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ARNOLD'S

LECTURES ON ANATOMY,

PHYSIOLOGY AND HYGIENE;

AND

DISEASE, ITS CAUSE, PREVENTION, AND CURE.

WRITTEN IN A FAMILIAR STYLE; DESIGNED FOR THE GENERAL READER.

BY

J. L. ARNOLD, M.D.

ILLUSTRATED EDITION.

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PREFACE.

THIS book is intended to give the careful reader a thorough knowledge of himself, physically and mentally; in a *healthy* and in an *unhealthy* condition; and how to preserve him in the former condition or to bring him safely out of the latter.

The idea is fast passing away, that a knowledge of the Human system, and the laws that govern it under different circumstances, should be kept from the general reader, and confined to the professional man. A study of the human body, either healthy or diseased, is a proper study for every one; and not only a proper, but a very essential study, really of more importance to our welfare than any other. For what enjoyment can one have in this world, without health? And in order to enjoy good health it is absolutely necessary to have a knowledge of the human system.

Modern civilization has made so many inventions pernicious to our welfare, that, to counteract them, a knowledge of ourselves is absolutely necessary. This Volume proposes to give the careful reader a thorough knowledge of this subject. But it must be studied from beginning to end, until every fact is understood and committed to memory. One reading will not be sufficient; it should be read and re-read, until it becomes thoroughly incorporated with our store of knowledge. Then the reader can tell at a glance, the effect of any influence whatever on the system, be it a habit or a disease, and will be enabled to correct the one and cure the other. The circulation of this book should be encouraged by the intelligent physician, as it will better enable the community in which he practices, to distinguish him from the ignorant empiric, who is frequently better patronized than himself.

If intelligent physicians could overcome that professional prejudice, against "letting their light shine before men," it would redound infinitely to their benefit. If they would perform fully their duties as "Guardians of the Public Health," they would be willing to disseminate their knowledge of the laws of Health, so that their patrons could *avoid* disease, as well as cured of it, by their advice. "But this would lessen our business," say they; — so be it then; — if fewer and better physicians will conduce to the Public Good, by all means, let this reform take place.

I offer no apology for endeavoring to communicate this useful knowledge to the public. I beg no pardon for having the hardihood to remove the vail from the sacred mysteries of Medical Science, and displaying their wonders, unobscured by professional jargon and jugglery, to the vulgar gaze. If there be professional brethren so selfish and bigoted as to denounce me for this; so be it. The consciousness of benefiting thousands will amply compensate me for enduring the ill-grounded hatred of the few. And moreover, physicians cannot hope, in this progressive age, to keep Medical Science eternally locked up in their own breasts: it will be liberated and scattered over the land. And is it not better for physicians themselves, to be the willing liberators, than to have it forced from them, to their disadvantage, by the unprofessional public? J. L. A.

January, 1856

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ANATOMY,

PHYSIOLOGY, AND HYGIENE.

LECTURE I.

I AM about to deliver to you a course of lectures on PHYSIOLOGY; and I shall require your fixed, undivided attention, while addressing you on this subject, that you may understand and fix in your mind the truths I propose telling you.

Unless you commence with me on the start, with the determination of understanding and retaining everything as fast as it is said, it will not do you much good; no more than the superficial study of any other subject.

There is hardly a necessity of my telling you the utility of this study. If there be any subject necessary to be known to a human being, it is the subject of himself. The body is but a machine, worked according to fixed physical laws. We understand the most of these laws, and will at some future time, no doubt, understand all of them; so that every operation of the human body can be explained with as much certainty as the operations of a steam-engine. It will require no greater discoveries in science to bring this

about, than have already been made. You will admit that it is absolutely necessary for an engineer to understand thoroughly the structure, the workings, and the strength of his engine, in order to run it profitably and safely. Now, if the human body is a machine, and much more complicated than any other machine, how vitally important is it that its engineer, or mind, should understand as much as possible of its structure, its workings, and its strength? It would seem as though this knowledge of ourselves was of more importance than any other branch of knowledge that is commonly taught in our schools. It would seem that more of our happiness depended on this knowledge than on any other. Good health is the basis or foundation of all earthly enjoyment. With the unnatural customs and vitiated tastes of modern society, it is next to impossible for us to have good health without an actual knowledge of the physiology of the human system; so that we can avoid those habits that are injurious to our health.

The studies that have always had a preference in our schools, such as grammar, arithmetic, and the foreign languages are, in reality, of less importance to us than the study of physiology, because a knowledge of these branches is not essential to the possession of good health, while a knowledge of physiology is absolutely so. In the first periods of man's existence, this physiological knowledge was not so indispensable, for men lived more naturally then; their appetites and desires were instinctive and proper, not leading to disease and death, as the artificial appetites and desires of more modern times do. It was not the design of our Creator that we should be sick any more than the wild animal, that lives naturally in the forest, is sick.

Our bodies are constructed so as to keep in perfect order until they are actually worn out by the labors of the series of years allotted to man.

This improper way of living is one of the bad effects of our superior intelligence misdirected. Animals, in their natural state, not knowing how to devise unnatural habits, enjoy perfect health through their whole lives. You find no diseased livers, hearts, lungs, bowels, or even teeth, among them. I do not refer here to domesticated animals, for they are subjected, more or less, to artificial habits by man; and hence we find disease among domestic horses, cows, and sheep. I think I am safe in saying, that there is not one person in ten, among enlightened nations, who, at the age of thirty, has a perfectly sound and healthy body. This should not be so. We should enjoy as good health at sixty as at sixteen. A strict observance of the laws of physiology will enable us to do this, so that even our teeth shall remain sound to an extreme old age. Is not a knowledge of physiology, then, a thing to be desired above all other kinds of knowledge? And is it not worthy of a large share of your time and attention as a study?

The word Physiology is derived from two Greek words (φυσις, meaning Nature, and λογος, meaning a discourse). Physiology would literally mean a discourse or treatise on natural objects. This was the province of physiology in the early history of the natural sciences, when less was known of all of them than is now known of the most insignificant of them. More latterly, however, the bounds of physiology have been restricted to a study of the functions or

uses of the different parts of organized things, either of the animal or vegetable kingdom.

Here I might as well define what I mean by an organized body, inasmuch as the term will occur frequently in these lectures.

An organized body is one that has life; that grows from nutriment taken from the external world by a set of vessels going through its internal structure, which vessels assimilate this nutriment to the different structures of the organized body. An organized body dies and undergoes decomposition, or a separation of its component parts. All organized bodies originate from a germ, or seed. The animal and the vegetable kingdoms are the province of organized bodies, while the mineral kingdom is the province of unorganized bodies. A horse is an organized body, so is an apple-tree or a blade of grass, because they have life and grow by means of nutrient vessels; but a stone is an inorganized body, because it has no life, and its only way of increasing in size is by external accretion, or an adding on to its external surface.

As easy as it may seem to distinguish between an organized and an inorganized body, there are some instances in which it is difficult. It is difficult to distinguish the mosses and many other plants of the lowest order in the vegetable kingdom, from the rocks on which they grow. In the Mississippi valley, above New Orleans, are whole forests covered with a drapery of moss, appearing as though the trees had been dipped in a huge tow-heap to supply the spinning-wheel of some giantess. One would hardly believe that there was life in this moss; but it lives and grows, the same as our bodies do, by nourishment.

The sponge is a vegetable, and so is the mould that grows on the barrels in our cellars.

Some plants grow, when suspended in the air, with no other nourishment than what they absorb from the atmosphere. The leather-tree of South America, is found on the most sterile rocks, from which it seems incredible that nourishment could be derived. To the sight it exhibits no signs of life, yet it lives and grows. More difficult still is it to draw the line of demarcation between the vegetable and animal kingdoms—to tell precisely where the one ends and the other commences. There are some vegetables that appear to have sensation and locomotion, while there are some animals that can scarcely be said to have either. The sensitive plant contracts instantly on being touched with the hand. The fly-trap, a plant of South America, shuts its spiked leaves when an insect gets in them, and holds it fast.

There is a kind of water-plant that separates itself from the stalk, and floats in search of the opposite sex. On the other hand, the zoophytes, which produce coral, forming immense reefs and islands in some parts of the world, are but a degree removed from the vegetable kingdom.

There are some kinds of worms that appear to have no sensation whatever, nor digestive organs, being nourished by absorption through the skin. There are others—as the tapeworm—that increase their species by throwing off joints, like the prickly pear, each severed joint growing of itself, like the parent body. There are organized bodies found in the human body, worms for instance, whose precise origin and nature are not even now known. The chrysalis, or form that silkworms and others of that kind assume, is as near

the nature of a vegetable seed as can be, awaiting but for favorable circumstances to germinate and grow.

Eggs of animals are nearly allied to the seeds of plants. As we ascend the scale of life, we find it hardly perceptible in the lowest orders of plants, becoming more and more developed as the higher orders of vegetables approach in organization, the lower orders of animals. Ascending from the lowest orders of animals, we find that the earth-worm has more life than the oyster; the moth more than the worm; insects and serpents more than moths; fish more than insects and serpents; birds, more than fish. The mammalia (or sucking animals,) have a higher organization, and consequently more life than birds.

Man stands at the top of the scale. He has the most perfect organization, and consequently is superior to all other animals. Man differs from the other mammalia in these respects: First, in his erect posture. No other mammalia walks, habitually, in an erect posture. The simia, or monkey tribe, approaches nearest to man in this respect; and some so called progressive philosophers, have gone so far as to say, that man was originally a monkey, and by gradual improvement, became man, in the same manner that the original crab-apple has, by cultivation, become the delicious pippin and rambo of the present day. Some wag has appended to this supposition, that men were originally monkeys—the necessary explanation, that they wore their tails off by sitting on them. There certainly is at the present time, a marked difference between a man and a monkey. The monkey's arms are much longer than man's. It is unable to oppose the thumb against the fingers of the same hand, as in grasping an object. Its legs, or more properly, its hind legs,

are not articulated with the foot in a manner to admit of an erect posture; consequently it is with an effort, that it walks erect; its natural way of walking being on all-fours. The construction of its feet, and so called hands, is adapted to climbing. And here I will remark, that in the study of physiology, we shall find each organ of the animal economy perfectly constructed, so as to perform the function for which it was designed. We shall find that the animals designed to live on grass, (called herbivorous,) are provided with teeth suitable for cutting off the grass, and other teeth for grinding it; and with capacious stomachs for the digestion of such bulky food. We shall find that the animals designed to live on flesh, (called carnivorous,) are provided with teeth and claws, suitable for seizing and tearing their prey, and with small stomachs, suitable for digesting flesh. So perfectly is every organ constructed for the wants of the animal, that an experienced anatomist can describe the size, shape and nature of any animal on being shown a single bone that belongs to it. In this manner Cuvier, a great French anatomist, has given a description of many animals whose species have been extinct for thousands of years, having in some instances but a single petrified bone to make out the animal from.

There is another animal bearing some resemblance to man in its attitude and domestic relations—it is the penguin. The penguin is a water-fowl of the South Sea islands. When walking, it is nearly erect: a party of them appearing at a distance like a body of diminutive, corpulent soldiers. The penguin associates with another water-fowl, called the albatross. In the spring, which commences in that part of the world the first of October, hundreds of these fowls of each

kind, come together in a convention. After they have had their meeting, (I don't know whether it is presided over by a president and vice-president or not,) they select a piece of ground containing about four or five acres, bordering on the sea. They then go to work and clear it of sticks and stones, until it is as smooth as the most beautiful park. They then make a wall around it, except on the sea-side, and lay it off into squares. At the corner of each square sits an albatross; in the center, a penguin. As much regularity is observed in their organized cities as in a well-conducted military station. But the penguin, though able to walk erect, and possessing some intelligence, has no hands. It must use its neck and bill for all its, not manual, but cervical operations; which necessity would detract materially from man's superiority over the lower animals.

There have been some philosophers so absurd as to contend that man, originally, went on all-fours, but by education, he assumed an erect attitude. The structure of his body alone, would refute such a supposition. His lower limbs are much larger than his upper, showing that they are to support and carry his body. The bones of his spine (constituting his backbone,) are largest at the lower part of the spine, decreasing regularly towards the top, which is not the case in animals that go on all-fours. The shape of the spine, as a whole, is that of a small *f*, bending forward at the bottom, where the bowels do not occupy much room; then it curves backward to allow room for the lungs; then forward again in the neck. Now, a straight line drawn down through its curves, will fall within the base of the feet, showing the body to be perfectly balanced when in an erect posture.

His legs are set perpendicularly on his feet, and can be of use for walking in no other than an erect position. His hand is not constructed to support weight in the manner of a foot. In fact, the idea of walking originally on his hands and feet is too absurd to demand a serious consideration. And, beside, we see that a child, at the proper age, as instinctively tries to walk on his two legs as a colt does on his four. Man has more brain, in proportion to his nerves of sensation, than any other animal. There are some small birds that have more brain, in proportion to the size of the body, than man; but the most of their brain belongs to the nerves of sensation, leaving that part of the brain, in which is seated the intellect, in smaller proportion than in man. In intellect alone has man a superiority over all other animals. The elephant, the tiger, the horse, and many other animals are his superiors in physical strength. The birds have the advantage over him in flying; the fish in swimming; most of the animals in fleetness; many in seeing; many in smelling. But man's intellect alone compensates, aye, more than compensates for a want of superiority in any one or all of these. It enables him to harness the elephant to his chariot, and to make the lion and the tiger his servants. It renders superior physical endowments unnecessary, by enabling him to turn those of the inferior animals to his own use. Man, with no more intellect than the lower animals, would be the most defenseless of them. Birds have wings to fly from danger. Some animals are constructed for climbing from danger; others for fleeing it. Some hide themselves in the bowels of the earth, or in the depths of the sea. Most all have some defensive part, as horns, teeth, claws, trunks or stings.

All have an instinct for avoiding danger. Man has none of these: neither the physical advantages of the bird, the fish, the fleet animal, nor of the beast of prey; yet, he is master of them all.

Man differs from the other animals in his articulating or talking powers. This difference is but the result of his superior intellect. His organs for the production of sound are not more delicately formed than those of some singing birds. The mocking-bird, that approaches the nearest to man in this respect, cannot make a thousandth part of the combinations of sounds that man can. The shape and structure of man's head is peculiar to himself. The forehead is prominent, symmetrical, and round; affording a large space for intellectual brain. His eyes are so situated that he can direct the gaze of both on the same object, at the same time. This double power of vision, and the extensive revolution of the eyeballs, together with the facility with which the head moves on the bones of the neck, render his powers of vision extensive and peculiar. Man's jaws and teeth are different from those of any other animal. His jaws are smaller and less protuberant, calculated for crushing gently, substances thrust into the mouth. His teeth are such as belong neither to herbivorous nor carnivorous animals. He has neither canine teeth, like those of the dog, nor grinders, like those of the cow—showing that his food should not be raw flesh, nor unground grain, nor uncooked vegetables, but should be of a mixed nature, and cooked.

