6 2/3	8	10	10 2/3
	Ounce. ½	1/6	2/3	1 1/3	2 2/3	3 1/3	4	5	5 1/3
	" 1	1/12	1/3	2/3	1 1/3	1 2/3	2	2½	2 2/3
	" 2		1/6	1/3	2/3	5/6	1	1¼	1 1/3

QUANTITY OF MEDICINE REQUIRED IN FLUID

(CONTINUED.)

SIZE OF DOSE.		℥ 1.	℥ 4.	℥ 8.	1 Pint.	℥ 20.	℥ 24.	℥ 30.	2 Pints.
DOSE.		Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.
Grn. 1/10	Minims. 5	9 3/5	38 2/5	1 16 4/5	2 33 3/5	3 12	3 50 2/5	4 48	5 7 1/5
	" 10	4 4/5	19 1/5	38 2/5	1 16 4/5	1 36	1 55 1/5	2 24	2 33 3/5
	" 15	3 1/5	12 4/5	25 3/5	51 1/5	1 4	1 16 4/5	1 36	1 42 2/5
	" 20	2 2/5	9 3/5	19 1/5	38 2/5	48	57 3/5	1 12	1 16 4/5
	Drac'm. ½	1 3/5	6 2/5	12 4/5	25 3/5	32	38 2/5	48	51 1/5
	" 1	4/5	3 1/5	6 2/5	12 4/5	16	19 1/5	24	25 3/5
	" 2	2/5	1 3/5	3 1/5	6 2/5	8	9 3/5	12	12 4/5
	Ounce. ½	1/5	4/5	1 3/5	3 1/5	4	4 4/5	6	6 2/5
	" 1	1/10	2/5	4/5	1 3/5	2	2 2/5	3	3 1/5
	" 2		1/5	2/5	4/5	1	1 1/5	1½	1 3/5
Grn. 1/8	Minims. 5	12	48	1 36	3 12	4 0	4 48	6 0	6 24
	" 10	6	24	48	1 36	2 0	2 24	3 0	3 12
	" 15	4	16	32	64	1 20	1 36	2 0	2 8
	" 20	3	12	24	48	1 0	1 12	1 30	1 36
	Drac'm. ½	2	8	16	32	40	48	1 0	1 4
	" 1	1	4	8	16	20	24	30	32
	" 2	½	2	4	8	10	12	15	16
	Ounce. ½	¼	1	2	4	5	6	7½	8
	" 1	1/8	½	1	2	2½	3	3¾	4
	" 2		¼	½	1	1¼	1½	1⅞	2
Grn. 1/6	Minims. 5	16	64	2 8	4 16	5 20	6 24	8 0	8 32
	" 10	8	32	1 4	2 8	2 40	3 12	4 0	4 16
	" 15	5⅓	21⅓	42⅔	1 25⅓	1 46⅔	2 8	2 40	2 50⅔
	" 20	4	16	32	1 4	1 20	1 36	2 0	2 8
	Drac'm. ½	2⅔	10⅔	21⅓	42⅔	53⅓	1 4	1 20	1 25⅓
	" 1	1⅓	5⅓	10⅔	21⅓	26⅔	32	40	42⅔
	" 2	⅔	2⅔	5⅓	10⅔	13⅓	16	20	21⅓
	Ounce. ½	⅓	1⅓	2⅔	5⅓	6⅔	8	10	10⅔
	" 1	1/6	⅔	1⅓	2⅔	3⅓	4	5	5⅓
	" 2		⅓	⅔	1⅓	1⅔	2	2½	2⅔
Grn. 1/5	Minims. 5	19 1/5	1 16 4/5	2 33 3/5	5 7 1/5	6 24	7 40 4/5	9 36	10 14 2/5
	" 10	9 3/5	38 2/5	1 16 4/5	2 33 3/5	3 12	3 50 2/5	4 48	5 7 1/5
	" 15	6 2/5	25 3/5	51 1/5	1 42 2/5	2 8	2 33 3/5	3 12	3 24 4/5
	" 20	4 4/5	19 1/5	38 2/5	1 16 4/5	1 36	1 55 1/5	2 24	2 33 3/5
	Drac'm. ½	3 1/5	12 4/5	25 3/5	51 1/5	1 4	1 16 4/5	1 36	1 42 2/5
	" 1	1 3/5	6 2/5	12 4/5	25 3/5	32	38 2/5	48	51 1/5
	" 2	4/5	3 1/5	6 2/5	12 4/5	16	19 1/5	24	25 3/5
	Ounce. ½	2/5	1 3/5	3 1/5	6 2/5	8	9 3/5	12	12 4/5
	" 1	1/5	4/5	1 3/5	3 1/5	4	4 4/5	6	6 2/5
	" 2		2/5	4/5	1 3/5	2	2 2/5	3	3 1/5
Grn. 1/4	Minims. 5	24	1 36	3 12	6 24	8 0	9 36	12 0	12 48
	" 10	12	48	1 36	3 12	4 0	4 48	6 0	6 24
	" 15	8	32	1 4	2 8	2 40	3 12	4 0	4 16
	" 20	6	24	48	1 36	2 0	2 24	3 0	3 12
	Drac'm. ½	4	16	32	1 4	1 20	1 36	2 0	2 8
	" 1	2	8	16	32	40	48	1 0	1 4
	" 2	1	4	8	16	20	24	30	32
	Ounce. ½	½	2	4	8	10	12	15	16
	" 1	¼	1	2	4	5	6	7½	8
	" 2		½	1	2	2½	3	3¾	4

QUANTITY OF MEDICINE REQUIRED IN FLUID

(CONTINUED.)

SIZE OF DOSE.		℥ 1.	℥ 4.	℥ 8.	1 Pint.	℥ 20.	℥ 24.	℥ 30.	2 Pints.
Dose.		Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.
Grn. ⅛	Minims. 5	32	2 8	4 16	8 32	10 40	12 48	16 0	17 4
	" 10	16	1 4	2 8	4 16	5 20	6 24	8 0	8 32
	" 15	$10\frac{2}{3}$	$42\frac{2}{3}$	1 $25\frac{1}{3}$	2 $50\frac{2}{3}$	3 $33\frac{1}{3}$	4 16	5 20	5 $41\frac{1}{3}$
	" 20	8	32	1 4	2 8	2 40	3 12	4 0	4 16
	Drac'm. ½	$5\frac{1}{3}$	$21\frac{1}{3}$	$42\frac{2}{3}$	1 $25\frac{1}{3}$	1 $46\frac{2}{3}$	2 8	2 40	2 $50\frac{2}{3}$
	" 1	$2\frac{2}{3}$	$10\frac{2}{3}$	$21\frac{1}{3}$	$42\frac{2}{3}$	$53\frac{1}{3}$	1 4	1 20	1 $25\frac{1}{3}$
	" 2	$1\frac{1}{3}$	$5\frac{1}{3}$	$10\frac{2}{3}$	$21\frac{1}{3}$	$26\frac{2}{3}$	32	40	$42\frac{2}{3}$
	Ounce. ½	$\frac{2}{3}$	$2\frac{2}{3}$	$5\frac{1}{3}$	$10\frac{2}{3}$	$13\frac{1}{3}$	16	20	$21\frac{1}{3}$
	" 1	$\frac{1}{3}$	$1\frac{1}{3}$	$2\frac{2}{3}$	$5\frac{1}{3}$	$6\frac{2}{3}$	8	10	$10\frac{2}{3}$
	" 2		$\frac{2}{3}$	$1\frac{1}{3}$	$2\frac{2}{3}$	$3\frac{1}{3}$	4	5	$5\frac{1}{3}$
Grn. ⅕	Minims. 5	$38\frac{2}{5}$	2 $33\frac{3}{5}$	5 $7\frac{1}{5}$	10 $14\frac{2}{5}$	12 48	15 $21\frac{3}{5}$	19 12	20 $28\frac{4}{5}$
	" 10	$19\frac{1}{5}$	1 $16\frac{4}{5}$	2 $33\frac{3}{5}$	5 $7\frac{1}{5}$	6 24	7 $40\frac{4}{5}$	9 36	10 $14\frac{2}{5}$
	" 15	$12\frac{4}{5}$	$51\frac{1}{5}$	1 $42\frac{2}{5}$	3 $24\frac{4}{5}$	4 16	5 $7\frac{1}{5}$	6 24	6 $49\frac{3}{5}$
	" 20	$9\frac{3}{5}$	$38\frac{2}{5}$	1 $16\frac{4}{5}$	2 $33\frac{3}{5}$	3 12	3 $50\frac{2}{5}$	4 48	5 $7\frac{1}{5}$
	Drac'm. ½	$6\frac{2}{5}$	$25\frac{3}{5}$	$51\frac{1}{5}$	1 $42\frac{2}{5}$	2 8	2 $33\frac{3}{5}$	3 12	3 $24\frac{4}{5}$
	" 1	$3\frac{1}{5}$	$12\frac{4}{5}$	$25\frac{3}{5}$	$51\frac{1}{5}$	1 4	1 $16\frac{4}{5}$	1 36	1 $42\frac{2}{5}$
	" 2	$1\frac{3}{5}$	$6\frac{2}{5}$	$12\frac{4}{5}$	$25\frac{3}{5}$	32	$38\frac{2}{5}$	48	$51\frac{1}{5}$
	Ounce. ½	$\frac{4}{5}$	$3\frac{1}{5}$	$6\frac{2}{5}$	$12\frac{4}{5}$	16	$19\frac{1}{5}$	24	$25\frac{3}{5}$
	" 1	$\frac{2}{5}$	$1\frac{3}{5}$	$3\frac{1}{5}$	$6\frac{2}{5}$	8	$9\frac{3}{5}$	12	$12\frac{4}{5}$
	" 2		$\frac{4}{5}$	$1\frac{3}{5}$	$3\frac{1}{5}$	4	$4\frac{4}{5}$	6	$6\frac{2}{5}$
Grn. ½	Minims. 5	48	3 12	6 24	12 48	16 0	19 12	24 0	25 36
	" 10	24	1 36	3 12	6 24	8 0	9 36	12 0	12 48
	" 15	16	1 4	2 8	4 16	5 20	6 24	8 0	8 32
	" 20	12	48	1 36	3 12	4 0	4 48	6 0	6 24
	Drac'm. ½	8	32	1 4	2 8	2 40	3 12	4 0	4 16
	" 1	4	16	32	1 4	1 20	1 36	2 0	2 8
	" 2	2	8	16	32	40	48	1 0	1 4
	Ounce. ½	1	4	8	16	20	24	30	32
	" 1	½	2	4	8	10	12	15	16
	" 2		1	2	4	5	6	$7\frac{1}{2}$	8
Grn. ⅗	Minims. 5	$57\frac{3}{5}$	3 $50\frac{2}{5}$	7 $40\frac{4}{5}$	15 $21\frac{3}{5}$	19 12	23 $2\frac{2}{5}$	28 48	30 $43\frac{1}{5}$
	" 10	$28\frac{4}{5}$	1 $55\frac{1}{5}$	3 $50\frac{2}{5}$	7 $40\frac{4}{5}$	9 36	11 $31\frac{1}{5}$	14 24	15 $21\frac{3}{5}$
	" 15	$19\frac{1}{5}$	1 $16\frac{4}{5}$	2 $33\frac{3}{5}$	5 $7\frac{1}{5}$	6 24	7 $40\frac{4}{5}$	9 36	10 $14\frac{2}{5}$
	" 20	$14\frac{2}{5}$	$57\frac{3}{5}$	1 $55\frac{1}{5}$	3 $50\frac{2}{5}$	4 48	5 $45\frac{3}{5}$	7 12	7 $40\frac{4}{5}$
	Drac'm. ½	$9\frac{3}{5}$	$38\frac{2}{5}$	1 $16\frac{4}{5}$	2 $33\frac{3}{5}$	3 12	3 $50\frac{2}{5}$	4 48	5 $7\frac{1}{5}$
	" 1	$4\frac{4}{5}$	$19\frac{1}{5}$	$38\frac{2}{5}$	1 $16\frac{4}{5}$	1 36	1 $55\frac{1}{5}$	2 24	2 $33\frac{3}{5}$
	" 2	$2\frac{2}{5}$	$9\frac{3}{5}$	$19\frac{1}{5}$	$38\frac{2}{5}$	48	$57\frac{3}{5}$	1 12	1 $16\frac{4}{5}$
	Ounce. ½	$1\frac{1}{5}$	$4\frac{4}{5}$	$9\frac{3}{5}$	$19\frac{1}{5}$	24	$28\frac{4}{5}$	36	$38\frac{2}{5}$
	" 1	$\frac{3}{5}$	$2\frac{2}{5}$	$4\frac{4}{5}$	$9\frac{3}{5}$	12	$14\frac{2}{5}$	18	$19\frac{1}{5}$
	" 2		$1\frac{1}{5}$	$2\frac{2}{5}$	$4\frac{4}{5}$	6	$7\frac{1}{5}$	9	$9\frac{3}{5}$
Grn. ⅔	Minims. 5	1 4	4 16	8 32	17 4	21 20	25 36	32 0	34 8
	" 10	32	2 8	4 16	8 32	10 40	12 48	16 0	17 4
	" 15	$21\frac{1}{3}$	1 $25\frac{1}{3}$	2 $50\frac{2}{3}$	5 $41\frac{1}{3}$	7 $6\frac{2}{3}$	8 32	10 40	11 $22\frac{2}{3}$
	" 20	16	1 4	2 8	4 16	5 20	6 24	8 0	8 32
	Drac'm. ½	$10\frac{2}{3}$	$42\frac{2}{3}$	1 $25\frac{1}{3}$	2 $50\frac{2}{3}$	3 $33\frac{1}{3}$	4 16	5 20	5 $41\frac{1}{3}$
	" 1	$5\frac{1}{3}$	$21\frac{1}{3}$	$42\frac{2}{3}$	1 $25\frac{1}{3}$	1 $46\frac{2}{3}$	2 8	2 40	2 $50\frac{2}{3}$
	" 2	$2\frac{2}{3}$	$10\frac{2}{3}$	$21\frac{1}{3}$	$42\frac{2}{3}$	$53\frac{1}{3}$	1 4	1 20	1 $25\frac{1}{3}$
	Ounce. ½	$1\frac{1}{3}$	$5\frac{1}{3}$	$10\frac{2}{3}$	$21\frac{1}{3}$	$26\frac{2}{3}$	32	40	$42\frac{2}{3}$
	" 1	$\frac{2}{3}$	$2\frac{2}{3}$	$5\frac{1}{3}$	$10\frac{2}{3}$	$13\frac{1}{3}$	16	20	$21\frac{1}{3}$
	" 2		$1\frac{1}{3}$	$2\frac{2}{3}$	$5\frac{1}{3}$	$6\frac{2}{3}$	8	10	$10\frac{2}{3}$

QUANTITY OF MEDICINE REQUIRED IN FLUID

(CONTINUED.)

SIZE OF DOSE.		℥ 1.	℥ 4.	℥ 8.	1 Pint.	℥ 20.	℥ 24.	℥ 30.	2 Pints.
Dose.		Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.
¾ Grn.	Minims. 5	1 12	4 48	9 36	19 12	24 0	28 48	36 0	38 24
	" 10	36	2 24	4 48	9 36	12 0	14 24	18 0	19 12
	" 15	24	1 36	3 12	6 24	8 0	9 36	12 0	12 48
	" 20	18	1 12	2 24	4 48	6 0	7 12	9 0	9 36
	Drac'm. ½	12	48	1 36	3 12	4 0	4 48	6 0	6 24
	" 1	6	24	48	1 36	2 0	2 24	3 0	3 12
	" 2	3	12	24	48	1 0	1 12	1 30	1 36
	Ounce. ½	1½	6	12	24	30	36	45	48
	" 1	¾	3	6	12	15	18	22½	24
	" 2		1½	3	6	7½	9	11¼	12
⅘ Grn.	Minims. 5	1 16⅘	5 7⅕	10 14⅖	20 28⅘	25 36	30 43⅕	38 24	40 57⅗
	" 10	38⅖	2 33⅗	5 7⅕	10 14⅖	12 48	15 21⅗	19 12	20 28⅘
	" 15	25⅗	1 42⅖	3 24⅘	6 49⅗	8 32	10 14⅖	12 48	13 39⅕
	" 20	19⅕	1 16⅘	2 33⅗	5 7⅕	6 24	7 40⅘	9 36	10 14⅖
	Drac'm. ½	12⅘	51⅕	1 42⅖	3 24⅘	4 16	5 7⅕	6 24	6 49⅗
	" 1	6⅖	25⅗	51⅕	1 42⅖	2 8	2 33⅗	3 12	3 24⅘
	" 2	3⅕	12⅘	25⅖	51⅕	1 4	1 16⅘	1 36	1 42⅖
	Ounce. ½	1⅗	6⅖	12⅘	25⅗	32	38⅖	48	51⅕
	" 1	⅘	3⅕	6⅖	12⅘	16	19⅕	24	25⅗
	" 2		1⅗	3⅕	6⅖	8	9⅗	12	12⅘
1 Grn.	Minims. 5	1 36	6 24	12 48	25 36	32 0	38 24	48 0	51 12
	" 10	48	3 12	6 24	12 48	16 0	19 12	24 0	25 36
	" 15	32	2 8	4 16	8 32	10 40	12 48	16 0	17 4
	" 20	24	1 36	3 12	6 24	8 0	9 36	12 0	12 48
	Drac'm. ½	16	1 4	2 8	4 16	5 20	6 24	8 0	8 32
	" 1	8	32	1 4	2 8	2 40	3 12	4 0	4 16
	" 2	4	16	32	1 4	1 20	1 36	2 0	2 8
	Ounce. ½	2	8	16	32	40	48	1 0	1 4
	" 1	1	4	8	16	20	24	30	32
	" 2		2	4	8	10	12	15	16
2 Grn.	Minims. 5	3 12	12 48	25 36	51 12	64 0	76 48	96 0	102 24
	" 10	1 36	6 24	12 48	25 36	32 0	38 24	48 0	51 12
	" 15	1 4	4 16	8 32	17 4	21 20	25 36	32 0	34 8
	" 20	48	3 12	6 24	12 48	16 0	19 12	24 0	25 36
	Drac'm. ½	32	2 8	4 16	8 32	10 40	12 48	16 0	17 4
	" 1	16	1 4	2 8	4 16	5 20	6 24	8 0	8 32
	" 2	8	32	1 4	2 8	2 40	3 12	4 0	4 16
	Ounce. ½	4	16	32	1 4	1 20	1 36	2 0	2 8
	" 1	2	8	16	32	40	48	1 0	1 4
	" 2		4	8	16	20	24	30	32
3 Grn.	Minims. 5	4 48	19 12	38 24	76 48	96 0	115 12	144 0	153 36
	" 10	2 24	9 36	19 12	38 24	48 0	57 36	72 0	76 48
	" 15	1 36	6 24	12 48	25 36	32 0	38 24	48 0	51 12
	" 20	1 12	4 48	9 36	19 12	24 0	28 48	36 0	38 24
	Drac'm. ½	48	3 12	6 24	12 48	16 0	19 12	24 0	25 36
	" 1	24	1 36	3 12	6 24	8 0	9 36	12 0	12 48
	" 2	12	48	1 36	3 12	4 0	4 48	6 0	6 24
	Ounce. ½	6	24	48	1 36	2 0	2 24	3 0	3 12
	" 1	3	12	24	48	1 0	1 12	1 30	1 36
	" 2		6	12	24	30	36	45	48

QUANTITY OF MEDICINE REQUIRED IN FLUID

(CONTINUED.)