RACES OF MEN.

Most all physiological writers divide men into races, differing in certain characteristics of manners, color, and features. The differences of the races are

not sufficient to indicate a difference of origin. All the races of men, unquestionably, originated from the same parents. But by peculiarity of individual constitution, climate, and education, these characteristics of different races have been produced.

The following division of men into races seems to be best:

The Caucasian, Mongolian, American, Ethiopian, and Australian. The Caucasian is called thus from its supposed origin in the Caucasian mountains in Asia. A beautiful and hardy race still inhabits these mountains. For many years the immense power of Russia has tried in vain to subjugate these mountaineers. And now, under Shamyl, their chieftain, they are making head against their oppressors with greater success than ever. When men will sell their offspring to buy arms to fight their enemies with, as the modern Caucasians do, they may be said to be a desperate race.

The Caucasian women have been renowned from time immemorial for their great beauty. The rich Turks get their wives and concubines mostly from this region. They pay, not unfrequently, the most enormous prices for these brilliant gems of humanity to adorn their harems with. It is rather a melancholy reflection that beings, designed to adorn the highest situations in life, should be thus thrust into its lowest and most degrading depths, there to decay in obscurity in a living tomb, merely to gratify the animal passions of beings more brute than human.

The Caucasian race is remarkable not only for personal beauty, but for superiority in most other human endowments. It holds the sway of empire, of learning, and of benevolence. It is fast bringing under the

mild influence of its government and habits all the other races. At some future age the other races may become so mixed and assimilated with it, as to incorporate all races into one again. The wonderful mixing of different nations together, of late, by means of the increased facilities for emigration, seems to indicate this.

The head of the Caucasian is round and symmetrical. The forehead is prominent. The features and the whole body rounded, regular, and beautiful. The eyes large and prominent. The nose elevated. The complexion fair. The white inhabitants of the United States are of the Caucasian race.

The Mongolian race is characterized by a dark, olive complexion, prominent cheek-bones, oblique eyebrows, flat visage, and scanty beard. It has existed from time immemorial in great empires, isolated, as it were, from the rest of the world. Hence it has retained its peculiarities with greater tenacity than any other race. Tartary, China, India, and Persia are peopled by this race. It is not so enterprising as the Caucasian nor so apathetic as the Ethiopian. It seems to have acquired a certain advancement in human knowledge and improvement, and there to have remained stationary for centuries. Alexander, over two thousand years ago, found India in much the same condition as the British found it not a hundred years ago.

China is a standing example of non-advancement and tenacity of old customs. The system of castes, that prevails in most all Mongolian nations, effectually prevents by its leaden influence any individual, consequently any national, advancement.

The American race consists of the different tribes

of American Indians, that now inhabit and that have inhabited the western hemisphere. This race is characterized by a straight, commanding form, copper complexion, straight, black hair, and high cheek-bones. It is of a roving, warlike disposition; subsisting principally by hunting and fishing. This race has furnished two nations somewhat advanced in the arts of civilization — the Mexican and Peruvian nations. They cultivated the arts of husbandry, architecture, and war to a great degree of perfection.

The negro or Ethiopian is characterized by woolly hair, retreating forehead, protuberant jaws, thick lips, and a black complexion. It has for many centuries been under subjection, to a great extent, to the other races.

The fifth division of the human family, the Australian, can hardly be considered a distinct race of itself, but more properly a degeneration of the Mongolian race, from which it probably had its origin. The East India and Australian islands are inhabited by this race. These islanders, together with the Polynesians, are perhaps the most degenerate of the human family.

These five divisions are sufficient under which to classify the marked peculiarities of men. Some writers have many more divisions, but if we should have as many divisions as there are peculiarities, we should have a race for every individual; for there never were two individuals with the same peculiarities.

A great deal of importance was formerly attached to another division of men into temperaments; as the sanguineous, lymphatic, choleric, melancholic, and nervous. Not so much importance is now attached to them.

We come now to examine man as an individual, and we shall find that the poet Young, speaks truly when he says,

> "How poor, how rich, how abject, how august,
> How complicate, how wonderful is man!"

Man may be said to consist of three parts — his mental part, his moral part, and his corporeal part. All these are intimately connected, so as to work harmoniously together as one complicated machine, if all the parts are in order; but if one wheel is worn away, or is broken, or runs faster or slower than the others, confusion and destruction is the consequence.

It is our object in these lectures to study these different parts; to learn the nature and the laws pertaining to the individual parts and those mutually relating to all, so that we may better understand how to direct this engine, we being constituted engineers of — ourselves.

It would be rather hazardous for a man to go on board a steamboat and begin to fire up, without knowing which screw to turn to let off steam when it gets too high; or to undertake to drive the boat ahead without knowing the channel. No less hazardous is it for one to go round on the top of his own individual engine, or rather his two-paddled steamboat, without knowing the nature and operation of its machinery. His knowledge of life-navigation requires to be pretty good to conduct his frail bark safely down the life-river, among its rocks and snags, having to wood with all kinds of fuel, and having to lay up at all sorts of landings.

A knowledge of ourselves is more important to our well-being than all other kinds of knowledge. In this self-knowledge we are not, as a general thing,

superior to the inferior animals. For each animal knows itself, its powers, its business, its wants, and the best means for supplying them. This cannot be said of all of our species. I think I am safe in saying, that there is not one man in three, even in this enlightened country, that finds out what he is, and what he is made for, until it is too late for the knowledge to do him any good. The beaver knows instinctively, that it has a trowel in its tail and an ax in its teeth. It knows from infancy how to use them to the best advantage. Further knowledge would avail it nothing; perhaps be an injury to it, by inducing it to attempt projects it was by nature unfitted to accomplish. With man, it is different; his self-knowledge must be acquired. But in man, this acquisition is unlimited, and the more he acquires, the more powerful he becomes. How essential then, to know himself thoroughly—the full extent of his powers, so that he can wield them to the best advantage.

We shall begin with the groundwork of man, his corporeal part—his body. We should form a very inaccurate idea of even the external appearance of our own species, if we never had seen but the parts which modern fashion permits to be seen. We should suppose, commencing at the feet, that the male sex walked on feet something the shape of a shingle hook, judging from the shape of a fashionable boot, we should imagine, that the ankle was as large as the upper part of the leg; that the chest was an inflated balloon, and that the head extended some foot or foot and a half above the crown. We should judge that the face of the male had nothing to distinguish it from that of the female. In short, we could not form a correct idea of a single part of the entire animal. Everything is

covered up but the face, and that even, is disfigured by the process of shaving.

If we could not get a correct idea of the external appearance of the male sex, by ordinary observation, the case would be worse with the female. We should suppose, judging from external appearances, that she was constructed something on the principle of the mermaid; the upper part human, and the lower part, not exactly fish-like, but cask-like. We should judge that she got along by means of a couple of little wings, fastened to the back part of the neck. We could however, form a pretty correct idea of her face, as she generally wears that in a natural condition, although it is not always the case; for in Oriental countries she has her face concealed by a veil, and in our own country, not unfrequently, by red and white powders. I should not be surprised, if it should become fashionable eventually, for us all to wear masks and goggles, it being immodest to expose the whites of the eyes or the tip of the nose. Our fashionable ballad screamers even now have to wear white gloves to sing in.

Whether this bandaging of the whole system, as if to cure it of one universal swelling, be right, be healthful, or natural, we shall hereafter inquire.

The human body is divided, by physiologists, into the head, the trunk, the upper and lower extremities. Viewing the body as a whole, we find it erect, symmetrical in its proportions, every part corresponding perfectly with the other, and so constructed as to be best adapted to strength and agility. We find no part of the human body in which we could suggest an improvement to suit our ideas of the useful or the beautiful. The lower extremities are the largest, because

they are to support the whole superstructure. The feet are made for stability and quickness of motion. The legs, for protracted support. The lower part of the body, for containing the bowels or furnaces of life, where the power is generated. The upper part, for containing the bellows to afford the necessary supply of air, without which, the internal fires could not be kept up. The mouth and throat are best constructed to prepare and furnish a passage for the air and fuel to their destination. The arms are placed at the side for guarding, loading and unloading, and otherwise serving the craft; while the head or pilot-house is placed on the top, or the hurricane-deck, where it can best command a view of the course, and of the whole environment of man. To be sure, it does not have windows on all sides like most pilot-houses, but what is better, it is fixed on a pivot, so as to revolve, and thus command a view in every direction. The body of man is furrowed all over by muscles. His limbs are principally made up of bone and muscle, not containing much fat; while the limbs of the female contain a greater proportion, which gives them a large, smooth, and rounded appearance; scarcely a muscle can be distinguished in a healthy female, not given to too much bodily labor. The skin of the female is also of a finer texture than that of the male. The hips of the female are broader than those of the male, which makes her waist appear smaller than it actually is. This broadness of the hips is peculiarly feminine; hence the reason why in all ages, artificial means have been used to render this peculiarity more striking. At one time hoops were used for this purpose—at another, quilted and sea-grass petticoats—at another, something in the shape of a life-preserver. The

female differs from the male, in having no beard, although coarse, masculine and strong-minded women are apt to have the vestige of one. Barnum has a woman, now on exhibition, in New York, who has a Simon-pure beard. Much, however, in relation to these sexual peculiarities, depends on the occupation. Let a man live the sedentary, unexposed life of most women, and he will become effeminate. Let a female work in the open fields and accustom herself to masculine exercises, and her appearance will become masculine. We frequently see lady-like gentlemen, and gentlemen-like ladies.

We will now study the different parts of the body in detail. The Skin first presents itself, covering almost the entire body. What parts are not covered by skin, are by mucous membrane, or nails or enamel, so that no part is exposed to the direct action of the air.

LECTURE II.

THE SKIN.

The skin is composed of three coats: the Cuticle, the Rete-mucosum, and the Cutis vera, or true skin. The cuticle, or outer coat, is transparent and devoid of sensation. It is designed as a protection to the more delicate parts beneath. It is made so as to increase in thickness and hardness, in proportion to the friction and pressure to which it is exposed.

Where the friction and pressure are great and constant, as in the case of those who labor continually with the hands, it thickens so as to form callouses. If it were not for this wise provision, men could not work long at any one kind of work. It makes no difference in what part of the body the friction is applied, thickening of the cuticle immediately takes place. The inside of the blacksmith's right-hand becomes calloused, so that he can hammer all day without inconvenience. The skin on the top of the head and on the shoulders, becomes callous, so as to enable porters to carry heavy weights there ten-times the distance they could before they had hardened the parts by use. In some occupations, the inside of the hands becomes almost like horn, without which quality it would be impossible for the laborers to pursue their calling. The person who goes much barefooted, has soles almost as impenetrable as tanned leather. The cuticle is like the outer bark of a tree, being insensible, designed for protection,

and is shed off continually. We see in this, as in every other physiological fact, the hand of an all-wise Creator, who has made provision in his works for all their wants.

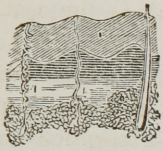
The second layer of the skin is the rete-mucosum, which means a soft net-work. This layer is so thin and so easily torn, that it is with difficulty separated from the other layers. In this layer, resides the coloring matter of the skin, of the whole individual, indeed. The difference of the coloring matter in this insignificant film distinguishes the transcendent Caucasian beauty from the unnoticed squaw; and the noble American citizen from the miserable slave. The old adage, "that beauty lies but skin-deep," is too favorable, for it lies but half skin-deep. In Albinoes, this coloring matter is entirely wanting. Albinoes are persons with a very light complexion, white hair and colorless eyes, or rather red eyes: the want of coloring matter in the eyes, permitting the blood-vessels to be seen, which gives the eyes a reddish appearance. Albinoes cannot endure a bright light, because all the rays of light strike on the nerve of the eye, without the superfluous rays being absorbed by the coloring matter that exists in others' eyes. They can see by twilight or moonlight only. Albinoes are said to be more frequent in Central America than in any other part of the globe. Families of Albinoes have been exhibited through the United States as curiosities. One called the "White Negro Family," was exhibited about twenty years ago. "White negroes" and "white blackberries" seem to be a contradiction in terms, nevertheless both these things exist. You will notice, generally, a correspondence in color between the skin, hair and eyes. If one be

light-colored, the others will be also; if dark, the others will be dark. There are exceptions to this to be sure. We sometimes see dark hair above light-colored eyes. We sometimes see a fair complexion associated with dark hair and eyes. I have seen a tuft of light hair growing in the middle of a head of black hair. The color of the hair of the head and the beard also, generally correspond, though not always, to the great vexation of those gentlemen who would raise a black imperial or moustache; though the hair on their heads is black enough, their whiskers will persist in coming out red. These differences in color, like ball-eyed horses and dogs, with one light eye and one dark one, are but exceptions to the general rule. I don't know as this general complexion of the hair, eyes and skin has any influence on the health of individuals, but I have observed that those of a light complexion retain the freshness of youth much longer than those of a dark complexion. There is a certain description of persons, characterized by fair skin, round, full form, blue eyes and light hair, which seems to wear, or "hold its own," as the saying is, better than any other. This description of persons looks well to the very last.