SIZE OF DOSE.		℥ 1.		℥ 4.		℥ 8.		1 Pint.		℥ 20.		℥ 24.		℥ 30.		2 Pints.	
Dose.		Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.
	Minims. 5	6	24	25	36	51	12	102	24	128	0	153	36	192	0	204	48
	" 10	3	12	12	48	25	36	51	12	64	0	76	48	96	0	102	24
	" 15	2	8	8	32	17	4	34	8	42	40	51	12	64	0	68	16
Grn.	" 20	1	36	6	24	12	48	25	36	32	0	38	24	48	0	51	12
	Drac'm. ½	1	4	4	16	8	32	17	4	21	20	25	36	32	0	34	8
	" 1		32	2	8	4	16	8	32	10	40	12	48	16	0	17	4
4	" 2		16	1	4	2	8	4	16	5	20	6	24	8	0	8	32
	Ounce. ½		8		32	1	4	2	8	2	40	3	12	4	0	4	16
	" 1		4		16		32	1	4	1	20	1	36	2	0	2	8
	" 2				8		16		32		40		48	1	0	1	4
	Minims. 5	8	0	32	0	64	0	128	0	160	0	192	0	240	0	256	0
	" 10	4	0	16	0	32	0	64	0	80	0	96	0	120	0	128	0
	" 15	2	40	10	40	21	20	42	40	53	20	64	0	80	0	85	20
Grn.	" 20	2	0	8	0	16	0	32	0	40	0	48	0	60	0	64	0
	Drac'm. ½	1	20	5	20	10	40	21	20	26	40	32	0	40	0	42	40
	" 1		40	2	40	5	20	10	40	13	20	16	0	20	0	21	20
5	" 2		20	1	20	2	40	5	20	6	40	8	0	10	0	10	40
	Ounce. ½		10		40	1	20	2	40	3	20	4	0	5	0	5	20
	" 1		5		20		40	1	20	1	40	2	0	2	30	2	40
	" 2				10		20		40		50	1	0	1	15	1	20
	Minims. 5	9	36	38	24	76	48	153	36	192	0	230	24	288	0	307	12
	" 10	4	48	19	12	38	24	76	48	96	0	115	12	144	0	153	36
	" 15	3	12	12	48	25	36	51	12	64	0	76	48	96	0	102	24
Grn.	" 20	2	24	9	36	19	12	38	24	48	0	57	36	72	0	76	48
	Drac'm. ½	1	36	6	24	12	48	25	36	32	0	38	24	48	0	51	12
	" 1		48	3	12	6	24	12	48	16	0	19	12	24	0	25	36
6	" 2		24	1	36	3	12	6	24	8	0	9	36	12	0	12	48
	Ounce. ½		12		48	1	36	3	12	4	0	4	48	6	0	6	24
	" 1		6		24		48	1	36	2	0	2	24	3	0	3	12
	" 2				12		24		48	1	0	1	12	1	30	1	36
	Minims. 5	12	48	51	12	102	24	204	48	256	0	307	12	384	0	409	36
	" 10	6	24	25	36	51	12	102	24	128	0	153	36	192	0	204	48
	" 15	4	16	17	4	34	8	68	16	85	20	102	24	128	0	136	32
Grn.	" 20	3	12	12	48	25	36	51	12	64	0	76	48	96	0	102	24
	Drac'm. ½	2	8	8	32	17	4	34	8	42	40	51	12	64	0	68	16
	" 1	1	4	4	16	8	32	17	4	21	20	25	36	32	0	34	8
8	" 2		32	2	8	4	16	8	32	10	40	12	48	16	0	17	4
	Ounce. ½		16	1	4	2	8	4	16	5	20	6	24	8	0	8	32
	" 1		8		32	1	4	2	8	2	40	3	12	4	0	4	16
	" 2				16		32	1	4	1	20	1	36	2	0	2	8
	Minims. 5	16	0	64	0	128	0	256	0	320	0	384	0	480	0	512	0
	" 10	8	0	32	0	64	0	128	0	160	0	192	0	240	0	256	0
	" 15	5	20	21	20	42	40	85	20	106	40	128	0	160	0	170	40
Grn.	" 20	4	0	16	0	32	0	64	0	80	0	96	0	120	0	128	0
	Drac'm. ½	2	40	10	40	21	20	42	40	53	20	64	0	80	0	85	20
	" 1	1	20	5	20	10	40	21	20	26	40	32	0	40	0	42	40
10	" 2		40	2	40	5	20	10	40	13	20	16	0	20	0	21	20
	Ounce. ½		20	1	20	2	40	5	20	6	40	8	0	10	0	10	40
	" 1		10		40	1	20	2	40	3	20	4	0	5	0	5	20
	" 2				20		40	1	20	1	40	2	0	2	30	2	40

QUANTITY OF MEDICINE REQUIRED IN FLUID

(CONTINUED.)

SIZE OF DOSE.		℥ 1.		℥ 4.		℥ 8.		1 Pint.		℥ 20.		℥ 24.		℥ 30.		2 Pints.	
Dose.		Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.
Grn. 12	Minims. 5	19	12	76	48	153	36	307	12	384	0	460	48	576	0	614	24
	" 10	9	36	38	24	76	48	153	36	192	0	230	24	288	0	307	12
	" 15	6	24	25	36	51	12	102	24	128	0	153	36	192	0	204	48
	" 20	4	48	19	12	38	24	76	48	96	0	115	12	144	0	153	36
	Drac'm. ½	3	12	12	48	25	36	51	12	64	0	76	48	96	0	102	24
	" 1	1	36	6	24	12	48	25	36	32	0	38	24	48	0	51	12
	" 2		48	3	12	6	24	12	48	16	0	19	12	24	0	25	36
	Ounce. ½		24	1	36	3	12	6	24	8	0	9	36	12	0	12	48
	" 1		12		48	1	36	3	12	4	0	4	48	6	0	6	24
	" 2				24		48	1	36	2	0	2	24	3	0	3	12
Grn. 15	Minims. 10	12	0	48	0	96	0	192	0	240	0	288	0	360	0	384	0
	" 15	8	0	32	0	64	0	128	0	160	0	192	0	240	0	256	0
	" 20	6	0	24	0	48	0	96	0	120	0	144	0	180	0	192	0
	Drac'm. ½	4	0	16	0	32	0	64	0	80	0	96	0	120	0	128	0
	" 1	2	0	8	0	16	0	32	0	40	0	48	0	60	0	64	0
	" 2	1	0	4	0	8	0	16	0	20	0	24	0	30	0	32	0
	Ounce. ½		30	2	0	4	0	8	0	10	0	12	0	15	0	16	0
	" 1		15	1	0	2	0	4	0	5	0	6	0	7	30	8	0
	" 2				30	1	0	2	0	2	30	3	0	3	45	4	0
Grn. 20	Minims. 10	16	0	64	0	128	0	256	0	320	0	384	0	480	0	512	0
	" 15	10	40	42	40	85	20	170	40	213	20	256	0	320	0	341	20
	" 20	8	0	32	0	64	0	128	0	160	0	192	0	240	0	256	0
	Drac'm. ½	5	20	21	20	42	40	85	20	106	40	128	0	160	0	170	40
	" 1	2	40	10	40	21	20	42	40	53	20	64	0	80	0	85	20
	" 2	1	20	5	20	10	40	21	20	26	40	32	0	40	0	42	40
	Ounce. ½		40	2	40	5	20	10	40	13	20	16	0	20	0	21	20
	" 1		20	1	20	2	40	5	20	6	40	8	0	10	0	10	40
	" 2				40	1	20	2	40	3	20	4	0	5	0	5	20
Grn. 25	Minims. 15	13	20	53	20	106	40	213	20	266	40	320	0	400	0	426	40
	" 20	10	0	40	0	80	0	160	0	200	0	240	0	300	0	320	0
	Drac'm. ½	6	40	26	40	53	20	106	40	133	20	160	0	200	0	213	20
	" 1	3	20	13	20	26	40	53	20	66	40	80	0	100	0	106	40
	" 2	1	40	6	40	13	20	26	40	33	20	40	0	50	0	53	20
	Ounce. ½		50	3	20	6	40	13	20	16	40	20	0	25	0	26	40
	" 1		25	1	40	3	20	6	40	8	20	10	0	12	30	13	20
	" 2				50	1	40	3	20	4	10	5	0	6	15	6	40
Grn. 30	Minims. 15	16	0	64	0	128	0	256	0	320	0	384	0	480	0	512	0
	" 20	12	0	48	0	96	0	192	0	240	0	288	0	360	0	384	0
	Drac'm. ½	8	0	32	0	64	0	128	0	160	0	192	0	240	0	256	0
	" 1	4	0	16	0	32	0	64	0	80	0	96	0	120	0	128	0
	" 2	2	0	8	0	16	0	32	0	40	0	48	0	60	0	64	0
	Ounce. ½	1	0	4	0	8	0	16	0	20	0	24	0	30	0	32	0
	" 1		30	2	0	4	0	8	0	10	0	12	0	15	0	16	0
	" 2			1	0	2	0	4	0	5	0	6	0	7	30	8	0
Grn. 40	Minims. 20	16	0	64	0	128	0	256	0	320	0	384	0	480	0	512	0
	Drac'm. ½	10	40	42	40	85	20	170	40	213	20	256	0	320	0	341	20
	" 1	5	20	21	20	42	40	85	20	106	40	128	0	160	0	170	40
	" 2	2	40	10	40	21	20	42	40	53	20	64	0	80	0	85	20
	Ounce. ½	1	20	5	20	10	40	21	20	26	40	32	0	40	0	42	40
	" 1		40	2	40	5	20	10	40	13	20	16	0	20	0	21	20
	" 2			1	20	2	40	5	20	6	40	8	0	10	0	10	40

QUANTITY OF MEDICINE REQUIRED IN FLUID

(CONTINUED.)

SIZE OF DOSE.			℥ 1.		℥ 4.		℥ 8.		1 Pint.		℥ 20.		℥ 24.		℥ 30.		2 Pints.	
Dose.			Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.
Grn. 60	Drac'm.	½	16	0	64	0	128	0	256	0	320	0	384	0	480	0	512	0
	"	1	8	0	32	0	64	0	128	0	160	0	192	0	240	0	256	0
	"	2	4	0	16	0	32	0	64	0	80	0	96	0	120	0	128	0
	Ounce.	½	2	0	8	0	16	0	32	0	40	0	48	0	60	0	64	0
	"	1	1	0	4	0	8	0	16	0	20	0	24	0	30	0	32	0
	"	2			2	0	4	0	8	0	10	0	12	0	15	0	16	0

EXPLANATION.

The preceding tables are designed to facilitate the determination of how much medicine, in a given dose, must be added to a required quantity of fluid, so that this fluid may be prescribed in doses of a certain amount. 1. The *given dose of the medicine* will be found in the first column, at the left of the brackets, or, in other words, the *quantity* of the *medicinal agent* required to be taken with each dose of the mixture or solution into which it enters; 2, the *dose of the fluid solution* of this medicine will be found in the first column, inclosed within the brackets, or, in other words, the *size* of the dose of the *mixture or solution* prescribed; 3, the quantity of *fluid required or prescribed* to form the solution, will be found at the heads of the other columns; and, 4, the *quantity of medicine which must be added* to the required or prescribed amount of fluid, will be found in the column under the head of such amount. Thus:

1. It is desired to give four fluidounces of liquid to a patient, to be taken in half fluidrachm doses, each dose to contain Strychnia $\frac{1}{30}$ grain, Quinia ½ grain, Morphia ⅛ grain. How much of each of these alkaloids must be added to the four fluidounces prescribed?—As already explained, find the given dose of the Strychnia $\frac{1}{30}$ grain, and, opposite to it, inclosed within the bracket, find the dose of the fluid solution, viz., half a fluidrachm; from which follow out the line until the column under four fluidounces has been reached, when it will be found that $2\frac{2}{15}$ grains of Strychnia will be required. Again, find the given dose of the Quinia grain ½, and inclosed within its bracket also find the dose of the fluid solution, viz., half a fluidrachm; from this, trace along the line as before, and in the column under four fluidounces, the quantity of fluid prescribed, will be found the required amount of Quinia, viz., 32 grains. For the Morphia, find the given dose, grain ⅛, then the half fluidrachm inclosed in its bracket, and tracing along, as before, the quantity of this alkaloid required will be found, 8 grains.

2. It is desired to prescribe two ounces of fluid to be taken in doses of ten minims, each dose to contain one-fiftieth of a grain of Atropine;

how much Atropine must be contained in the two fluidounces?—As $\frac{1}{50}$ grain is not in the tables, find $\frac{1}{25}$ grain, and on the ten minims line under four fluidounces will be found $7\frac{17}{25}$ grains, or the quantity required were the given dose of Atropine $\frac{1}{25}$ for four fluidounces; one-half of which will be the amount of Atropine, at $\frac{1}{25}$ grain dose, for two fluidounces, viz., $3\frac{21}{25}$ grains, and one-half of this again will be the quantity of Atropine at $\frac{1}{50}$ grain dose for two fluidounces, viz., $1\frac{23}{25}$.

3. It is desired to add two grains of Veratria to a fluid, to be administered in twenty minim doses, each dose to contain $\frac{1}{25}$ grain of Veratria. How much of the fluid will be required for the two grains?—Find the given dose, $\frac{1}{25}$ grain, and the dose of the fluid, 20 minims; follow this line until the amount nearest to two grains is found, which in the present instance will be $3\frac{21}{25}$ grains, in the column under four fluidounces; $3\frac{21}{25}$ grains is $1\frac{21}{25}$ grains more than 2 grains, or an excess of forty-six $\frac{1}{25}$ grains=46 doses. By the following table it will be seen that four ounces contain 96 doses of 20 minims each; subtract from this the excess of 46 doses, and 50 doses remains for the two grains, and as each dose is to consist of 20 minims of the solution, 50 doses will= 1000 minims=16 drachms and 40 minims of fluid. The same result may be obtained, as follows: One dose is to contain $\frac{1}{25}$ grain, therefore two grains will give fifty $\frac{1}{25}$ths or 50 doses, which being multiplied by the number of minims required for each dose, 20, will give 1000 minims=16 drachms, 40 minims.

4. How much fluid will be required for 12 grains of Morphia; the fluid to be given in 20 minim doses, each containing $\frac{1}{2}$ grain of Morphia? Ans.—1 ounce.

5. I have one ounce of Iodide of Ammonium which I desire to give in solution in doses of a teaspoonful containing two grains each; how much water will the ounce of Iodide require?

Find the given dose of the Iodide, *i. e.*, 2 grains, and the line containing the dose of the fluid, *i. e.*, one drachm; follow this line along until the column containing one ounce or eight drachms are found, and at the top of this column will be found the required answer, viz., 30 ounces of fluid.

II. Table for determining the number of doses there are in a definite amount of fluid medicine, when given in a certain dose.

NUMBER OF DOSES IN

SIZE OF DOSE.	℥ 1.	℥ 4.	℥ 8.	1 Pint.	℥ 20.	℥ 24.	℥ 30.	2 Pints.
Minims. 5.....	96	384	768	1536	1920	2304	2880	3072
" 10.....	48	192	384	768	960	1152	1440	1536
" 15	32	128	256	512	640	768	960	1024
" 20.....	24	96	192	384	480	576	720	768
Drac'm. ½.....	16	64	128	256	320	384	480	512
" 1.....	8	32	64	128	160	192	240	256
" 2.....	4	16	32	64	80	96	120	128
Ounce. ½.....	2	8	16	32	40	48	60	64
" 1.....	1	4	8	16	20	24	30	32
" 2.....		2	4	8	10	12	15	16

How many doses of 15 minims each, are there in 24 ounces of fluid? By following the dose, (15 minims,) in the first line, along until the column under 24 ounces is reached, the answer will be found, viz., 768 doses.

How many drachm doses are there in 30 ounces of fluid? Ans. 240.

III. Table for determining how much fluid medicine must be given to a patient to last for a definite length of time, when taken in a certain dose, which is to be repeated three times every day.

Thus, 8 drops of a fluid repeated 3 times a day, will require $1\frac{1}{2}$ ounces to last a month. The small figures to the right of the drachms signify minims.
N. B. A drop here is considered equal to a minim.

Size of dose 3 times a day.....	Quantity required for two weeks or fifteen days.....	Quantity required for one month.....	Quantity required for six weeks.....	Quantity required for two months.....	Quantity required for ten weeks.....	Quantity required for three months.....
	Pt. Oz. Dr.	Pt. Oz. Dr.	Pt. Oz. Dr.	Pt. Oz Dr.	Pt. Oz. Dr.	Pt. Oz. Dr.
3 drops.	$2._{15}$	$4._{30}$	$6._{45}$	1 1	1 $3._{15}$	1 $5._{30}$
4 "	3	6.	9	1 4	1 7	2 2
5 "	$3._{45}$	$7._{30}$	1 $3._{15}$	1 7	2 $2._{45}$	2 $6._{30}$
6 "	$4._{30}$	1 1.	1 $5._{30}$	2 2	2 $6._{30}$	3 3
7 "	$5._{15}$	1 $2._{30}$	1 $7._{45}$	2 5	3 $2._{15}$	3 $7._{30}$
8 "	6	1 4	2 2	3 0	3 6	4 4
9 "	$6._{45}$	1 $5._{30}$	2 $4._{17}$	3 3	4 $1._{45}$	5 $0._{30}$
10 "	$7._{30}$	1 7	2 $6._{30}$	3 6	4 $5._{30}$	5 5
12 "	1 1	2 2	3 3	4 4	5 5	6 6
15 "	1 $3._{15}$	2 $6._{30}$	4 $1._{45}$	5 5	7 $0._{15}$	8 $3._{30}$
18 "	1 $5._{30}$	3 3	5 $0._{30}$	6 6	8 $3._{30}$	10 1
20 "	1 7	3 6	5 5	7 4	9 3	11 2
25 "	2 $2._{45}$	4 $5._{30}$	7 $0._{15}$	9 3	11 $5._{45}$	14 $0._{30}$
30 or $\frac{1}{2}$ dr.	2 $6._{30}$	5 5	8 $3._{30}$	11 2	14 $0._{30}$	1 0 7
40 " $\frac{2}{3}$ "	3 6	7 4	11 2	15 0	1 2 6	1 6 4
60 " 1 "	5 5	11 2	1 0 7	1 6 4	1 12 1	2 1 6
2 "	11 2	1 6 4	2 1 6	2 13	3 8 2	4 3 4
4 "	1 6 4	2 13	4 3 4	5 10	6 16 4	8 7
1 oz.	2 13	5 10	8 7	11 4	14 1	16 14
2 "	5 10	11 4	16 14	22 8	28 2	33 12
4 "	11 4	22 8	33 12	45	56 4	67 8

EXAMPLE.

It is desired to give a patient enough fluid to last six weeks, to be taken in teaspoonful doses three times a day, each dose to contain 1 grain of quinia and $\frac{1}{3}$ grain of morphia. What quantity of fluid must be given, and what proportions of quinia and morphia must it contain?