The third coat of the skin is called the cutis vera, or true skin, because its functions seem to be more important than those of the other layers. It is composed principally, of bloodvessels, nerves and perspiratory ducts. In this, are situated the roots of the hair. This is the part of the skin that has feeling. We can stick a pin through the other two coats of the skin without feeling it, or without drawing blood, for you do not come to the nerves and bloodvessels of the

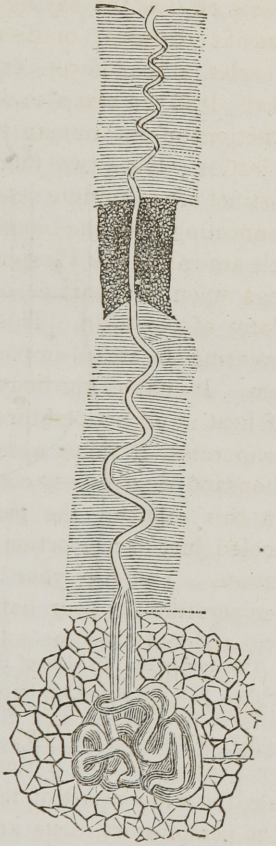
skin till you come to the third coat. This is the coat that is exposed in blisters and burns, when the "skin comes off," as the saying is. This is the seat of cutaneous diseases, or diseases of the skin, such as measles, scarlet fever, erysipelas, small-pox and the like. It is the seat also of two of the most important functions of the human system—absorption and perspiration; these two functions being performed by a distinct set of minute vessels opening on the skin, and connecting with the bloodvessels. These minute vessels are called the Perspiratory Ducts, and their openings upon the surface of the cuticle, are called the Pores of the Skin. This function of perspiration, or sweating, is an all-important one in the human system. It enables the body to preserve the same degree of heat in all temperatures. When fluid of any kind evaporates, it takes a certain quantity of heat—one thousand degrees—to convert it from fluid to vapor. In this manner, the part on which the fluid lies is cooled just in proportion to the rapidity of the evaporation. You dip your hand in water of the same temperature as your hand, and hold it in the air, it will suddenly become cold. This coldness is produced by the quantity of heat the water takes from the hand to convert the water into vapor. When the body becomes too hot, either from great exertion, or from too high a temperature of the surrounding air, the watery part of the blood is poured out through the perspiratory ducts and pores, on the skin, forming sweat or perspiration. By the evaporation of this perspiration, taking a thousand degrees of heat, the temperature of the body is kept the same all the time. If it were not for this provision, our flesh would melt

FIG. 1.



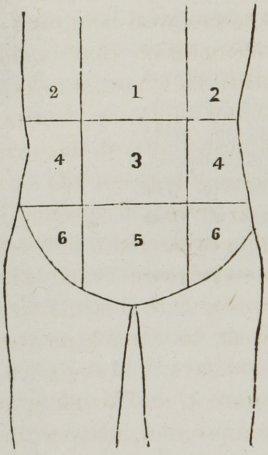
A section of the skin. The upper layer represents the cuticle; the dark layer, the cutis vera, or true skin; the thin layer between these two, is the rete mucosum, or coloring layer of the skin; the granulated layer at the bottom, is fat lying under the skin. The tube passing through all these layers to the right, is an oil duct; the other two tubes are perspiratory ducts.

FIG. 2.



A magnified perspiratory gland, embodied in the layer of fat, under the skin, with its ducts uniting and passing up through the layers of the skin.

FIG. 8.



The anatomical division of the body into regions :—1. Epigastric region. 2, 2. Right and left Hypochondriac. 3. Umbilical. 4, 4. Lumbar. 5. Hypogastric. 6, 6. Iliac. This is an imaginary division merely, for the sake of description.

in the summer time, the same as a piece of pork when put out in the hot sun. This provision enables a man to sit in a hot oven until a piece of beef is baked.

Another use of perspiration is to carry off the fluids of the system when they are taken in too great quantity. It undoubtedly purifies the blood also by carrying off the useless and injurious matters that get into it.

How essential to our well-being it is then, that the skin be kept in a condition that it can perform properly its functions? How is this to be done, you ask? The medicine-vender steps up, bottle in hand, and says, "Take a tablespoonful of this syrup, three times a day; it will keep the pores of the skin open, and no mistake: price only twenty-five cents!" The advocate of individual rights says, that a hot stew, with a little good brandy in — the more brandy the better — is a sovereign thing to regulate this matter; no difference whether you sweat too much or too little. Old Granny Wormwood says, "Make a tea of catnip, sassafras, and rangumroot, and drink a quart every two hours." The Thompsonian advises that, if the pores won't keep open any other way, to steam them once in a while, and then they are bound to come open.

Hygeia, the goddess of health, intimates a more simple and natural way of keeping the skin in a healthy condition, and that is simply by keeping the skin clean, and keeping it clothed in such a manner as to prevent its being exposed to sudden changes of temperature. Either uncleanliness or sudden and prolonged exposure to cold will check perspiration. There is no necessity of your making an ice-breaker of yourself, floundering round in a millpond, every morning before breakfast,

during the winter months; or of living a fish-life in any other way, because we have neither the skin of the catfish nor the scales of the sheep's-head to enable us to live in this element.

We must always bear in mind that the skin, as well as every other organ, is capable of performing its duty itself, without any assistance, if it only has a chance. All that it is necessary to do then, is to keep it clean. The parts exposed to the air, the face, neck, ears, and hands, should be washed, as they generally are, three times a day; the feet, every night. Once a week, during the winter, the whole body should be washed, and once a day in summer. The best time to wash the body is just before going to bed; it calms down the nervous system and leaves it in a condition most congenial to sleep. The water for washing the body, should feel cool to the touch, but not cold enough to produce too great a shock. A strong, hearty person can bear the water colder than one in ill condition.

If a bath is used, after coming out of it, the body should be dried by wrapping a sheet around it, and then it should be rubbed with a towel. Bathing should be conducted so that the skin will experience a lively sensation after the process. There is no excuse for any one neglecting this. If a bath is not at hand, take a basin or pail and a towel, and make a business of it at regular times. Even if your system derived no permanent good from it, the delicious sensation one feels after bathing, is sufficient compensation for the trouble. But don't run into the other extreme of bathing much oftener than here recommended; that is, using bathing and rubbing as a

stimulus to excite the skin to an inordinate action. This practice is but another form of intemperance. It is not a whit better than stimulating the stomach to inordinate action by the use of alcoholic drinks. Continued bathing, in this way, will eventually get the skin into such a condition that it cannot act at all, except as it is stimulated, no more than the drunkard's stomach can, unless stimulated by spirits.

Don't think that I would discourage the external use of water. I merely make these remarks to apprise you that even as simple an agent as water, may do harm if used improperly. I would encourage its use in the temperate manner I have recommended. It will enable you to enjoy the blessing of health in a greater degree; it will enable you to accomplish more labor, and, what is not a small item, it will enable you to cheat the doctor out of many a bill.

The consequence of letting the skin remain uncleansed is to change these little perspiratory ducts into absorbent vessels; to change their action entirely. Instead of pouring out perspiration, they go to work and take up the old dried perspiration and dirt, on the surface of the skin, and carry it back into the circulation. In this way one is continually eating himself over again—becoming one of the worst of cannibals. This power of absorption, that the perspiratory ducts possess, is illustrated to every one in the case of the cow and the hog. Let a milch cow lie in a dirty stable, and see how soon the taste of the milk will show it. Or let hogs lie continually in their own filth, and you can notice it in the taste of the pork. These filthy substances, that the animals lie in, become part of the milk and flesh.

I have known farmers, who were aware of this fact, curry not only their horses, but all their other cattle and hogs regularly, so that these filthy substances should not be taken into the blood. It is far worse for this filth to be taken in by the skin than by the mouth; for when it is absorbed by the skin it goes directly into the blood in an unpurified condition, but when it is taken in by the mouth and stomach, it is purified before it enters the blood. Physicians take advantage of this power of the skin in introducing medicines into the system, when some difficulty of the stomach or bowels prevents the medicine being taken internally. I have frequently seen persons salivated, by rubbing mercurial ointment on the skin. When the cuticle is taken off, as in the case of blisters, the mouths of the perspiratory ducts become more exposed, and if any fine substance be sprinkled on, it will immediately be taken up by these ducts and carried into the blood, and affect the system as quick and as surely as if taken into the stomach. The plague and other epidemic diseases, where the cause exists in the air, are said to have been warded off by persons clothing themselves in oiled garments, so that the poison could not come in contact with the skin and be absorbed. But I should fear the preventative would be about as bad as the disease. And history says, that a general in old times found it so, who, by clothing his men in oiled garments, to keep out the plague lost nearly all of them from the effects of the garments in preventing the passing off of the perspiration.

The diseases of the skin form a great variety, more so than of any other structure; and many of their

characteristics are very singular. They spread rapidly, sometimes going over a whole limb in a few hours.

These diseases sympathize greatly with the lining membrane of the alimentary canal — that is, the stomach and bowels. Many of these cutaneous diseases are caused by derangements of the alimentary canal, and cannot be cured until the difficulty is removed from the bowels. Eruptions on the skin are sometimes produced merely by eating some substance that does not agree with the stomach, as the eating of certain kinds of fish with some persons, and the eating of strong cheese with others will produce an eruption. A majority of the eruptions in children are caused by improprieties in diet, and are easily removed by simply clearing these irritating substances from the bowels, and taking measures to prevent their accumulating again. Many mothers, under the erroneous impression that the difficulty lies wholly in the skin, are continually daubing on some kind of grease or liniment "to drive it away," as they call it. But the more they daub, as a general thing, the more it will not go. The measles, small-pox, and scarlet fever are specific diseases of the skin coming from contagion, and not depending on any particular condition of the bowels or general system. Their great danger is in extending along the skin to the mucous membrane lining the mouth, or the inner skin, thence along it into the lungs and bowels, producing inflammation in these vital parts similar to that on the surface.

And here it may be as well to mention a general law of diseased structure: that inflammation will always extend along the same kind of structure that

it has commenced in, rather than go to another structure. And when a disease leaves a part, for instance, the external skin, to go to some other part, it goes to a structure nearest like the one it left: that is, it is most apt to go to the mucous membrane lining the bowels or lungs, which resembles the structure of the skin nearer than any other. To give another illustration, that of rheumatism; when rheumatism leaves a joint, existing, as it does, in a serous membrane in the joint, it goes to some other serous membrane, either in a joint or to the serous membrane covering the bowels, or lungs, or heart, or brain. In rheumatism of the muscles it skips from one muscle to another in different parts of the body. Sometimes it goes to the muscular part of the heart, when the consequences are fatal. In diseases of the skin it should be kept clean, the bowels should be kept in a proper condition, sudden changes in temperature should be avoided, and a light diet should be used. Cool drinks should be used instead of hot, stimulating ones, as are generally recommended.

The skin is more delicate in structure in some parts than in others. Around the joints, where mobility is requisite, it is thin and pliable. The skin covering the lip, where the external skin gradually merges into mucous membrane or internal skin, is very delicate; at least this is the general opinion among young men. Whether they secrete honey or not I am not positive. I suppose they do though, for we frequently hear of "honied lips." The skin covering the cheeks is transparent, allowing the arterial blood to be seen through it. It is capable of being injected with blood, under the influence of certain emotions, producing the blush.

What these emotions are that produce blushing, each individual best knows for him or herself. The cheek undergoes a process of hardening sometimes that renders it incapable of blushing, either from modesty or shame. A sort of a moral, or rather, immoral tanning rendering it honor-proof. This kind of cheek might be styled a patent leather cheek — always smooth and always shining, but incapable of changing its color either for the better or worse. It makes a very good commercial cheek. If it were not for its protective power the consciences of certain public men would be awfully scorched by the rays of truth.

The skin covering the forehead is of a clear, white color. It is said sometimes to become alloyed with brass. Whether this is actually the case, or whether it is a slander on human nature I leave you to decide. Certain it is, however, that some foreheads are proof against all moral arrows, turning them off as a duck's back does a drop of water.

The skin is the seat of the sense of touch. This sense exists in its greatest perfection in the tips of the fingers, where the extremities of the nerves devoted to this sense, terminate. By bringing these nervous terminations in contact with external objects, a sensation is conveyed to the brain, which we call the sensation of touch. What is called the sixth sense of some writers, is but the sense of touch made extremely sensitive by education. I mean that power that enables bats and blind persons to tell when they are near an object without touching it; it is owing probably to their being able to feel the reaction of the air from the object when they approach it. Insects have the sense of touch located in long hairs or feelers.

THE HAIR.

The hair comes next under consideration as an appendage to the skin. It grows from a root in the true skin; as it passes through the rete mucosum and cuticle it receives a reflected covering from each. It has a sameness of structure, having no vessel or nerve, growing entirely from vessels at the root. The hair has beards on the outside, similar to wheat beards, directed towards the outer end of the hair, thus causing the hair to lie in the same direction. The direction of these beards can be ascertained by cutting a hair with a razor. The hair is cut much easier by cutting towards the root against the direction of the beards.

It is useless to prescribe rules for the treatment of the hair. Fashion is bound to rule here. If Fashion says, wear the hair long, long it must be. If she says, wear a cue, down grows the pig-tail. At one time it was fashionable to wear a huge heap of frizzled hair on the head, after the fashion of the Poland hen. It has always been fashionable to powder and oil the hair, which is probably not injurious, if these substances are kept washed carefully from the skin. Coloring the hair is practiced very extensively now, by those who do not think gray or red hairs, or sandy whiskers, honorable. If any of you undertake to color your whiskers though, I hope you will not be as unfortunate as a medical student I knew once, by the name of Grimes—old Grimes' son, I suppose—who colored about one-half his face by the operation, so that it staid colored for about a month. False hair and curls frequently add to the wearer's beauty, and are not to be condemned if the wearer does not use them to get a companion under false pretenses. Short hair is cer-

tainly the most convenient, enabling the wearer to comb and clean the scalp conveniently.

THE BEARD.

Nature undoubtedly designed that the beard should be permitted to grow, or she would not have placed it there, having created nothing in vain. It might have been designed merely to distinguish the male from the female when both are clothed the same; but difference in clothing has rendered this mark of distinction unnecessary, and so we moderns, as a general thing, keep the face shaved. I think that every mother's son of us will admit that this shaving operation is a real bore, consuming a year or two of every man's life—and then the torture one endures if the razor is dull. And if the razor is sharp the case is not much better, for you are continually cutting and slashing yourself, and pulling the wool off from all the old hats to stop the blood with. And then what a fix the young gentlemen are in, if they are not pretty closely shaved, at a bussing bee, currying off their sweethearts' faces till they are fairly sore. Why it is perfectly horrible! Those fuzzy young gentlemen are to be envied, I assure you.

Grayness is owing to a want of coloring matter in the hair. Certain depressing emotions have a tendency to turn the hair gray. Excessive fright is said to have turned the hair gray suddenly. The story has often been related of the boy who was being let down by means of a rope, to get birds' eggs, over a precipice in an island north of England; the rope being almost severed by a sharp rock, so frightened the boy that, when he was drawn up, his hair was discovered to be turned white.

When the hair falls off owing to a want of action of the roots of the hair, washing and rubbing the scalp with slightly stimulating substances will have a tendency to increase the growth of the hair, unless the roots are entirely destroyed, and then you might as well try to raise a crop of hair on the top of a white oak stump. All the hair tonics in the world can't raise a single hair unless there is a root to start with. You could raise a crop of apple-trees from a piece of ground, by pouring Jayne's hair tonic over it, just as quick as you could raise a crop of hair from a bald scalp without any hair roots in it. Shaving the head repeatedly is about as good a way as any to stimulate the growth of the hair.