By the above table, a teaspoonful or drachm dose given three times a day, will require 1 pint and 7 drachms of fluid to last for six weeks. Now, by referring to table *I*, on a line with the given dose, 1 grain, it will be found that for drachm doses 1 pint will require 2 drachms and 8 grains of the medicine, while 8 drachms or 1 ounce will require 8 grains, making two drachms and 16 grains; but as only 7 drachms are required, or 1 drachm less than the ounce, the amount of the dose for the superfluous drachm, which contains one grain, must be deducted, making 2 drachms and 15 grains of quinia. Again, by referring to the given dose, $\frac{1}{3}$ grain, in same table, and following the line of drachm doses, it will be found that one pint will require $42\frac{2}{3}$ grains, while 8 drachms will require $2\frac{2}{3}$ grains, making in all $45\frac{1}{3}$ grains; from which deduct the superfluous drachm which contains $\frac{1}{3}$ grain, and the result will be 45 grains of morphia.

IV. Table for reducing American Wine or Apothecaries' measures to French fluid measures.

Minims.		Millilitres.
1	equal to	.062
2	"	.124
3	"	.185
4	"	.247
5	"	.307
6	"	.369
7	"	.431
8	"	.493
9	"	.554
10	"	.616
20	"	1.232
30	"	1.848
40	"	2.464
50	"	3.079
f. Drachms.		
1	equal to	3.696
2	"	7.392
3	"	11.089
4	"	14.785
5	"	18.482
6	"	22.178
7	"	28.874
f. Ounces.		Centilitres.
1	equal to	2.9571
2	"	5.9143
3	"	8.8714
4	"	11.8286
5	"	14.7857
6	"	17.7428
7	"	20.7000
8	"	23.6572
9	"	26.6142
10	"	29.5714
11	"	32.5285
12	"	35.4856
13	"	38.4428
14	"	41.3999
15	"	44.3509

Pints.		Litres.
1	equal to	.4731
2	"	.9463
3	"	1.4194
4	"	1.8925
5	"	2.3657
6	"	2.8388
7	"	3.3120
8	"	3.7851
9	"	4.2620
10	"	4.7314
20	"	9.4628
30	"	14.1943
40	"	18.9257
50	"	23.6572
60	"	28.3886
70	"	33.1200
80	"	37.8515
90	"	42.6208
100	"	47.3144
200	"	94.6288
300	"	141.9432
400	"	189.2576
500	"	236.5721
600	"	283.8865
700	"	331.2009
800	"	378.5154
900	"	426.2083
1,000	"	473.1443
2,000	"	946.28869
3,000	"	1419.43299
4,000	"	1892.57664
5,000	"	2365.72172
6,000	"	2838.86538
7,000	"	3312.00969
8,000	"	3785.15475
9,000	"	4262.08354
10,000	"	4731.44272

EXAMPLE.

How many Litres are there in 12372 pints, 10 ounces, 5 drams, and 3 minims?

Pints.	Oz.	Dr'ms.	Min's.		Litres.
10000				=	4731.44272
2000				=	946.28869
300				=	141.94329
70				=	33.12009
2				=	.94630
	10			=	.29571
		5		=	.01848
			3	=	.00018
12372	10	5	3	=	5854.05546

V. Table for determining what quantity of medicine, at a given dose, is

NUMBER OF PILLS OR

SIZE OF DOSE.	8.	10.	12.	15.	16.	18.	20.	24.
Grains.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.	Dr. Gr.
1/60	2/5	1/6	1/5	1/4	4/15	3/10	1/3	2/5
1/50	4/5	1/5	6/25	3/10	8/25	9/25	2/5	1 2/5
1/40	1 1/5	1/4	3/10	3/8	2/5	9/20	1/2	2 2/5
1/30	1 4/5	1/3	2/5	1/2	8/15	3/5	2/3	3 3/5
1/25	2 2/5	2/5	1 2/25	3/5	16/25	18/25	4/5	4 4/5
1/20	3 2/5	1/2	3/5	3/4	4/5	9/10	1	1 1/5
1/16	1/2	2/5	3/4	15/16	1	1 1/8	1 1/4	1 1/2
1/15	8/15	2/3	4/5	1	1 1/15	1 1/5	1 1/3	1 3/5
1/12	2/3	5/6	1	1 1/4	1 1/3	1 1/2	1 2/3	2
1/10	4/5	1	1 1/5	1 1/2	1 3/5	1 4/5	2	2 2/5
1/8	1	1 1/4	1 1/2	1 7/8	2	2 1/4	2 1/2	3
1/6	1 1/3	1 2/3	2	2 1/2	2 2/3	3	3 1/3	4
1/5	1 3/5	2	2 2/5	3	3 1/5	3 3/5	4	4 4/5
1/4	2	2 1/2	3	3 3/4	4	4 1/2	5	6
1/3	2 2/3	3 1/3	4	5	5 1/3	6	6 2/3	8
2/5	3 1/5	4	4 4/5	6	6 2/5	7 1/5	8	9 3/5
1/2	4	5	6	7 1/2	8	9	10	12
3/5	4 4/5	6	7 1/5	9	9 3/5	10 4/5	12	14 2/5
2/3	5 1/3	6 2/3	8	10	10 2/3	12	13 1/3	16
3/4	6	7 1/2	9	11 1/4	12	13 1/2	15	18
4/5	6 2/5	8	9 3/8	12	12 4/5	14 2/5	16	19 1/5
1	8	10	12	15	16	18	20	24
2	16	20	24	30	32	36	40	48
3	24	30	36	45	48	54	1 0	1 12
4	32	40	48	1 0	1 4	1 12	1 20	1 36
5	40	50	1 0	1 15	1 20	1 30	1 40	2 0
6	48	1 0	1 12	1 30	1 36	1 48	2 0	2 24
8	1 4	1 20	1 36	2 0	2 8	2 24	2 40	3 12
10	1 20	1 40	2 0	2 30	2 40	3 0	3 20	4 0
12	1 36	2 0	2 24	3 0	3 12	3 36	4 0	4 48
15	2 0	2 30	3 0	3 45	4 0	4 30	5 0	6 0
20	2 40	3 20	4 0	5 0	5 20	6 0	6 40	8 0
25	3 20	4 10	5 0	6 15	6 40	7 30	8 20	10 0
30	4 0	5 0	6 0	7 30	8 0	9 0	10 0	12 0
40	5 20	6 40	8 0	10 0	10 40	12 0	13 20	16 0
60	8 0	10 0	12 0	15 0	16 00	18 0	20 0	24 0

EXAMPLE.

1. How much will it require to make 48 pills or powders, of Podophylin at $\frac{1}{4}$ grain dose,—Quinia at $\frac{1}{2}$ grain dose,—Citrate of Iron at 1 grain dose,—and Cimicifugin at 1 grain dose?

Ans.—Podophyllin, (dose $\frac{1}{4}$ grain,)=grains, 12.
Quinia, (dose $\frac{1}{2}$ grain,)=grains, 24
Citrate of Iron, (dose 1 grain,)=grains, 48.
Cimicifugin, (dose 1 grain,)=grains, 48.

required to enter into the formation of a definite number of Pills or Powders.

POWDERS REQUIRED

25.		30.		36.		40.		48.		50.		60.		80.		90.		100.	
Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.	Dr.	Gr.
	$\frac{5}{12}$		$\frac{1}{2}$		$\frac{3}{5}$		$\frac{2}{3}$		$\frac{4}{5}$		$\frac{5}{6}$		1		$1\frac{1}{3}$		$1\frac{1}{2}$		$1\frac{2}{3}$
	$\frac{1}{2}$		$\frac{3}{5}$		$\frac{18}{25}$		$\frac{4}{5}$		$\frac{24}{25}$		1		$1\frac{1}{5}$		$1\frac{3}{5}$		$1\frac{4}{5}$		2
	$\frac{5}{8}$		$\frac{3}{4}$		$\frac{9}{10}$		1		$1\frac{1}{5}$		$1\frac{1}{4}$		$1\frac{1}{2}$		2		$2\frac{1}{4}$		$2\frac{1}{2}$
	$\frac{5}{6}$		1		$1\frac{1}{5}$		$1\frac{1}{3}$		$1\frac{3}{5}$		$1\frac{2}{3}$		2		$2\frac{2}{3}$		3		$3\frac{1}{3}$
	1		$1\frac{1}{5}$		$1\frac{1}{2}\frac{1}{5}$		$1\frac{3}{5}$		$1\frac{2}{2}\frac{3}{5}$		2		$2\frac{2}{5}$		$3\frac{1}{5}$		$3\frac{3}{5}$		4
	$1\frac{1}{4}$		$1\frac{1}{2}$		$1\frac{4}{5}$		2		$2\frac{2}{5}$		$2\frac{1}{2}$		3		4		$4\frac{1}{2}$		5
	$1\frac{9}{16}$		$1\frac{7}{8}$		$1\frac{7}{8}$		$2\frac{1}{2}$		3		$3\frac{1}{8}$		$3\frac{3}{4}$		5		$5\frac{5}{8}$		$6\frac{1}{4}$
	$1\frac{2}{3}$		2		$2\frac{2}{5}$		$2\frac{2}{3}$		$3\frac{1}{5}$		$3\frac{1}{3}$		4		$5\frac{1}{3}$		6		$6\frac{2}{3}$
	$2\frac{1}{12}$		$2\frac{1}{2}$		$2\frac{1}{2}$		$3\frac{1}{3}$		4		$4\frac{1}{6}$		5		$6\frac{2}{3}$		$7\frac{1}{2}$		$8\frac{1}{3}$
	$2\frac{1}{2}$		3		$3\frac{3}{5}$		4		$4\frac{4}{5}$		5		6		8		9		10
	$3\frac{1}{8}$		$3\frac{3}{4}$		$4\frac{1}{2}$		5		6		$6\frac{1}{4}$		$7\frac{1}{2}$		10		$11\frac{1}{4}$		$12\frac{1}{2}$
	$4\frac{1}{6}$		5		6		$6\frac{2}{3}$		8		$8\frac{1}{3}$		10		$13\frac{1}{3}$		15		$16\frac{2}{3}$
	5		6		$7\frac{1}{5}$		8		$9\frac{3}{5}$		10		12		16		18		20
	$6\frac{1}{4}$		$7\frac{1}{2}$		9		10		12		$12\frac{1}{2}$		15		20		$22\frac{1}{2}$		25
	$8\frac{1}{3}$		10		12		$13\frac{1}{3}$		16		$16\frac{2}{3}$		20		$26\frac{2}{3}$		30		$33\frac{1}{3}$
	10		12		$14\frac{2}{5}$		16		$19\frac{1}{5}$		20		24		32		36		40
	$12\frac{1}{2}$		15		18		20		24		25		30		40		45		50
	15		18		$21\frac{3}{5}$		24		$28\frac{4}{5}$		30		36		48		54	1	10
	$16\frac{2}{3}$		20		24		$26\frac{2}{3}$		32		$33\frac{1}{3}$		40		$53\frac{1}{3}$	1	0	1	$6\frac{2}{3}$
	$18\frac{3}{4}$		$22\frac{1}{2}$		27		30		36		$37\frac{1}{2}$		45	1	0	1	$7\frac{1}{2}$	1	15
	20		24		$28\frac{4}{5}$		32		$38\frac{2}{5}$		40		48	1	4	1	12	1	20
	25		30		36		40		48		50	1	0	1	20	1	30	1	40
	50	1	0	1	12	1	20	1	36	1	40	2	0	2	40	3	0	3	20
1	15	1	30	1	48	2	0	2	24	2	30	3	0	4	0	4	30	5	0
1	40	2	0	2	24	2	40	3	12	3	20	4	0	5	20	6	0	6	40
2	5	2	30	3	0	3	20	4	0	4	10	5	0	6	40	7	30	8	20
2	30	3	0	3	36	4	0	4	48	5	0	6	0	8	0	9	0	10	0
3	20	4	0	4	48	5	20	6	24	6	40	8	0	10	40	12	0	13	20
4	10	5	0	6	0	6	40	8	0	8	20	10	0	13	20	15	0	16	40
5	0	6	0	7	12	8	0	9	36	10	0	12	0	16	0	18	0	20	0
6	15	7	30	9	0	10	0	12	0	12	30	15	0	20	0	22	30	25	0
8	20	10	0	12	0	13	20	16	0	16	40	20	0	26	40	30	0	33	20
10	25	12	30	15	0	16	40	20	0	20	50	25	0	33	20	37	30	41	40
12	30	15	0	18	0	20	00	24	0	25	0	30	0	40	0	45	0	50	0
16	40	20	0	24	0	26	40	32	0	33	20	40	0	53	20	60	0	66	40
25	0	30	0	36	0	40	0	48	0	50	0	60	0	80	0	90	0	100	0

2. How many doses will 3 grains of Strychnia make, at $\frac{1}{20}$ grain, for a dose? Ans. 60.

Trace along the line from $\frac{1}{20}$, the size of the dose, until 3 grains is reached, and on looking at the top of the column in which it is placed, the answer 60 will be found.

VI. Table for reducing American to French measures of length.

INCH.		MILLIMETRES.
$\frac{1}{10000}$	equal to	.00254
$\frac{1}{9000}$	"	.00282
$\frac{1}{8000}$	"	.00317
$\frac{1}{7000}$	"	.00362
$\frac{1}{6000}$	"	.00423
$\frac{1}{5000}$	"	.00507
$\frac{1}{4000}$	"	.00634
$\frac{1}{3000}$	"	.00846
$\frac{1}{2000}$	"	.01269
$\frac{1}{1000}$	"	.02539
$\frac{1}{900}$	"	.02822
$\frac{1}{800}$	"	.03175
$\frac{1}{700}$	"	.03628
$\frac{1}{600}$	"	.04233
$\frac{1}{500}$	"	.05079
$\frac{1}{400}$	"	.06349
$\frac{1}{300}$	"	.08466
$\frac{1}{200}$	"	.1269
$\frac{1}{100}$	"	.2539
$\frac{1}{95}$	"	.2673
$\frac{1}{90}$	"	.2822
$\frac{1}{85}$	"	.2988
$\frac{1}{80}$	"	.3175
$\frac{1}{75}$	"	.3386
$\frac{1}{70}$	"	.3628
$\frac{1}{65}$	"	.3907
$\frac{1}{60}$	"	.4233
$\frac{1}{55}$	"	.4618
$\frac{1}{50}$	"	.5079
$\frac{1}{45}$	"	.5644
$\frac{1}{40}$	"	.6349
$\frac{1}{35}$	"	.7257
$\frac{1}{30}$	"	.8466
$\frac{1}{25}$	"	1.0159
$\frac{1}{20}$	"	1.2699
$\frac{1}{15}$	"	1.6933
$\frac{1}{10}$	"	2.5399
$\frac{1}{5}$	"	5.0799
$\frac{1}{4}$	"	6.3498
$\frac{1}{2}$	"	12.6998
		Centimetres.
1	equal to	2.539
2	"	5.079
3	"	7.619

INCH.		CENTIMETRES.
4	equal to	10.159
5	"	12.699
6	"	15.239
7	"	17.779
8	"	20.319
9	"	22.859
10	"	25.399
20	"	50.799
30	"	76.198
40	"	101.598
50	"	126.997
60	"	152.397
70	"	177.796
80	"	203.196
90	"	228.595
100	"	253.997
200	"	507.990
300	"	761.986
400	"	1015.981
500	"	1269.977
600	"	1523.972
700	"	1777.967
800	"	2031.963
900	"	2285.958
1000	"	2539.979
2000	"	5079.908
3000	"	7619.862
4000	"	10159.816
5000	"	12699.770
6000	"	15239.724
7000	"	17779.678
8000	"	20319.632
9000	"	22859.586
10,000	"	25399,794
20,000	"	50799.081
30,000	"	76198.621
40,000	"	101598.163
50,000	"	126997.704
60,000	"	152397.245
70,000	"	177796.786
80,000	"	203196.326
90,000	"	228595.867
100,000	"	253997.947

EXAMPLE.

How many Centimetres are there in $4632\frac{1}{30}$ Inches?

Inches.		Centimetres.
4000	=	10159.816
600	=	1523.972
30	=	76.198
2	=	5.079
$\frac{1}{30}$	=	.0846
$4632\frac{1}{30}$	=	11765.1496

VII. Table for reducing Troy American to French Weights.

GRAINS.		MILLIGRAMMES.
$\frac{1}{1000}$	equal to	.06479
$\frac{1}{900}$	"	.07199
$\frac{1}{800}$	"	.08099
$\frac{1}{700}$	"	.09256
$\frac{1}{600}$	"	.10799
$\frac{1}{500}$	"	.12958
$\frac{1}{400}$	"	.16198
$\frac{1}{300}$	"	.21597
$\frac{1}{200}$	"	.32395
$\frac{1}{100}$	"	.64791
$\frac{1}{95}$	"	.6820
$\frac{1}{90}$	"	.7199
$\frac{1}{85}$	"	.7623
$\frac{1}{80}$	"	8099
$\frac{1}{75}$	"	.8632
$\frac{1}{70}$	"	.9256
$\frac{1}{65}$	"	.9968
$\frac{1}{60}$	"	1.0799
$\frac{1}{55}$	"	1.1780
$\frac{1}{50}$	"	1.2958
$\frac{1}{45}$	"	1.4398
$\frac{1}{40}$	"	1.6198
$\frac{1}{35}$	"	1.8512
$\frac{1}{30}$	"	2.1597
$\frac{1}{25}$	"	2.5916
$\frac{1}{20}$	"	3.2395
$\frac{1}{15}$	"	4.3194
$\frac{1}{10}$	"	6.4791
$\frac{1}{8}$	"	12.9583
$\frac{1}{5}$	"	16.1979
$\frac{1}{4}$	"	32.3959
$\frac{1}{2}$	"	64.7919
1	"	129.5838
2	"	194.3757
3	"	259.1676
4	"	323.9595
5	"	388.7514
6	"	453.5433
7	"	518.3352
8	"	583.1371
9	"	647.9192
10	"	

GRAINS.		GRAMMES.
20	equal to	1.2958
30	"	1.9437
40	"	2.5916
50	"	3.2395
60	"	3.8875
70	"	4.5354
80	"	5.1833
90	"	5.8313
100	"	6.4791
200	"	12.9583
300	"	19.4375
400	"	25.9167
500	"	32.3959
600	"	38.8751
700	"	45.3543
800	"	51.8335
900	"	58.3137
1000	"	64.7919
2000	"	129.5838
3000	"	194.3757
4000	"	259.1676
5000	"	323.9595
6000	"	388.7514
7000	"	453.5433
8000	"	518.3352
9000	"	583.1371
10,000	"	647.9192
20,000	"	1295.8383844
30,000	"	1943.7575766
40,000	"	2591.6767688
50,000	"	3239.5959610
60,000	"	3887.5151532
70,000	"	4535.4343454
80,000	"	5183.3535376
90,000	"	5831.2727298
100,000	"	6479.19192221

EXAMPLE.

How many Grammes are in 198.753 $\frac{1}{50}$ Troy grains?

Grains.		Grammes.
100,000	=	6479.192
90,000	=	5831.371
8,000	=	518.3352
700	=	45.3543
50	=	3.2395
3	=	.1943757
$\frac{1}{50}$	=	.0012958
198,753$\frac{1}{50}$	=	12877.6876715

To Calculate for Fractions between those given in the Table.