The roots of the hair are subject to disease, particularly the roots of the eyelashes. They should be kept clean and a weak ointment of red precipitate applied. What is called standing up of the hair in fright, is probably owing to an involuntary retraction of the muscle of the scalp. Animals have a muscular structure under the skin, on purpose to move the hair and skin so as to dislodge insects. There are accounts of individuals having feeling or sensation in their hair, causing them pain to have it cut.

THE NAILS.

The nails are another appendage of the skin. They have no sensation except near the root. The nails are parts of the cuticle, secreted in the same manner, composed of the same material, but much more dense and hard, to answer a different purpose; that is, to protect the tactile extremities of the fingers. Beside protecting the ends of the fingers, the nails give greater accuracy to the sense of touch by affording a

firm basis, on which the nerves of sensation can be pressed. Among the South Sea Islanders the nails are permitted to grow to their full extent, resembling bears' claws more than human nails. Carelessness in trimming the nails, particularly the toe nails, will produce what are called "*hang nails*," a very painful inflammation at the sides of the nails. They are best cured by cutting off the sides of the nails, where they goad the flesh, and scraping the top of the nail very thin, so that the sides of the nail will retract. If morbid growths, called "*proud flesh*," form there, touch them with caustic.

EXTERNAL COVERINGS OF ANIMALS.

The external covering of the inferior animals is various, according to the element they are designed to move in, their peculiar habits, and the climate they naturally belong to.

The natural covering of man is not sufficient to protect him against the inclemencies of all climates, indicating beyond a doubt, that it was designed he should furnish himself with artificial clothing. Man could not, by any physical training, so harden his system as to enable him to exist in an extreme northern latitude without artificial covering. Not so with the inferior animals. Nature has furnished each one with sufficient covering to live comfortably in the place and element it was designed to live. It has furnished the oyster with a hard shell to resist the action of the sea. It has furnished most all four-footed animals with a thick skin and a covering of hair. Those living in the frigid zones are furnished with a very thick coat of hair, and that of a light color to prevent the escape of the animal heat. Animals living in the

torrid zone, have a thinner covering. The Mexican dog could no more live in the frigid zone than the polar bear could live in the torrid zone. Sheep, taken from a cold to a warm climate, lose the fineness and thickness of their fleeces, their wool partaking more of the nature of hair.

Birds are furnished with a protection of feathers—the very best protection against cold that possibly could be devised. Water-fowl are furnished with an abundant supply of oil to make their feathers impervious to water. When warm weather comes and less covering is needed, quadrupeds and birds shed their hair and feathers.

Animals having no hair or wool, as the elephant and rhinoceros, are furnished with a thick, resisting skin. The skin of serpents is smooth, so as to slip easily over the ground. Fish are provided with coverings adapted to their element. The skin of the whale is covered with an oily substance to protect it from the water. Other fish, instead of a cuticle, have scales. Some have a complete bony case, as the nautilus, which is provided with a bony covering like a boat; it has two little arms, between which is stretched a thin web like the wing of a bat. When the nautilus wishes to sail, it throws out its ballast of water, which brings it to the surface; it then hoists its little sail and skips over the waves before the wind, like any other ship. When it is tired of gliding over the waves it takes in its sail, scuttles its boat, and sinks.

Insects and reptiles shed their skins several times during their short lives. This is called moulting. I think this would have been a good arrangement for that part of the human family that has such an in-

stinctive horror of water. It would enable them to come out with a clean skin, at least once a year.

The skin, or rather the follicles of the skin in many animals, secrete a fluid with a peculiar odor by which the animal is known. You can easily distinguish a horse from a dog, or a sheep from a hog, by the sense of smell alone. It is a popular opinion that the negro can be distinguished from the white man by his odor. I don't deny but that there may be noses delicate enough to do this.

Fluids of different odors are secreted in different parts of the body, both in man and animals. Thus the secretion of the armpits is easily distinguished from that of the soles of the feet. It is the odor of this secretion of the feet, that enables the dog to follow the tracks of different animals; the dog knowing, by the peculiar odor, what animal he is following. There is a difference in this odor even between individuals, because the dog will distinguish the footsteps of his master from the footsteps of a thousand other individuals.

Fashion has decided that the peculiar odors of certain animals are more becoming to us than that of our own. The musk-deer and muskrat stand here pre-eminent. It is universally decided that they are superior to man in this respect, and we are continually hunting them down and robbing them of their treasure to scent ourselves with. That other odoriferous animal, the skunk, has great reason to be thankful that his is not a fashionable odor, although I don't see why it should not be, it is certainly much stronger and more penetrating than that of the muskrat.

The claws and hoofs in animals correspond to the nails in man, and grow in the same manner.

LECTURE III.

THE OSSEOUS OR BONY SYSTEM.

We next come to the internal structure of the body. We will first commence with the osseous or bony system. This might be called the framework of the body to which is fastened the siding, the roof, the partitions, and the machinery of the human structure. Bone is composed of an earthy and an animal part, intimately mixed together. By putting a bone in some fluid that will eat up the earthy part of it, muriatic acid, for instance, you can obtain the animal or gelatinous part separate. It will retain the shape of the bone, but will have lost its hardness and stiffness. You can twist it round like a piece of whalebone. If you burn a bone, you will destroy the animal part but not the earthy part. The shape of the bone will remain as before; but it will have lost its toughness and will break from the slightest blow. This explains to you perfectly the uses of the two different parts that compose bone. The earthy part is to give it firmness and stability, so that it will not bend, and the animal part is to give it toughness, so that it will not break. Sometimes the relative quantity of one of these parts is too small in the bones of the living individual. When the earthy portion is too small the limbs bend and grow crooked, as in the case of rickety children. The thigh bones of Madame Supiot were so flexible from a deficiency of earthy matter in them, that she

could lay her feet on each side of her head; her other bones were equally flexible. At her death she was two feet two inches shorter than before she was afflicted with this disease.

When the animal portion is too small the bones will break from the slighest jar; the contraction of the muscles have been known to fracture them. This state of the bones is called *fragilitas ossium*, or brittleness of the bones. It is often produced by scurvy. During Lord Anson's voyage around the globe, his seamen were so afflicted with brittleness of the bones, from the effects of scurvy, that wherever their bones had been broken, they came apart again. Caries of the bone is where the bone is eaten away, as in decayed teeth. The bones sometimes enlarge to twice their natural size; they also change into a fleshy substance. Necrosis is a death of the bone corresponding to mortification in the flesh. Matter will sometimes form in the interior of a bone and eat its way out under the skin.

The cause of this diseased condition of the bones is generally constitutional, owing, as most diseased conditions are, to some impropriety in the way of living, and can be cured only by correcting that impropriety. In the growth of the bones of the child, the animal or gelatinous portion is formed first; then the earthy portion is gradually diffused through it, commencing from points and extending until it becomes intimately mixed with the animal portion of the whole bone. This excess of animal matter in the bones of infants makes their bones weaker and more easily bent than in after life. Hence the impropriety of encouraging children to stand alone sooner than they have a natural disposition to. It is almost sure to make them "bandy-legged." In old persons it is just

the reverse. The earthy portion predominates, making their bones more brittle than in youth.

Bones are divided into long, short, and broad bones; the bones of the arms and legs are specimens of long bones; those of the wrist and instep, of short bones, and those of the head, and shoulders, and hips, of broad bones. The shaft of long bones is very firm, hollow in the middle, and filled with marrow. They are larger at the ends and more spongy in texture than in the shaft. This is to form a large surface for the joint, and to prevent too much jarring of the bone, which would be the case if the extremities of the bones were as firm and inelastic as the shaft. The end of the long bones are covered with cartilage so as to present a smooth surface for articulating with other bones, to form joints. The hollows of long bones are filled with a fatty substance called marrow. Physiologists differ as to the use of marrow in bones. Some aver it is to prevent the bones from becoming too dry; others, that it is placed there as a reserve, to supply the system with nourishment when food cannot be obtained. In birds these hollows are filled with air to give lightness to the body. The question naturally arises, why is the shaft of the long bone made cylindrical or hollow? Would it not occupy less space if it were solid? Here, again, we see what a scientific mechanic Nature is, for she knows and has put in practice the law that the same quantity of matter arranged in the form of a hollow cylinder, is stronger that when arranged in any other shape. The long bones have but one small hole penetrating their sides: this is for the passage of the vessels for the nourishment of its internal structure. The body of the bone is nourished by a membrane covering the bone, called the periosteum; also

by nutritive vessels entering the spongy part of the bone at the ends. The short bones are principally found in the wrist and instep, where little motion is required of them. They are small, irregularly-shaped bones, resembling pebbles; but they are adapted perfectly to their use, and they are so framed together that they act like the stones in an arch—the more they are resisted the stronger they are. The broad bones are found in the pelvis or hip bones, in the shoulders and head. They are composed of two thin plates of hard bone, between which is a spongy structure so that the plates may yield, when struck, without being broken. The skeleton is divided, for the sake of description, into the head, trunk, the upper and lower extremities. The head, in infancy, is divided into a number of bones, which are movable on each other, allowing the head to be pressed into almost any shape. In this way an infant's head can be made at least a quarter longer and a quarter less in circumference than natural. As the child grows these bones take their proper places, and their edges grow together, forming one whole bone, the skull. The bones of the skull are flat, concave internally, and convex externally. They are formed of two plates, the external and the internal, and a spongy layer between the two plates called the diploe. The diploe is elastic, and allows the external plate to give when struck, so as not to injure the brain by blows.

We see illustrated here, as in every other part of the human body, and in fact, as in every part of the animal and vegetable kingdom, the infinite wisdom of an all-wise Creator. The most insignificant part of the most insignificant insect is eloquent of the wisdom of God. Everything in Nature is perfectly adapted tc the purpose for which it was designed.

No improvement in any natural organization can be suggested by the acutest mind. The two plates of the skull are separated from each other in some places, as above the eyes, forming cells. These cells, above the eyes, communicate with the upper part of the nose, and sometimes when a person has a bad cold, they discharge matter into the nose. The bones into which the skull is divided in infancy, are called the Os Frontis, or bone of the forehead. The two Parietal bones, forming the top and sides of the skull. The two Temporal bones, situated at the temples. The Occipital bone, forming the back part of the skull. The Sphenoid bone, forming the under part, or base of the skull, and the Ethmoid, situated internally, behind the bones of the face, joining the frontal, temporal and sphenoid bones. The skull, as a whole, is formed in the best possible shape for the protection of the brain, which it contains. Every part of its external surface where it is exposed to blows, is in the shape of an arch. You cannot strike the head anywhere, but what you strike on an arch. Now every mechanic knows, that an arch is the strongest possible structure. If the skull were any other shape, one-tenth part of the force would break it. The lower portion of the front part of the skull is not of this shape, because there is no need of it; the eyes and the bones of the face being placed before it, and affording sufficient protection. The skull is hollow, and of irregular shape within, to accommodate the different portions of the brain. It is pierced in different parts by foramina or holes, for the passage of nerves and bloodvessels. You can trace the courses of some of the bloodvessels by their beds in the bone. At the base of the skull is the Foramen Magnum, or large hole of the skull, through

which passes the spinal nerve, called, generally, the Spinal Marrow, or marrow of the back bone, the largest nerve in the body. The arrangement of all these holes is perfect. The one for the passage of the main artery, which carries the blood directly from the heart to the brain, is curved, so that the force of each jet of blood as it comes from the heart, is lost materially, by dashing against the bone, otherwise the force with which the blood has to be sent to carry it up the neck would jar the brain too much. The hole for the passage of the venous blood out of the brain, is large and free, so as to prevent the blood from being stopped. The nerves of sensation pass out through the different holes in the front and lower part of the skull. Where the olfactory, or smelling nerve passes out, the bone is pierced by a great many small holes, giving the bone the appearance of a sieve. The hole where the optic nerve passes out is round and nearly straight. The auditory nerve passes out at the end of the triangular bone, in which is situated the organ of hearing. The ridges through the inside of the skull are for the attachment of membranes, that keep the different parts of the brain separate. The bones of the face are fastened to those of the head; they are the two malar or cheek bones; the two nasal bones forming the bridge of the nose, the palate bone; the upper maxillary or upper jaw-bone, and two sets of little bones inside the nose: called the turbinated bones; and the vomer, which with the palate bone separates the nose into two parts. The upper jaw-bone has a cavity or hollow on each side, which is sometimes the seat of inflammation; when matter collects in it, a tooth has to be drawn, and a hole drilled up into the cavity, to let the matter out. On the inside of the

nose, on each side, is a little hole, the opening of a tube that goes up to the inner corner of the eye, through which the tears pass from the eye to the nose. Sometimes this little tube gets stopped up, so that the tears cannot escape into the nose, but run over the lids on the cheek. This difficulty can be removed by opening this tube and enlarging it with bougies, or, by inserting a small silver tube. The lower jaw-bone has the shape of a horse-shoe, bent up at the heel. At infancy, it is bent but very little at the angle; as the teeth come in, it becomes more bent; when the teeth come out again in old age, it becomes straight again, as in infancy. Thus the child's lower jaw and the aged person's have the same shape. This provision is to enable the jaws to come together at all ages, so that mastication, or chewing, can be performed. When this change takes place in persons with long noses, they are apt to be provided with a pair of pinchers, the nose and the chin being the forks thereof. Surmounting the internal edge of each jaw-bone is a ridge, called the alveolar processes, into which the teeth are fastened. When the second or permanent teeth come out, these processes grow much less in size, and become covered with the gum; and this gum becomes hardened, so that it is a substitute for teeth, enabling a person to "Gum it," as the phrase is. The lower jaw is fastened to the upper jaw by means of ligaments and muscles.

THE TEETH.

The teeth differ, in some respects, from the other bones of the body, in their growth, in their exposure to the air, in their varying in number at different periods of life, and in their not uniting again, when

broken. The first, or milk teeth, are twenty in number. Between the ages of six and fourteen, the roots of the first set of teeth die and become absorbed, causing the teeth to fall out, to give place for the permanent teeth, which are thirty-two in number—sixteen above, and sixteen below, each tooth corresponding with the one opposite it on the same jaw. In each jaw are four incisors or cutting teeth, placed in front; two cuspides, or eye-teeth, called so from their supposed resemblance to a spear, placed next the incisors; four bicuspides, or double spear teeth, placed next the cuspides; four molar or grinding teeth, placed next the bicuspides, and two wisdom teeth, situated the farthest back. The wisdom teeth do not appear until the person is about twenty years old, by which time it is naturally supposed, that one ought to have a little wisdom. I fear, however, that if the wisdom teeth did not appear until their owner became wise, there would once in a while be a full-grown jaw minus these four teeth. Each tooth is composed of a crown and root. The crown, or that portion which is above the gum, is covered externally with a hard enamel, which cannot be injured by the air; in this respect, unlike any other bone of the body; for if any other bone be exposed to the air, it becomes destroyed. The inner substance of the crown of the tooth is a hard ivory; in the center is a hollow, containing blood-vessels for the nourishment of the tooth, and a nerve. The root of the tooth is of ordinary bone, and fastened in the alveolar processes of the jaw-bone. In drawing the teeth, a piece of this alveolar process frequently sticks to the tooth, when the doctor gets the credit of breaking the jaw-bone. When inflammation takes place in the tooth, the bloodvessels become enlarged,

and press the nerve against the side of the tooth, causing toothache. If the parts about the nerve could yield when the nerve is pressed by the enlarged blood-vessels, as in the soft parts of the body, inflammation in the tooth would not be so extremely painful as it is. What is called the jumping toothache, is caused by blood rushing in the artery, and pressing on the nerve at each contraction of the heart. The enamel is what preserves the tooth from decay; as soon as this is destroyed, the inner or bony structure of the tooth will decay as soon as any other bone that is exposed to the air.

Hot or cold drinks or food will crack this enamel, or biting hard substances; and as soon as this crack is formed, decay commences and keeps on eating until it reaches the cavity, exposing the nerve and bloodvessels contained there. Drawing in hot smoke also cracks this enamel; therefore, I would advise those who will not give up this bad habit entirely, at least to draw their smoke through a long pipe-stem, as the Turks do, so that the smoke has time to cool. Using strong acids to excess, as strong vinegar and sour cider, or sour food will act chemically on the teeth; the acid acting on the lime of the tooth and destroying it rapidly.

Some have an idea that the use of tobacco will preserve the teeth, but I think not. It may deaden the feeling of the gums and teeth, but I think it will not prevent their decay; and even if it should, the remedy would be worse than the disease. The injury that the whole system would receive from the use of tobacco would be greater than the benefit that the teeth would derive.

As soon as you discover the enamel of your teeth to be cracked, or eaten through in any place, the

sooner you attend to it the better. Go to an honest dentist, have him clean the cavity thoroughly, and plug it with gold; this will effectually stop the decay of the tooth at that place. I believe, if it is plugged properly and in time, that the tooth will last as long as if it never had been decayed. I had one of my front teeth plugged five years ago, it appears as sound now as ever. I should probably have lost the tooth in less than a year if I had not had it plugged. But do not let a dentist plug your teeth with anything but gold. The compositions that are sometimes used by cheap dentists do the teeth more harm than good. I was imposed on, when I was a boy, by a villainous dentist, who used an amalgam and charged me with gold-filling, by which means I lost the teeth he filled.

When the tooth becomes decayed, so as to expose the nerve, it cannot be filled; then the sooner it is drawn the better; for a decayed tooth is always a source of irritation, causing sometimes a very painful disease of the face called tic-douloureux. Decayed teeth also taint the breath.

If the milk teeth do not fall out by the time the second teeth come through they should be drawn to prevent the second teeth coming in crooked. When the second teeth are lost, they can be replaced by artificial ones. Artificial teeth add not only to the beauty of the individual, but to his real comfort, and to his health by enabling him to masticate properly. Artificial teeth, as a general thing, look better than the natural ones, being more regular, and are easily kept clean. Now don't any of you go and get your natural sound teeth taken out in order to have a new and whiter set. If you have a good set of teeth, wash them with a soft brush and water every

morning. Don't use very hot or very cold drinks or food, nor much acid, and your natural teeth will look well enough.

The jaws of the inferior animals differ from those of man in being longer and more protuberant. The jaws of carnivorous animals have only one motion, that is, to open and shut like a pair of shears; while the jaws of graminivorous animals have two motions—a vertical, or up and down motion, and a lateral motion, or a motion sidewise.

The teeth of the inferior animals are constructed for the wants of the animal. The teeth of gnawers are made long, and the enamel or hard part, exists only on the outside like a chisel, the inside of the tooth being soft. In this manner the tooth keeps sharp, in the same way that a chisel does, by the inside wearing away and leaving the external enamel. Their teeth keep growing in length, and if they cannot get hard substances to eat, their teeth will grow so long as to prevent them from being used. The teeth of carnivorous animals are sharp for seizing and tearing their prey. Those of graminivorous animals are wide and edgelike in front, for cutting off grass and twigs, broad and flat behind, and ridged for grinding their food.

All quadrupeds, or four-footed animals, have teeth, except the ant-eaters. These do not need them, for they get their living by lying down at the side of an ant-hill, and protruding their tongue until it gets covered with ants, and then they draw it in and swallow their dupes. So we see that man is not the only animal that takes in those who put confidence in him.

The elephant, who follows grinding for a living, having to grind a large quantity every day, in order

to nourish his huge body, is continually supplied with new sets of grinders as long as he lives — having sometimes as many as six or eight new sets of teeth. They come in from behind, pressing the old, worn tooth out, forward.

The age of most domestic animals can be ascertained by the teeth. This would be a bad idea with us. I fear, it would prevent many an old bachelor and old maid getting a companion.

THE SPINE OR BACK-BONE.

This is composed of twenty-four separate bones, each placed the one upon the other like a pile of brick. Through each of these bones, vertically, passes a large hole, which, when the bones are together, forms a continuous tube or canal from the large hole at the bottom of the skull, where the first or uppermost bone of the spine is attached, to the extremity of the sacrum, the bone on which the spine rests. Through this spinal canal, passes the spinal cord or marrow, as as it is generally called, the largest nerve of the body, or rather, it is all the nerves of the trunk and extremities bound up in one cord. Between each of the bones of the spine, coming out on each side, is a much smaller hole, through which comes out a nerve from the spinal cord, to supply the parts nearest with nervous influence. There are twenty-five pairs of these holes coming out from between the different bones of the spine, and five, sometimes six, pairs coming out from the sacrum. The spinal bones or vertebræ have little prominences of bone coming out from their sides and from their back part, to which muscles are attached for moving the spine, and for moving other parts of the body. Covering the face of each bone,

where it joins with the other, is a cartilaginous or gristly substance, to make the spinal column elastic, so as to prevent the brain being jarred, as it otherwise would be at every step. Another advantage of this cartilage is to allow the spine to bend in different directions. In old persons this cartilage becomes harder or more of the nature of bone, causing them to be more careful in walking, so as to prevent concussions or jarring of the brain. You notice, also, that their back is more stiff, not bent in different directions so easily as in youth.

The bones of the different parts of the spine are a little different in their shape. Those of the neck (called the cervical vertebræ) are flat and shaped so as to afford great rotary motion, enabling us to turn our head in all directions without turning our body. The cervical vertebræ are seven in number. Below these are the dorsal vertebræ, twelve in number, situated behind the chest; they are a little larger than the cervical vertebræ. They are shaped so as to admit of but little motion, because much motion here would interfere with the action of the heart and lungs. To the sides of the dorsal vertebræ are attached the heads of the twelve ribs; the other extremeties of the ribs are attached to the sternum or breast-bone. The five lower bones of the spine (the lumbar vertebræ) are still larger than the dorsal vertebræ; their faces where they join together are more convex, so as to allow of considerable motion, backward and forward and sideways. The shape of the spine, as a whole, is that of a small letter, *f*, projecting forward at the top, backward at the chest, to give room for the lungs, and projecting forward again at the loins, where the bowels occupy less room. The spine is so shaped that a per-

pendicular line, drawn through its curves, will fall within the base of the feet, proving that the natural attitude of man is an erect one. Diseases that weaken the bony or muscular parts of our bodies, and improper attitudes in sitting, standing, walking, or riding will change the shape of the spine, producing, what is called, curvature of the spine, or hunch-back.

The way children sit in school, generally, is calculated to give them curvature of the spine if they are at all predisposed to it. The benches they are required to sit on, are mostly without backs to them, and so high that they are not able to put their feet to the floor—keeping the little fellows in a continual state of torture. I would recommend, as an improvement to this plan, that instead of high benches for low children to sit on, our school-rooms be provided with a lot of meat-hooks suspended from the ceiling by cords, so that each little codger can be hung up by the coat collar.

The writing desks are also wrongly constructed. All are of the same height, no difference what the height of the scholar that has to use them, whether three feet or five. The children must accommodate themselves to the benches—not the benches to the children—on the principle of the ancient tyrant who made all his guests fit a certain bedstead. It makes me think of a story one of my neighbors told me about a coffin that was made for an Indian here some years ago; when the dead Indian's companions came to put him in they found the coffin was too short. A sort of a wag who was present, told the Indians to go out a few minutes and he would fix the matter; as soon as they were out he took a hatchet and cut the Indian's feet off, and folded them up, and boxed the corpse up

to the perfect satisfaction of his friends. Now we don't exactly cut off the feet of the children too high for the benches, but we disfigure them in another way by making them stoop and sit in an unnatural position, and thus injure their systems for life; for just as the child sits or walks the future man or woman will. The children that are too low for the writing desks have to stretch one side up to it as high as they can, producing, in this way, curvature of the spine. The only healthy position is an erect one. When your body gets tired from standing, or sitting, or walking erect, don't ease it by lopping over like a frost-bitten cornstalk; but lie down in a straight position till you are able to assume an erect one again. The spinal column or back-bone rests on the sacrum, which is the hindermost bone of the pelvis.

The pelvis is called so from its supposed resemblance to a basin. It constitutes the foundation of the frame, on which all the other parts act. In infancy, the bones of the pelvis are divided into seven different bones. The two pubic, two iliac, two ischiatic, and the sacrum. The sacrum is called thus, from its being the part of the animal that the ancients offered in sacrifice. These bones grow together and become one bone as the child grows older. The bones of the pelvis are large and strong. The muscles that move the legs arise principally from the bones of the pelvis. The pelvis is much broader in the female than in the male. This peculiarity of the female is rendered more striking by her manner of clothing, having but little clothing on the upper part of the body, the most of it being on the lower part, in the form of skirts, tied around the waist; while directly the reverse is the case with the male, having the most

of his clothing around the upper part of his body, and the least around his hips and legs. The way the fashion was this last year, it makes a man look perfectly ridiculous, his coat being twice too big for him, and his pants fitting close to the skin, looking as though he had dressed up on purpose to be laughed at—resembling as near as I can make a comparison, a Shanghai rooster with an overcoat on. The female's dress is big at the bottom, and little at the top, while the male's is little at the bottom, and big at the top.

The pelvis sits on the heads of the thigh-bones, which are round like balls, and fit into corresponding round cavities in the pelvis. The heads of the thigh-bones are held in their sockets by a strong ligament, that incloses the joint like a sack, one end being fastened around the head of the thigh-bone, and the other around the edge of the cavity, and by a strong round ligament, like a cord going from the center of the head of the bone to the upper part of the hollow. The thigh-bones are large and strong, as they necessarily must be, to support the weight of the body. To the thigh-bones, are attached those large muscles that move the thigh in different directions. The other ends of these muscles are fastened to the bones of the pelvis, and to the spine. The lower end of the femur, or thigh-bone, is articulated, so as to form a joint with the tibia or bone of the leg; the ends of the bones forming the joint are bound together with strong ligaments. In front of this joint, between the extremities of the two bones, is the round, flat bone, called the patella, or knee-pan, designed to protect the joint from injury, and to assist the motion of the leg. The patella, or knee-pan, is attached below, by means of a strong ligament to the tibia or leg bone,

and above, it is fastened to the large muscles that form the fleshy part of the front of the thigh, whose contraction draws the patella, and consequently, the leg upward. Beside the tibia, or large bone of the leg, there is another smaller one on the outside of the tibia of the same length, designed to give protection and support to the muscular or fleshy part of the calf of the leg. This bone is called the fibula. These two bones, the tibia and fibula are articulated with the bones of the foot.

BONES OF THE FOOT.

The back part of the foot is composed of several short, thick bones, closely connected together, so as to admit of but little motion, but put together in the form of an arch, giving great strength to that part of the foot on which the weight of the body generally rests. Extending before these are the bones of the middle part of the foot, called the metatarsal bones. They are five in number, corresponding to the number of toes. Then there are three ranges of bones, for the different parts of the toes, except for the big toe, which has but two bones. These ranges of bones are called phalanges; they decrease in size and strength, to the last row. These different bones of the foot are bound together at the joints by ligaments.

The arm has one large bone, called the humerus. The head of the humerus, where it is connected with the shoulder-blade, is round like a ball, like that of the head of the thigh-bone, which allows it to revolve around in all directions. The fore-arm has two bones, the ulna and the radius. The upper end of the ulna is firmly attached by means of a wide, hinge-like joint and strong ligaments, to the lower end of the

humerus; while the radius is attached at the lower end by a hinge-like joint and strong ligament, to the bones of the wrist. Now this radius is fastened at both ends to the side of the ulna, in such a manner as to allow it and the hand to which it is fastened, to revolve around the ulna, thus enabling us to turn our hand. This rotation is called pronation and supination. Pronation, when the palm of the hand is downwards, and supination when the palm of the hand is upwards. The bones of the wrist and fingers are similar to those of the instep and toes, with the exception, that the bones of the fingers are longer, and admit of more motion than those of the toes.

THE RIBS.

The ribs are twelve in number; seven of them called true ribs, and five false or floating ribs. The true ribs are fast at both ends; one end by means of a joint to the back-bone; the other end by means of a cartilage or gristle to breast-bone or sternum. The other five false ribs are fast but at one end, where they join the back-bone; the other ends are loose or floating. The ribs are constructed so as to expand the chest laterally or outward, more than vertically, or upward and downward. Hence the impropriety of wearing clothes which fit tight around the breast, preventing the due expansion of the lungs, and consequently a due inhalation of air.

There are thousands of persons in our country who are opposed to capital punishment—who revolt at the idea of hanging a man until he is dead just because he has killed somebody, who are hanging themselves every day of their lives. They don't exactly hang themselves by the neck, but they do by the breast,

which is just as bad. The only difference is, that strangulation is produced a little higher up, in hanging by the neck than it is in hanging by the breast. The Sternum, or Breast-bone, runs down through the middle of the front part of the chest; the front ends of the ribs are fastened to it. This sternum is Nature's corset-board, and a much better one it is than the stiff, hard ones that Art makes of hickory, or whalebone, or even steel.