Thus, how many milligrammes are there in $\frac{1}{43}$ of a grain? We subtract $\frac{1}{45}$ grain=1.4398, from $\frac{1}{40}$ grain=1.6198, which leaves .1800. But as there are five steps between $\frac{1}{40}$ and $\frac{1}{45}$, we divide this .1800 by 5, which gives for each step .0360. Multiply this by 3 to give the three steps required to add to $\frac{1}{40}$ to make it $\frac{1}{43}$, which gives .1080. Subtract this from $\frac{1}{40}$ grain=1.6198, and we have $\frac{1}{43}$ grain=1.5118 milligrammes.

A similar course is required for the hundredths; thus how many milligrammes are in the $\frac{1}{336}$ of a grain.

$\frac{1}{300}$ grains	=	.21597
$\frac{1}{400}$ grains	=	.16198
100 steps	=	.05399 ÷ 100 and
1 step	=	.000539 × 36 and
36 steps	=	.0019404 subtract
this from $\frac{1}{300}$	=	.21597
		.00194, and we have
$\frac{1}{336}$ grains	=	.21403 milligrammes.

VIII. Table to aid in facilitating the conversion of French Weights and Measures into American.

	GRAMMES; OR, CUBIC CENTIMETRES.			METRES.	LITRES. Distilled Water.			ARE.	STERE. Solid.
U'it	Troy Gr's.	Cub. In.	Minims.	Eng. Inches.	Troy oz.	Ap. Pts.	Cub. In.	Square Yds.	Cubic F't.
1	15.43402	.061028	16.2319	39.3707904	32.104	2.1135	61.028	119.60327	35.31658
2	30.86804	.122056	32.4638	78.7415808	64.208	4.2270	122.056	239.20654	70.63316
3	46.30207	.183084	48.6957	118.1123712	96.312	6.3405	183.084	358.80981	105.94974
4	61.73609	.244112	64.9276	157.4831616	128.416	8.4541	244.112	478.41309	141.26633
5	77.17012	.305140	81.1595	196.853952	160.520	10.5476	305.140	598.01636	176.58291
6	92.60414	.366168	97.3914	236.224742	192.624	12.6811	366.168	717.61963	211.89949
7	108.03816	.427196	113.6233	275.595532	224.728	14.7947	427.196	837.22290	247.21607
8	123.47218	.488224	129.8552	314.966323	256.832	16.9082	488.224	956.82618	282.53265
9	138.90621	.549252	146.0871	354.337113	288.936	19.0217	549.252	1076.42945	317.84923
10	154.34023	.610280	162.3190	393.707904	321.040	21.135	610.280	1196.03272	353.16582
20	308,68046	1.22056	324.6380	787.415808	642.08	42.270	1220.56	2392.0654	706.33164
30	463.02070	1.83084	486.9570	1181.123712	963.12	63.405	1830.84	3588.0981	1059.49746
40	617.36093	2.44112	649.2760	1574.831616	1284.16	84.541	2441.12	4784.1309	1412.66328
50	771.70117	3.05140	811.5950	1968.53952	1605.20	105.476	3051.40	5980.1636	1765.82910
60	926.04140	3.66168	973.9140	2362.24742	1926.24	126.811	3661.68	7176.1963	2118.99492
70	1080.38164	4.27196	1136.2330	2755.95532	2247.28	147.947	4271.96	8372.2290	2472.16074
80	1234.72187	4.88224	1298.5520	3149.66323	2568.32	169.082	4882.24	9568.2618	2825.32656
90	1389.06211	5.49252	1460.8710	3543.37113	2889.36	190.217	5492.52	10764.2945	3178.49238
100	1543.40234	6.1028	1623.1900	3937.07904	3210.40	211.353	6102.80	11960.3272	3531.65820
200	3086.80468	12.2056	3246.380	7874.15808	6420.8	422.70	12205.6	23920.6545	7063.3164
300	4630.20703	18.3084	4869.570	11811.23712	9631.2	634.05	18308.4	35880.9818	10594.9746
400	6173.60937	24.4112	6492.760	15748.31616	12841.6	845.41	24411.2	47841.3091	14126.6328
500	7717.01172	30.5140	8115.950	19685.39520	16052.0	1054.76	30514.0	59801.6364	17658.2910
600	9260.41406	36.6168	9739.140	23622.47424	19262.4	1268.11	36616.8	71761.9636	21189.9492
700	10803.81640	42.7196	11362.330	27559.55328	22472.8	1479.47	42719.6	83722.2909	24721.6074
800	12347.21875	48.8224	12985.520	31496.63232	25683.2	1690.82	48822.4	95682.6182	28253.2656
900	13890.62110	54.9252	14608.710	35433.71136	28893.6	1902.17	54925.2	107642.9455	31784.9238
1000	15434.02345	61.028	16231.900	39370.79040	32104.0	2113.53	61028.0	119603.2728	35316.5820

Myria.	Kilo.	Hecto	Deca.	Unit.	Deci.	Centi.	Milli.
0 0 0 0	0 0 0	0 0	0	·	0	0 0	0 0 0

EXPLANATION.

1. The figures in the first column, under Unit, have reference to Grammes, Metres, Litres, etc., and for convenience have been carried out by tens and hundreds, to 1,000; thus, 1 Gramme=15.43402 Troy Grains; 8 Litres=488.224 Cubic Inches; 60 Ares=7176.1963 Square Yards, etc. But in determining the different denominations of French weights or measures, above or below the Unit as, *Hecto*grammes, *Centi*litres, etc., we must confine ourselves to the first ten lines of the table.

2. In the line *below* the table, Unit is represented by a dot, and the prefixes to the units of French weights and measures are represented by one or more ciphers; those on the right of the Unit signifying that as many *whole numbers* contained in the answers to the Unit column as there are ciphers representing the prefix or given denomination of French weight or measure, must be cut off and placed to the right among the decimals; and those on the left signifying that as many *decimals* contained in the answer to the Unit column as there are ciphers representing the prefix or given denomination of French weight or measure, must be cut off and placed to the left among the whole numbers,—in order to convert these answers into those required for the given French weight or measure.—A few examples will more clearly illustrate:

Ex. 1. How many pints are there in six Kilolitres?

Find six in the Unit column, and trace along the line until the column of pints under Litres is reached; we now have the answer to the Unit column, that 6 Litres=12.6811 pints. In the lower table the prefix *Kilo* will be found on the left of Unit, and is represented by three ciphers; therefore, to convert the above answer into that for Kilolitres, we cut off three of its *decimals* and place them to the left among the whole numbers; then 6 Kilolitres=12681.1 Pints.

Ex. 2. How many Troy Grains in eight Centigrammes?

Find eight in the Unit column, and trace along the line until the column of Troy Grains under Grammes is reached; we now have the answer to the Unit column, that 8 Grammes=123.47218 Troy Grains. In the lower table the prefix *Centi* will be found on the right of Unit, and is represented by two ciphers; therefore, to convert the above answer into that for Centigrammes, we cut off two of its *whole numbers* and place them to the right among the decimals; then 8 Centigrammes =1.2347 Troy Grains.

Ex. 3. How many Cubic Inches are there in one Millilitre?

By the process above explained, we find 1 Litre=61.028 Cubic Inches, three whole numbers of which must be cut off and placed to the right among the decimals, in order to obtain the desired answer. But there are not enough whole numbers for this purpose, therefore, the deficiency must be made up by prefixing the necessary amount of ci-

phers to the whole numbers, and which in this instance is only one; then 1 Millilitre= .06102 Cubic Inches.

Ex. 4. In 1268 Steres how many solid Cubic Feet?

1000	Steres=	35316.5820	solid Cubic Feet.
200	" =	7063.3164	"
60	" =	2118.9949	"
8	" =	282.5326	"
Ans.—1268	" =	44781.4259	"

N. B. By a somewhat reversed process, American Weights and measures may be converted into French, by means of the above Table. Thus, in 642 Inches how many Centimetres?

393.7079	Inches=	1000	Centimetres.	
236.2247	" =	600	"	
11.8112	" =	30	"	
.2360	" =	.6	"	
.0196	" =	.05	"	
641.9994	" =	1630.65	"	=16.3065 Metres.

TABLE IX,

For reducing minute parts of French Weights and Measures to American, suitable for Microscopists, Chemists, Physiologists. etc.