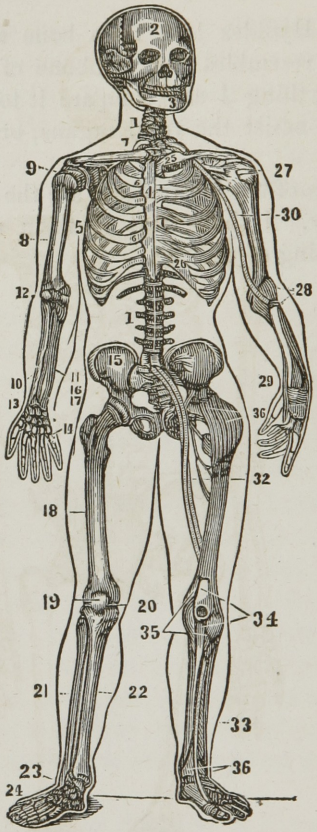
There is one great mistake that Nature committed, though (or at least we moderns think so) when she made the framework of the chest, she ought to have made another set of ribs to go up and down; for when Nature first got out the patent for this machine, she had no idea that the human body would become so weak as to require lateral stays to keep it from lopping down. But man, or rather woman has taken out a patent for an improvement in this respect, that is, for another set of ribs going up and down. In a few more generations, if we keep on miss-improving, I think we shall need still another set of ribs, crossing the other two sets at an angle, so as to act as braces to them; and then, if hickory timber and whales hold out, we shall be enabled to keep the chest in some sort of shape.

The Shoulder-blade, or Scapula, is situated on the upper and back part of the chest. It is kept in its place by muscles, ligaments and by the Clavicle, or Collar-bone, which is fastened, at one end, to the shoulder-blade and, at the other, to the sternum, or breast-bone. The clavicle keeps the shoulder-blade pushed outward and backward, in the same manner that the old Dutch governor keeps the horses apart, when traveling.

The Os Hyoides is a little bone situated in the throat. It resembles the wishbone of a chicken, as near as anything I can compare it to. Its use is to protect and assist the vocal organs, or organs of the voice.

The bones of the internal ear are the smallest bones in the body. I shall treat of them more minutely when speaking of the ear.

FIG. 4.



A front view of the skeleton. 1, Spine (back-bone). 2, Skull. 3, Lower jaw. 4, Sternum (breast-bone). 5 and 6, Ribs. 7, Clavicle (collar-bone). 8, Humerus (bone of the arm). 10 and 11, Radius and ulna (bones of the forearm). 13, Wrist. 14, Hand. 15, Pelvis (hip bones). 18, Femur (thigh-bone). 19, Patella (knee-pan). 21, Fibula (small bone of the leg). 22, Tibia (large bone of the leg). 23, Ankle. 24, Foot. 25, 26, 27, 28, 29, 31, 34, 35, 36, Ligaments holding the bones together.

Fig. 5, (opposite page), A back view of the skeleton, showing the scapulæ (shoulder blades), spine, sacrum and back part of the hip bones advantageously.

FIG. 5.

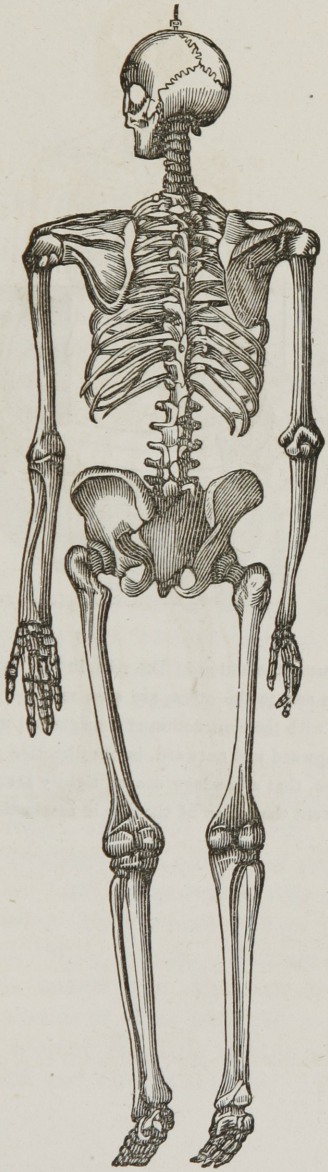


FIG. 6.

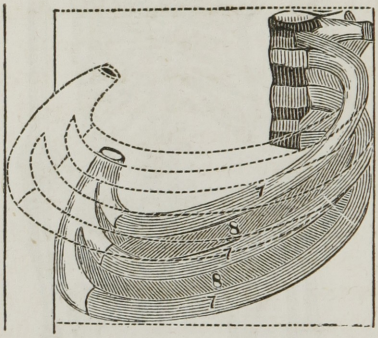


Fig 6, represents the action of the ribs, in respiration. Between the ribs going from one to the other, are seen muscles whose contraction, in conjunction with the contraction of the external muscles of the chest raise the ribs upward and outward, in the direction of the dotted lines. It is plain to see, that a bandage drawn tightly around the body, will effectually prevent the action of the ribs in respiration.

LECTURE IV.

THE MUSCULAR SYSTEM

Muscle is lean meat. Its use in an animal is to produce motion by a contraction of its substance. The muscles are not made merely to cover up the bones and give beauty to the shape. Every muscle, every little strip of lean meat you can find in your own body or in the body of any other animal, was made to produce some kind of motion. There is not a fibre of muscle, or lean meat in the whole body, but that assists in giving motion to some part; and there is not a movement in the whole body, but what is produced by the contraction or relaxation of some muscle or combination of muscles. Walking, talking, the motions of the eye, mouth and face, swallowing and laughing, and the like, are all performed by muscles. The motions of the blood, lungs, bowels, arms, hands, legs, and feet are made by muscles.

A muscle is composed of a bundle of bundles of muscular fibre. These little bundles of muscular fibre that compose a muscle, are called Fasciculi. Each of these fasciculi is composed of a number of still smaller strings of muscular fibre bound together by a delicate sheath of membrane. These small strings, that form the fasciculi, are called the Fibres. They are too small to be seen with the naked eye. You can distinguish the fasciculi, or bundles of fibre, with the naked eye. All of you have noticed the little strings into which you can pull corned beef after it is boiled. These are

the fasciculi or bundles of muscular fibre, of which muscle is composed. Boiling dissolves the substance that binds these little fasciculi together, and enables you to pull them off in strings.

When these little fasciculi or bundles of fibre are bound together to form a muscle, they are covered with a membrane inclosing the whole muscle, to separate it from the other muscles; and some of these muscles, that are used a great deal and their action is required to be very free, are covered with another sheath, in which they act so that their motion cannot possibly be interfered with by any other muscle.

Muscles are of different shapes according to where they are placed, and to the kind of motion they are required to produce.

Some muscles are long and nearly round. The muscles of the arm are of this kind; this shape is called Fusiform or Spindle shape. Another kind is broad and thin. The muscle covering the forehead and scalp, whose contraction draws the eyebrows up, is of this kind. Any other shaped muscle would be in the way here, and would detract very much from a person's beauty; and beside that, it would prevent phrenologists feeling our bumps, and telling us what we liked and what we did not like, what we were made for and what we were not made for. This shaped muscle is called a Radiated muscle. Where a muscle is straight on one side, and sends off a number of little fibres from the other side to be attached to different parts along the line of the muscle, it is called a Penniform muscle, from its resemblance to a goose-quill pen. When the straight part of the muscle has fibres running out from each side, it is called a Bipenniform muscle.

Muscles are fastened at each end. One end of the muscle is generally fastened to some stationary part, as it respects its motion, by the fibres of the muscle itself. The other end of the muscle is generally joined to a tough, inelastic substance called its Cord or Tendon. This cord or tendon is fastened to the part that the muscle is intended to move. On the top of the hands and in the wrist, you can see and feel the cords of the muscles of the Fore-arm. When this cord or tendon is broad and thin, as the muscle is, it is called an Aponeurosis. The tendon of the muscle of the scalp is an aponeurosis.

Now, we have told what muscle is, how muscles are constructed, their different shapes, and how they are fastened at each end. We have told you the use of muscle is to produce motion. How does it do it? By a contraction of its substance lengthwise. By a shortening of the muscle, which must bring its ends and the parts to which those ends are fastened, nearer each other. Now, if one of these parts, to which an end of the muscle is fastened, remains fixed when the muscle contracts, the part to which the other end is fastened must be moved the distance that the muscle shortens. If, for instance, the muscle that bends my fore-arm, which is fastened to a fixed point near the shoulder, contracts, that is, shortens its length, it draws the fore-arm upward, because it cannot draw the part to which the other end is fastened downward. How does a muscle contract, in order to shorten its length, and thus move the part to which it is fastened? When a muscle contracts, the little fasciculi or bundles of fibres of which it is composed, assume a zigzag direction, consequently their ends must approach each other as much as the fasciculi are shortened in leav-

ing their straight direction and taking this zigzag direction.

You can easily illustrate this matter by taking a string and stretching it out straight. This will represent the Fasciculus of a muscle in a state of relaxation or rest. Now draw this string to the right and left, in alternate curves. This will represent the fasciculus when contracted. You will notice the ends will approach each other. If one end be fastened to a fixed object, and the other to one that can move, the object that can move will approach the one that is stationary. This is the philosophy of muscular contraction. This shortening of the little fasciculi makes the muscle thicker in the middle. By grasping your arm, and then bending the fore-arm, you can feel the muscle swell under the hand.

The next question that naturally arises is, What makes these little fasciculi leave their straight direction and take a zigzag one, in order to shorten the muscle? Something must cause them to do it, inasmuch as nothing is produced without a cause. It is the stimulus of the nervous influence that causes this. A nerve goes to every muscle; and this nerve has the power to set the muscle to contracting when it is excited. The nerve can be excited by touching it with a pin. If you cut down to a nerve that goes to a muscle, and touch the nerve with the point of the knife, it will cause the muscle to which the nerve goes, to contract. If you apply electricity to the nerve it will cause the muscle to contract. Even after an animal is dead, you can make it move by exciting the nerves with electricity.

Now that mysterious agent called the Nervous influence, or nervous fluid, or the life-fluid, or any other

name you choose to give it, that agent that goes along the nerves in so singular and inexplicable a manner, has the power of exciting the nerves, and causing them to cause the muscular fasciculi to contract. This nervous influence is set in motion and directed by the will.

For instance, when we want a certain part to move, the will sends an order along the nerve going from the brain to the muscle that moves the part; the muscle contracts, and the part moves. I will further illustrate it; I want to take up an apple and put it to my mouth. My hand is directly over the apple. I want first to open my fingers. I send an order by the nervous telegraph to the Extensor muscles of the fingers, to contract; they contract, and the fingers open. I wish the hand to fall on the apple. I send an order to the muscles whose contraction holds the arm up, to relax; they relax, and my hand falls on the apple. I wish now to grasp the apple with my fingers; I send an order to the Flexor muscles of the fingers to contract. They contract, and my fingers shut on the apple. I wish now to carry the apple to my mouth. I send an order to the flexor muscles of the fore-arm to contract; it contracts, and brings the hand to my mouth. I wish now, to turn my hand over. I send an order to some little muscles of the fore-arm, placed there for that express purpose, to contract; they contract, and my hand is turned over, and the apple is at my mouth, where I wanted it. The act is performed in a hundredth part of the time it takes me to tell it; nevertheless, all these operations have to be gone through with before the apple gets to my mouth. In this way is every motion of our body produced; and not only of our body, but every motion of every other

animal, insect, fish, bird or reptile. Muscular contraction enables the elephant to walk, the snake to crawl, the flea to jump. I think you will all admit, who have ever tried to catch a flea, that its muscular power must be immense, for the size of its body; it would be the same as our jumping two or three hundred feet.

To describe all the muscles of the body, there being about five hundred of them, would occupy more time than we have to spare, therefore I shall only describe the most important ones.

The scalp is covered with a thin muscle, running backward and forward for raising the skin of the forehead and the eyebrows. It is a contraction or shortening of this muscle that produces wrinkles in the forehead. There are some very weak muscles situated about the ear, for the purpose of moving it. One behind, to draw it back; one above, to draw it up, and one before, to draw it forward. Very few persons, however, have the power of using these muscles. There is probably not one person in ten that can move his ears by these muscles. It is likely that our covering the ears by long hair, and by bonnets and hats render these muscles unnecessary. If our hair was cut close, and we wore no head covering, these muscles would be called into use, to keep the flies away from the external ear. I think they would become pretty largely developed in musquito time. The motions of the eyeball and eyelids are produced by a set of delicate little muscles. A little muscle in each eyelid draws it back when we open our eyes. A muscle going all around the eye in the lids, draws the eyelids together like the draw-string to a purse, when we shut our eye. There are little muscles fastened to all sides

of the eyeball to turn it in every direction. When one of these muscles is too short, it draws the eye too much in that direction, producing strabismus or "cross-eye." This can be cured sometimes, by the person wearing a blind over the eye, like one side of a spectacle, in the center of which, is a round hole By forcing the eye to look continually through this hole it will cause the shortened muscle to become longer, and thus enable the person to look straight Children who are likely to become cross-eyed should most certainly be subjected to this process; for no deformity is noticed sooner than cross-eyedness. However handsome a person may be otherwise, if he or she is continually "looking two ways for Sunday," as the saying is, it will detract materially from their beauty. There are little muscles running up from the upper lip in different directions, to raise it, to open the nostrils, and to change the shape of the cheek to express different emotions, as mirth by laughing, grief by crying. In pleasurable emotions, the face seems to draw up and look full. In unpleasant emotions the face relaxes and grows longer. There is a good deal of truth in the expression of a person's having a long face when in grief. The lower lip has little muscles that draw it down, and one that draws it up. Most all these muscles as is the case with nearly all the muscles of the body, are attached to bone where they commence, and by their contraction, draw the part to which the other end is fastened, toward the point where it arises from the bone. A circular muscle goes around the mouth, similar to that going around the eye, and for the same purpose—that is, for shutting the mouth. Some men who have talkative wives, are of the opinion, that this muscle does not exist in women, or if it

does, that they never put it in use. The lower jaw is drawn up to the upper jaw, by means of a very powerful muscle, called the Masseter, or Chewing muscle. The use of this, is to mash the food, to enable a person to chew gum and tobacco, and to hold a pipe between the jaws.