Parts of Millimetres, Milligrammes, Millilitres, Grammes, or Cubic Centimetres, and Miliares, reduced to American Weights and Measures.													Millimetres.			Milligram'e.		Mil'tre, Gr'ms or C. C.			Miliare.	Millis.
													L'ne $\frac{1}{8}$ in.	L'ne $\frac{1}{10}$ in	L'ne $\frac{1}{12}$ in	Troy Grs.	Apoth. Min.	Cubic Inc'es.	Tr'y Gr. of Dis Wa.	Apoth. Min'm	Square Inches.	Cubic Inches
a.		b.	c.	a.		b.	c.	a.		b.	c.	a.		b.	c.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
$\frac{1}{5}$	or	.2	=.	$\frac{1}{50}$	or	.02	=.0	$\frac{1}{500}$	or	.002	=.00	$\frac{1}{5000}$	or	.0002	=.000	$\frac{1}{50000}$	or	.00002	=.0000	0630	0787	0946	00309	003246	012205	3.087	3.2464	31.0011	12.2054
$\frac{3}{10}$	"	.3	=.	$\frac{3}{100}$	"	.03	=.0	$\frac{3}{1000}$	"	.003	=.00	$\frac{3}{10000}$	"	.0003	=.000	$\frac{3}{100000}$	"	.00003	=.0000	0945	118	1419	00463	004869	018308	4.630	4.8696	46.5017	18.3081
$\frac{2}{5}$	"	.4	=.	$\frac{1}{25}$	"	.04	=.0	$\frac{1}{250}$	"	.004	=.00	$\frac{1}{2500}$	"	.0004	=.000	$\frac{1}{25000}$	"	.00004	=.0000	1260	157	1892	00617	006492	024411	6.173	6.4927	62.0023	24.4108
$\frac{1}{2}$	"	.5	=.	$\frac{1}{20}$	"	.05	=.0	$\frac{1}{200}$	"	.005	=.00	$\frac{1}{2000}$	"	.0005	=.000	$\frac{1}{20000}$	"	.00005	=.0000	1575	197	2365	00771	008115	030514	7.717	8.1159	77.5029	30.5135
$\frac{3}{5}$	"	.6	=.	$\frac{3}{50}$	"	.06	=.0	$\frac{3}{500}$	"	.006	=.00	$\frac{3}{5000}$	"	.0006	=.000	$\frac{3}{50000}$	"	.00006	=.0000	1890	236	2838	00926	009738	036617	9.260	9.7391	93.0034	36.6162
$\frac{7}{10}$	"	.7	=.	$\frac{7}{100}$	"	.07	=.0	$\frac{7}{1000}$	"	.007	=.00	$\frac{7}{10000}$	"	.0007	=.000	$\frac{7}{100000}$	"	.00007	=.0000	2205	276	3311	01080	011361	042719	10.803	11.3623	108.5040	42.718
$\frac{4}{5}$	"	.8	=.	$\frac{2}{25}$	"	.08	=.0	$\frac{1}{125}$	"	.008	=.00	$\frac{1}{1250}$	"	.0008	=.000	$\frac{1}{12500}$	"	.00008	=.0000	2520	315	3784	01234	012984	048822	12.347	12.9855	124.0046	48.821
$\frac{9}{10}$	"	.9	=.	$\frac{9}{100}$	"	.09	=.0	$\frac{9}{1000}$	"	.009	=.00	$\frac{9}{10000}$	"	.0009	=.000	$\frac{9}{100000}$	"	.00009	=.0000	2835	354	4257	01389	014607	054925	13.890	14.6087	139.5052	54.924
..	"	1.	=.	$\frac{1}{10}$	"	.1	=.0	$\frac{1}{100}$	"	.01	=.00	$\frac{1}{1000}$	"	.001	=.000	$\frac{1}{10000}$	"	.0001	=.0000	315	394	473	0154	016232	061028	15.434	16.2319	155.00584	61.028

DIRECTIONS.

§ 1. The first five divisions of the foregoing Table contain *fractional* parts of a Millimetre, Milligramme, Millilitre, Miliare and Millistere, arranged as follows: *a*, the first column of figures in each of these five divisions contains the parts of a Millimetre, Milligramme, etc., in *fractions; b*, the second column contains the same, but represented in *decimals; c*, the third column gives the unit dots and decimal ciphers which must be prefixed to the answers or figures opposite to them in the sixth to the fifteenth division.—The *answers* are in the divisions from the sixth to the fifteenth, inclusive.

§ 2. In reducing parts of a Millilitre to Troy Grains and Minims; parts of a Miliare to Square Inches; and parts of a Millistere to Cubic Inches, (as seen in the 12th, 13th, 14th, and 15th divisions), for every cipher found in the third column (*c*) of the first five divisions, and opposite the given fractional part of the Millilitre, Miliare, or Millistere, as represented in the first column (*a*) of one of the first five divisions, the *whole figures* in the *answer* thereto must be advanced one step to the right,—the whole figure on the left of the decimal dot or unit being carried over to the right side of it among the *decimal figures;* and when all the whole figures have been thus cut off to four decimals, ciphers must be prefixed to them as the decimals decrease in value, as described in the preceding section, in order to give the true decimal value to the answer. Thus:

1	Millitre	is equal to	15.434	Troy Grains	and	16.2319	Minims.
$\frac{1}{10}$	"	"	1.5434	"	"	1.62319	"
$\frac{1}{100}$	"	"	.15434	"	"	.16231	"
$\frac{1}{1000}$	"	"	.01543	"	"	.01623	"
$\frac{1}{10000}$	"	"	.00154	"	"	.00162	"

§ 3. Parts of an inch may be obtained by prefixing an additional cipher to the decimals ascertained for a line, the $\frac{1}{10}$th of an inch; thus .05 Millimetre=.0197 lines ($\frac{1}{10}$ inch)=.00197 inch.

EXAMPLES.

Ex. 1. What part of a line ($\frac{1}{12}$ inch) is $\frac{3}{50}$ or .06 millimetre?

In one of the first five divisions of the table find $\frac{3}{50}$ or .06, and by tracing the line along until we come under Millimetres, in the division headed "Line $\frac{1}{12}$ inch," we find the figures 2838, to which must be prefixed the decimal cipher in the third column of the division, opposite $\frac{3}{50}$. The answer, therefore, will be .02838 of a line $\frac{1}{12}$ inch.—But suppose we substitute $\frac{3}{5000}$ or .0006 millimetres for the $\frac{3}{50}$ or .06, the figures will be the same as in the preceding instance, requiring, however, to be prefixed by the three decimal ciphers opposite $\frac{3}{50000}$, and then the answer will be .0002838 of a line $\frac{1}{12}$ inch.

Ex. 2. What part of a Cubic Inch is $\frac{4}{10}$ millilitre?

Find .4 or $\frac{2}{5}$, follow the line along to Millilitre under the division of Millitres and in the column of Cubic Inches; the answer will be .024411 Cubic Inches.

Ex. 3. How many Troy Grains are in .17643 Milligrammes?

	.1	or	$\frac{1}{10}$	Milligrammes	=.0154	Troy Grains.
	.07	"	$\frac{7}{100}$	"	=.00180	"
	.006	"	$\frac{3}{500}$	"	=.0000926	"
	.0004	"	$\frac{1}{2500}$	"	=.000006492	"
	.00003	"	$\frac{3}{100000}$	"	=.000000463	"
Ans.	.17643	"	$\frac{17643}{100000}$	"	=.017299555	Troy Grains.

To Divide Medicines into Fractions of a Grain.

1. Divide one grain of Strychnia into doses of $\frac{1}{25}$ths each.

Take of Starch (or other inert or insoluble powder) *twenty-four grains*, Strychnia *one grain;* mix, and triturate thoroughly together, and then weigh out sixteen grains of the mixture, which will be equal to $\frac{1}{25}$ths of the grain of Strychnia.—Or, for a solution, take of Distilled Water *forty-nine minims*, Nitric, or Phosphoric Acid *one minim*, Strychnia *one grain;* mix. When the Strychnia is dissolved, thirty-two minims of the solution will be equal to $\frac{32}{50}$ths or $\frac{1}{25}$ths of a grain of the alkaloid.

2. Required a dose of Aconitina, $\frac{8}{15}$ths of a grain.

Take of Starch (or other inert powder) *fourteen grains*, Aconitina *one grain;* mix, and triturate thoroughly together. Eight grains of the mixture will equal $\frac{8}{15}$ths of a grain of Aconitina.—Or, for a tincture, take of Alcohol *thirty minims*, Aconitina *one grain;* mix, and dissolve the alkaloid. Sixteen minims of the solution will be equal to $\frac{16}{30}$ths or $\frac{8}{15}$ths of a grain of Aconitina.—Or, for a solution, take of Distilled Water *one hundred and fifty minims*, Aconitina *one grain;* mix. Eighty minims of this solution is equal to $\frac{80}{150}$ths or $\frac{8}{15}$ths of a grain of the alkaloid.

3. Required $\frac{7}{10}$ths of a grain of Chloride of Gold and Soda to add to a fluidounce of Water.

Take of Chloride of Gold and Soda *one grain*, Starch (or finely-powdered pumice-stone, sand, or emery, etc.) *fifteen grains;* mix, triturate well together, and then weigh out seven grains, equal to $\frac{7}{10}$ths of the Gold Salt, and add it to the water, which will dissolve this salt but not the emery, or pumice, etc.

N. B. The balance of the triturated medicine, not employed, should be kept for future use in a small vial, with the proportions of medicine and inert powder labeled upon it.—In all cases where solutions or tinctures are to be made, and it is not desirable to have other matters to enter therein, triturate with some insoluble material, and when the solution is made, filter. Powdered emery, pumice-stone, sand, etc., may be used when the article is to be dissolved in water; and, if in

alcohol or ether, powdered starch, gum arabic, tragacanth, or sugar of milk, etc.

Dissolve $10\frac{4}{15}$ grains of Atropia in one pint of Alcohol.

First, weigh out *ten grains* of Atropia and add it to the Alcohol.

Second, triturate *one grain* of Atropia with *fourteen grains* of powdered pumice-stone, and of this mixture, add four grains to the Alcohol, making $10\frac{4}{15}$ grains of Atropia that have been added to the fluid. Filter, if required.

N. B. GLYCERIN No. 2, is frequently referred to in the work, and as it has been suggested to me that many will not understand what is meant by it, I will explain at this place. Glycerin No. 1, is the best deodorized article to be found in the market, and commands a very high price; Glycerin No. 2, is the next best article, it is not wholly decolorized nor deodorized, though its odor is hardly perceptible,—its price is about one-third that of the No. 1 article, and it is fully equal to this for the preparations in which it has been recommended.

Carbolic Acid is recommended in several parts of this work; it must, however, be borne in mind that this agent is a powerful and active caustic, very volatile, and corrodes and disorganizes the tissues with which it comes in contact, and may, consequently, effect much serious mischief when improperly employed. It is not soluble in water to any great extent, and should always be first dissolved in four times its volume of alcohol before being added to water, and it should also be sufficiently diluted before applying it to delicate mucous membranes, to the air passages, and internally, etc. In most instances, it may be as advantageously and much less dangerously employed in the form of what has been called *Phenol Sodique*, and which may be made by neutralizing pure crystalized carbolic acid in solution with caustic soda; press the resulting crystals between bibulous paper, and then dry them under a bell glass over a dish of sulphuric acid. It is a *phenate of soda*, stable, easily decomposed, and soluble in water, and carbolic acid.

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