In the cheek is a muscle called the Buccinator muscle, which throws the food between the teeth from the outside. The principal use, however, to which it is put now-a-days is to keep the quid of tobacco in motion. And I think that tobacconator would be a more proper name for it than buccinator.

The tongue is composed principally of muscles, some of which are fastened to the lower jaw, some to the little bone down in the throat, called the Hyoid bone; some are fastened to the under side of the skull. So you see that by the contractions of the different muscles of the tongue, it can be drawn in any direction.

The neck is full of small muscles to produce the different motions of the head, of the vocal or talking apparatus, and of the swallowing apparatus. Those for moving the head in different directions commence at the sternum and collar-bone, and from the spine and shoulder: they are fastened to different parts of the lower and outer edges of the skull and lower jaw. Those for the use of the voice go from one of the little cartilages in the throat, called the Larynx, or Adam's apple, to another cartilage called the Cricoid cartilage, and from these cartilages to the hyoid bone, and to the parts of the mouth, and down to the sternum. Those muscles that produce swallowing are arranged one below the other in the gullet, going around it so as to stop it up when they contract; so that when a mouthful of food is forced to the back part of the

mouth, or upper part of the throat, the upper muscles going round the gullet, contract and force the food down to the next set of muscles that go round it in like manner; these contract and force it still farther, and thus the food goes on, being forced down by the contraction of these muscles, until it is forced into the stomach.

The chest is covered with muscles on all sides. In front is the large muscle of the breast, commencing from several of the ribs and fastened to the upper part of the large bone of the arm. Its use is to draw the arm up and toward the body. A set of muscles are fastened at one end to the ribs, and by the other to the bones of the Spine for to raise the ribs, and thus expand the chest, as in breathing. Between each rib, going from one to the other, is a little muscle to assist also in expanding the lungs.

On the back are muscles, fastened at one end to the spine and ribs, and at the other to the skull, for the purpose of moving the head backward; others are fastened to the Shoulder-blade, for the purpose of moving that. Several arise from the shoulder, ribs, and spine, and are attached to the Humerus, to move it in different directions.

The abdomen or belly is covered with broad muscles, fastened to the ribs, spine, back-bone, and bones of the pelvis or hip, so by their contraction, to draw down the ribs in expiration, or forcing the breath from the lungs and to bend the body forward and sideways.

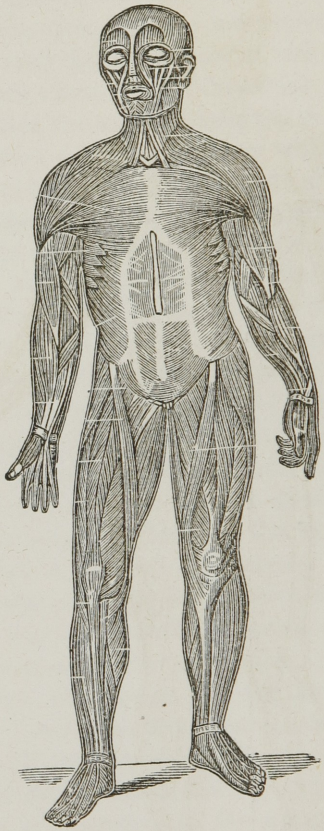
Along the back are muscles attached to the different bones of the spine, for the purpose of bending the back.

The hip and thigh-bones are covered with very large, powerful muscles, for the purpose of moving the thigh and leg. Those that are for moving the thigh

have their origin from the large bones of the hip and lower part of the spine. There are separate muscles attached all around the upper part of the thigh-bone, whose action will move it in all directions. And here I will remark that the muscles designed to move long bones are attached near the end over which the muscle passes, so as to act on the principle of a lever of the third-variety, where the power is applied between the weight to be moved and the fulcrum, and nearest the fulcrum. For instance, the muscles for bending the arm, are attached to the bones of the fore-arm near the elbow joint, so that a very little shortening of the muscle will make the hand move a much greater distance. The muscular force is applied to the bones in the same way that you apply force to a ladder to raise it on end, the farther end of the ladder moving much faster than your hand. It takes a great deal more force to raise a weight in this way, but what is lost in force is gained in rapidity of motion. This is the reason that nature fastened the muscles near the ends of the bones they are intended to move, to enable us to make quick motions with our limbs.

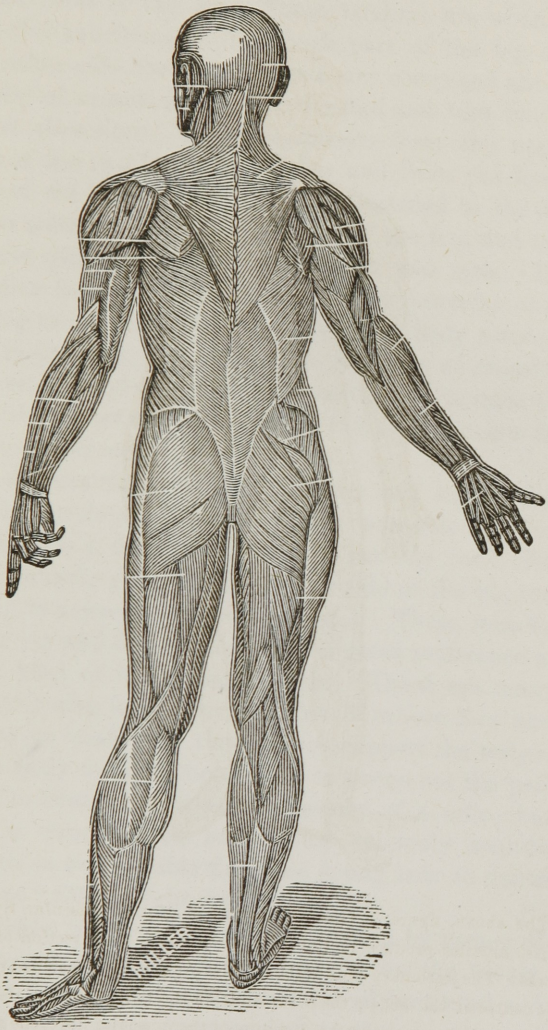
The muscles for moving the leg lie around the thigh. They commence from the upper part of the thigh-bone and lower part of the hip-bones. The principal ones for extending the leg and bringing the foot forward are fastened to the upper part of the Patella or Knee-pan; the knee-pan being fastened to the front part of the large bone of the leg by a strong ligament causes the contraction of the extensor muscles of the leg to bring the foot and leg forward the same as if they were attached directly to the leg. On the back part of the thigh are muscles for drawing the foot and leg back. You can feel their tendons or cords

FIG. 7.



The above, figure 7, is a representation of the Muscular System These muscles produce motion by contracting in the direction of their fibres. The stationary ends of the muscles are generally fastened nearest the centre of the body; the other ends, to the parts they are designed to move. By examining the direction of the muscular fibre, the motion its contraction produces can be told at a glance. The straight, transverse lines point out the principal muscles.

FIG. 8.



Muscles on the back part of the body.

in the bend of the leg. These tendons are what we call the hamstrings. The back part of the leg and the outer side forming the calf, are composed almost wholly of muscle for moving the foot and toes in different directions. They commence from the upper part of the two bones of the leg and from the lower part of the thigh-bone. They are fastened to the different sides of the different bones of the foot and toes for the purpose of moving the foot and toes. The muscles fastened to the heel are very powerful ones, having to raise the weight of the entire body continually in walking. To the toes go four sets of muscles. One set to bend the toes down, another set to raise the toes, then a set on each side of the toes to draw the toes to either side.

In dancers the muscles of the toes and leg become greatly developed. Fanny Ellsler was able to whirl round, like a top, on the end of her big toe. The small muscle going to the under side of the big toe, having to support her entire weight. These muscles of the leg and foot seem to have a great preference as to the kind of labor they perform. There are many delicate young ladies, the muscles of whose foot and leg are so weak that they cannot support the weight of the body for the young lady to sweep out the parlor, or to enable her to walk a quarter of a mile; but when a dance is on hand, they suddenly acquire strength so as to enable the same young lady to dance all night "till daylight doth appear."

The arm is moved in every direction by means of muscles having their commencement on the breast, neck, and back. The fore-arm is moved backward and forward by muscles commencing at the shoulder and upper part of the humerus, or bone of the arm. Those

that bend the fore-arm, are fastened to the front part of the ulna, near the joint. Those that extend the fore-arm, or draw it backward, are fastened to that point of the ulna on which we lean, when we lean on the elbow. This little point of bone is sometimes broken off, and then the person cannot bend his fore-arm backward. The fore-arm is covered with muscles for turning the radius and the hand (to which it is articulated) over the ulna, and muscles for bending the wrist, and for opening and shutting the fingers. The muscles for turning the radius commence from the lower part of the humerus and are fastened to the radius, so that the contraction of one set will draw the radius over one way, while the contraction of the other set will draw it back again, producing pronation or turning the palm of the hand down, and supination or turning the palm upward.

The fingers are moved to either side by means of short muscles attached to the sides of the bones of the fingers.

It is the education of these muscles moving the wrist and fingers, that produces the skillful violinist. It is the rendering of these little muscles perfectly obedient to the will. In the first place, a violinist must have a musical brain, or musical ear as it is generally called. A natural power to appreciate the qualities of sounds and of their combinations. A man might saw off all the catgut in Christendom, and saw off all the teeth of his neighbors in practicing, without becoming a fiddler, if he has not got a musical brain. The tune and music originate in the brain. The hands are only instruments for its execution.

There are many other sets of muscles, belonging to the ear, circulation of the blood, the vocal or talking

apparatus, and the bowels, which I shall speak of when treating of those parts.

The most of the muscles that I have spoken of as yet, are what are called Voluntary muscles; that is, they are under the control of the will. They do not contract unless the will orders them to. But there is a set of muscles called Involuntary muscles, over which the will has no control. These are the muscles belonging to the circulation of the blood, to respiration or breathing, to the bowels, and to all the vital operations. Those operations must be kept a-going for the preservation of the individual; and it is absolutely necessary that these muscles should not be under the control of the will; for if our heart beat only when we willed it to, or our lungs expanded only when we willed them to, we should be in constant danger of dying from a stoppage of these two organs.

The muscles are enlarged and rendered stronger by regular and temperate exercise. If a person uses his right arm regularly every day, for months in succession, its muscles will become much larger and stronger. A blacksmith's right arm is stronger than any other part of his body. I would as soon be kicked by a mule, as to be struck with a blacksmith's fist. Persons in the habit of walking a great deal, have the muscles of the legs enlarged and strengthened so as to enable them to walk another person down, who may be stronger otherwise, but who has not educated his muscles for walking. There is an old story related of a man by the name of Milo, who commenced lifting every day a calf; as the calf grew, he continued to lift it until it became an ox. By training his muscles every day, he was enabled to lift twice what he could at the start.

Relaxation should follow muscular contraction. You can soon tire out a muscle by the least exertion, if you keep it up continually without relaxation. You cannot hold the weight of your hand out from the body but a short time, without relaxation. The punishment used by some teachers, of making their scholars hold a ruler out at arm's length until the muscles of the arm become perfectly exhausted, is cruel in the extreme. It is not a whit better than the thumbscrews of the Inquisition. Better whip the child to the quick, by half.

Change of work is a great advantage, enabling one to accomplish much more by bringing into action a new and fresh set of muscles. A wood-sawyer will saw and split more wood by sawing a while, and then splitting, than by sawing a whole day and then splitting a day. Youths that are growing, cannot endure so much muscular exertion as when they have attained their growth. Napoleon, who was aware of this fact, complained much to the French government for sending him young men who had not attained their maturity, as recruits, because they were not able to endure his forced marches.

After violent exertion it is better to rest gradually than to sit down and rest suddenly. Perhaps some of you have noticed the fact, that after you have been exercised violently, you feel better to walk around awhile, than to sit still. The remark is common of persons being so tired that they cannot rest at night. Muscular exercise should be at regular times, temperate in its action, and in the open air; and should be of such a nature as to call into action as many muscles of the body as possible. Exercise should not be continued to fatigue, if possible. Clothing should not be so tight as to interfere with the action of the muscles.

Any of you, who have tried to chop with a tight coat on, know this.

The mind exerts a great influence on muscular action. When the mind is enlisted and entertained in the exercise, it acts as a powerful stimulus to the muscles; but when a person merely exercises for the purpose of exercise, without any other object in view, it is a drag. When Napoleon was marching from Moscow with his starving, frozen, and wearied army, his soldiers frequently could hardly be induced to march a step; but let the enemy appear, and they were all life until he was driven away, and then they would relapse again into their exhausted, inactive state.

LECTURE V.

THE NERVOUS SYSTEM.

The Nerves are those little white cords that are found in every part of the system. They commence in minute fibres, each fibre enveloped with a delicate membrane. These minute fibres commence in the intimate structure of every part of the body, or wherever bloodvessels are found. A greater proportion of them commence in the skin and mucous membrane, than in any other structure. This is illustrated by cutting off a limb. After the skin is cut through, not much pain is felt in cutting through the other parts.

These little fibres or commencement of the nerves unite together, several of them forming a larger nerve or bundle of nerves; this bundle of nerves frequently unites with other bundles, and all are enveloped in one sheath. In this way all the minute nerves of the body, arms, hands, legs, and feet unite, forming the Spinal Cord that is contained in the back-bone. Between each Vertebra or section of the back-bone, as I told you when speaking of the bones, is a hole, through which these nerves go to unite with the Spinal nerve. The spinal nerve, or bundle of all the nerves of the body, goes up into the skull and there unites in a very intricate and mysterious manner with the brain.

Now these little, minutest fibres of nerves, in uniting together and thus forming the larger nerves, do not mix their substance together, but each fibre

remains separate from the others, each fibre being covered with its own individual covering. In this way each nervous fibre goes separately to the brain. The minutest nerve in the tip of your finger, has its own termination in the brain. This independence of each nervous fibre from the others, you will observe (when we come to speak of the uses of the nerves) to be absolutely necessary, in order that each individual part may make known its wants to the brain without being confused by the wants of other parts.

The Nervous system may be divided, for the sake of description, into three parts. The Brain proper, or that portion of the nerves that lies within the Skull. The Nerves going out from the brain, or what is more proper, the nerves going into the brain to form it; and the Ganglionic or Sympathetic nerves presiding over the involuntary actions of the system.

To commence, then, with the Brain. The brain is contained within the cavity of the skull. The skull is a bony box, made on purpose for the protection of this vital organ, being constructed on the principle of an arch, so as to best resist external violence; and being formed for the same purpose, of two hard tables, between which is an elastic, spongy substance, so that the external plate of the skull may give, when struck, without injuring the internal plate, which would act directly on the brain; the least depression of this internal table on the brain, or the least enlargement of it internally, affects seriously the action of the brain.

The brain is covered inside the skull with three Membranes. One thick hard one externally, called the Dura Mater; a more delicate one under this, called the Arachnoid Membrane, from its resemblance

to a spider's web. Another, or third covering, called the Pia Mater, lies under this; it dips down into all the hollows of the brain, that divide it into parts called Convolutions of the brain. This pia mater is composed principally of bloodvessels, and its use is for the nourishment of the brain, the same as the periosteum or membrane covering the bones, is for the nourishment of the bones. The use of the arachnoid or middle membrane of the covering of the brain, is to secrete or separate a thin, watery fluid from the blood, called Serum, which envelops the brain so as to prevent any friction between the brain and the parts it is in contact with. When this water is secreted in too great quantity, it produces what is called dropsy of the brain, a very fatal disease among children. Rickety children are more subject to it than any others, so that the common expression of a person being a "sap-head," might literally be true. A person can have too much sap in his head for the good of his sense. The substance of the brain is that of a pulpy mass, the same as the nerves going to form it. A thin layer on the outside, has a grayish appearance; internally, constituting a greater proportion of the brain, is a whiter substance. The external or grayish portion is called the Cineritious or bark part of the brain; the internal or white portion, is called the Medullary part. The brain is partially divided into two parts, by a portion of its coverings. These two parts are joined together at the base. The back and under part of the brain, which is much the smallest, is called the Cerebellum, and is supposed to preside over the animal part of the individual. That is, those qualities which man and the inferior animals have in common, such as muscular motion and the

animal passions. The largest part of the brain, the front and upper part, is called the Cerebrum. This is supposed to be the organ of the higher attributes of the mind, constituting his mental and moral part. This Cerebrum is larger in man than in any other animal, in proportion to their size. The brain is divided lengthwise, into two Hemispheres, the upper part of which are separated by a portion of the outer covering of the brain. This partition of membrane is to hold up one half of the brain, when the head is laid on the side, so as to keep the upper half of the brain from pressing on the lower half. These two hemispheres of the brain are further divided, on their under surface, into three Lobes. Then these lobes are divided into still smaller sections, called Convolutions, that are distinguished on the surface by numerous elevations and depressions. The inner structure of the brain is curious in the extreme, being full of layers and strips of brain, of hollows, elevations and depressions, the nature and use of which peculiarities of structure we are entirely ignorant of. In the lower part of the brain is a little soft body, in the center of which, are two or three little, hard substances, like grains of sand. Some have ascribed the seat of the soul to this part, and that the friction of these little grains together, is what starts the spark of life. Future investigation may explain the uses of all the different structures of the brain, but at present, we must remain comparatively ignorant of them. The use of nearly every other structure of the body can be explained on mechanical and chemical principles, but we must confess our inability to explain the physiology of the different parts of the brain in this manner.

The Cerebrum and Cerebellum unite in a peculiar

manner with the Spinal cord after it enters the skull, the fibres on the right side of the cord crossing over to unite with the left side of the brain, and the fibres on the left side of the cord crossing over and uniting with the right side of the brain; so that the right side or hemisphere of the brain has control over the nerves of the left side of the body, and the left half or hemisphere of the brain has control over the nerves of the right side of the body. This is proved by the manner in which paralysis affects the body where the seat of the disease is in the brain. The opposite side of the body is paralysed from that in which the disease of the brain exists. One would naturally suppose that the brain, the center of the nervous system, would be the most sensitive part of it; but strange as it may seem, nevertheless it is a fact, that the substance of the brain has no feeling at all. You can cut off slices of the brain with a knife, without the person's feeling it. But the extension or prolongation of the spinal cord in the skull, called the Medulla Oblongata, is very sensitive; if this is but touched by an instrument, it throws the body into violent convulsions. That the brain is the organ of the mind, there is no doubt, for we see that there is always a correspondence between the size of a person's brain and his mental power. As a general rule, a person with a small brain has a small mind; and one with a large brain has a large mind. You may perhaps point to instances of persons having large heads, that are very weak in the upper story; but if you dissect the brain of those persons, you will find there is some imperfection in the structure of the substance of the brain. This seeming exception does not affect the general rule, any more than a diseased muscle causing a morbid enlarge

ment and a consequent weakness of the muscle, affects the general rule that the strength of a muscle is calculated by its size. Take a big bow-line for instance, and if every fibre of that line is sound, it will be stronger than the tow-line that is much smaller; but if the fibres of the bow-line are rotten, diseased, it may not be so strong as the tow-line. So a brain may be large, but its structure may be imperfect, rendering it weaker than a much smaller brain, though better constructed. But if the structure of the brain is perfect, the larger the brain, the stronger the mind.

The brain of Cuvier, the great naturalist, that I spoke of in a former lecture, is the largest one on record, weighing four pounds thirteen ounces and a half. A brain may be large, and its parts be perfectly constructed, and still not contain a strong mind. The cause of this is, that one part of the brain may be too large to correspond with the other parts. The person's mind may be strong enough on one particular subject, and not even have common sense on other subjects; in the same way that a person may have a strong arm, enabling him to do the most laborious work that requires only the arm, while his legs may be so imperfectly developed as to prevent him walking an hour. A strong, well-constructed brain has all its parts in the right proportion, enabling it to labor successfully in almost any intellectual field. There is no doubt, I think, that there is a division of the functions of the brain, certain portions being devoted to certain powers of the mind. We find that every other structure and organ of the body has its particular work or function to perform, and why should it not be so with the brain? But I do not believe that, in our present knowledge of the structure and functions of the brain,

that we can tell what particular function belongs to each particular part. We have pretty good reason for believing that our animal nature and propensities are presided over by some power that resides in the Cerebellum. This has been ascertained by experiment on living human brains, and by comparison with the brains of the inferior animals. But to what parts of the cerebellum the different animal feelings and passions belong, I candidly believe we do not know. We have reason to believe, by observing the growth of the Cerebrum, to be in proportion to the enlargement of the mind, by comparing the sizes of different cerebri of different individuals, and finding that those with the largest cerebri have the largest minds, and by a comparison of the cerebri of different animals, differing in the amount of intelligence they possess ; I say, by such a course of comparisons and reasonings, we are led to the belief that the cerebrum or larger portion of the human brain is the organ of the mind or intellect—that here is where the thinking and willing principles of our nature reside and nowhere else. Take the cerebrum away and you are no longer capable of thinking or reasoning. The cerebellum might enable you to live like an animal, having all its tastes and desires ; but you would have no intelligence and would be incapable of improvement. You would be worse off than the horse, which does have a small cerebrum.

Phrenologists have undertaken to locate the different powers of the mind in particular parts of the brain. They locate these qualities of the mind going from the outside or circumference of the brain, toward its center. Each of these portions of the brain, say they, comes in contact (the membranes of the brain

only intervening,) with the skull, and corresponds with an elevation of the skull over the part, which they call a Bump; in this way making these elevations over the surface of the skull an index to the development of the portions of the brain lying under them. So that all we have to do, to measure a person's mental powers, is to measure his bumps. However well satisfied phrenologists may be in the correctness of their system, I never could bring myself to the belief that our knowledge of the brain was sufficient to allow of the location of the different qualities of the mind to individual parts; and much less to warrant us in locating these qualities in the external portions of the brain, and still less yet, in ascribing a raising of the tables of the skull to be in proportion to the development of a particular power of the mind. I should think, that if particular qualities of the mind have their particular parts of the brain, these parts of the brain would be as likely to be located in the internal structure of the brain as on its superficial structure; and judging from the singular and complicated structure of the inside of the brain, that if a very delicate and elaborate endowment of the mind would require a very delicate and elaborate organization for its instrument, that we should find these complex instruments in the internal structure of the brain, rather than on the external surface, judging from the appearance of the different parts of the brain; for, as I said before, it is all guess-work; that we have no good reason for locating any particular part of the mind in any particular part of the brain, judging from the appearance of its structure. And then, even suppos ing that the different parts of the mind were actually

located in regular sections of the external part of the brain, having their boundary-lines fixed by law, the same as the boundary-lines of each township are, the Phrenological system is no more certain than before, for the prominences of the skull do not correspond invariably with the development of that part of the brain directly underneath; for some of the bumps are caused by a thickening of the skull, for the better attachment of muscles; while other bumps are caused by a separation of the tables of the skull, to form a cavity between them, as is the case in the Frontal Sinuses, the outer table bulging outward forming a bump, and the inner table bulging inward, causing a deficiency instead of an increased quantity of brain underneath the bump. So that just in proportion to the largeness of the bump externally, is the want of brain beneath it. I may be too skeptical on this point, but I candidly believe that this Phrenology is a carrying the thing farther than our real knowledge of the brain warrants.

In the formation of the Nervous system of man there is a striking similarity between it, at its different stages of development, and that of the different orders of animals. The center of the nervous system, in the lowest orders of animals, is merely a cord without any enlargement at any point. In animals a degree higher in the scale of life, in the lowest fishes, this cord becomes slightly enlarged at five different places at one end of the cord, resembling little knots; these five pairs of enlargements are called Ganglia. In the higher order of fishes, the two first of these knots or pairs of ganglia seem to be fused into one, leaving only three pairs of ganglia or knots. As we ascend a step higher in animal life, as exhibited in the cat and dog, for

instance, we find first, a single ganglion or enlargement of the spinal cord, the cerebellum, and then, immediately following, four ganglia; on removing the covering of the middle of these ganglia, you will find two pairs of ganglia inclosed in the sheath, making out the five pairs of ganglia that we find to exist as a nervous center in all animals above the lowest order; which lowest order has but a cord without any enlargement for its nervous center.

Now let us examine the development of the nervous system in man, from the first sign of a nerve to a full grown brain. The first indication of a nervous system in a human being, in the first periods of infancy, is merely a pair of small cords. The infant, at this stage of development has no more life than the lowest orders of animals, in which we find the same kind of a nervous system. As the infant becomes more developed, five little knots or ganglia are noticed on each of these cords near one end; they are not disposed in a straight line, as in fishes, but in a curved direction, to accommodate itself to the future cranium. The infant, at this period of development, has the life of a still higher order of animals — the higher order of fishes; and as these five pairs of ganglia become more united, resembling the nervous system of the highest order of animals, as the cat and dog, the infant has the life and intelligence of those animals. Then, finally, as these original germs of the brain enlarge and become intimately united together, we have the human brain, superior in its size and in the delicacy of its structure to the brain of any other animal, and, as a consequence, we have an intelligence connected with this superior organization, superior to the intelligence of any other animal.

We find the brain thus organized in the child, but its organization is not yet perfect, for the brain continues to improve in structure by becoming more firm and distinct in its different parts, and larger as the child grows up to adult age. This improvement and strengthening of the brain continues through life, if its possessor lives in such a manner that its energies are not crippled by connection with a weakened body. There is no need of this dotage or second childhood— it is not natural. If men lived as nature designed they should, the mind would become stronger to the last.

In ancient times, when men lived more naturally, old age was but another name for wisdom; but now-a-days a man is kicked off the stage of action at fifty. We have our retired lists of ministers, soldiers, and politicians — a polite system of bribery for the recipients not to expose their weakness. But this should not be so; a man's mind should be stronger at seventy than it is at thirty; it should be stronger at eighty than it is at seventy; for I believe that the mind was designed to progress continually to the end of the chapter. And then, I believe, that when it leaves this chapter and commences another in a higher state of existence, it will continue to progress. And who is prepared to say but that it will go into a still higher and higher existence through all eternity, as its powers become more and more developed?

No wonder that men's minds grow weak in old age, in modern times. The course of life we live, is the one best calculated to weaken the energies of our brain; and it is a good thing that our Creator has taken compassion on us and shortened our lives, for if we were permitted to live a hundred years, as in

old times, we should have no mind at all to start with in the next world. We are all of us living in such a way as to weaken and finally destroy the integrity of our brain, and, as a consequence, our mind; for you must bear constantly in recollection, that the brain is the organ of the mind, and whatever affects it affects the mind, and that the mind is always in the same condition as the brain. If the brain be small and weak, the mind will be also; if the brain be injured, the mind will be; if the brain be diseased, the mind will be diseased. Now, we are all of us, continually using practices and articles of food and drink to stimulate the brain to inordinate action, or to bring it below an ordinate action—to deaden it, as it were, and to change it from a natural to an unnatural action, merely because it gives us a morbid pleasure for a short time, to be followed, when the excitement goes off, by a proportionate want of pleasure.

What are these practices you ask? Too great exercise of the brain, and exercise in an unnatural way. One can injure and wear out his nervous system by too constant and too severe mental application. You see this illustrated in what are called precocious or forward children—children with large brains—too large for the size of their bodies. Their aptness in learning induces their parents and teachers to stimulate them to inordinate exertion; they make rapid progress for a while, but finally their nervous power gives way. The nourishment that ought to have gone to the support, growth, and strengthening of the other parts of their bodies has been entirely taken up by the brain; and the result is, that the physical organization of the individual is not properly balanced, the brain being too large for the other parts of the system. It is like

putting a powerful engine, calculated to drive a large steamboat, into a canal-boat; its workings will shake the little craft to pieces. And we find that these precocious children do not make as smart men and women as children that are not so forward. Instead of encouraging such children to increased exertion, they should rather be held back, so that the other parts of their bodies may keep pace with the development of their brain.

Particular pains should be taken in giving such children plenty of exercise in the open air. As a general thing they have not the disposition for bodily exercise as other children, and will not take sufficient, unless encouraged in it. But these precocious, forward children are exceptions. The majority of children, instead of requiring a curb and stiff rein to hold them back, require the spur to urge them on. There are occasional cases of adults who study too much for the well-being of their nervous system. An inordinate ambition for intellectual glory is generally the incentive. This burning of the midnight oil, for the sake of glory, as a general thing, is not profitable—*don't pay*—for, at the same time that we are burning out the midnight oil, we are also burning out the oil of life. The mind is, however, over-exerted oftener in other than purely intellectual pursuits. The studying up plans to get rich, and the constant mental anxiety in carrying these plans out, consume more of the oil of life than the labor for intellectual glory: the merchant, for instance, whose mind is on the stretch from morning till night trying to convince old Mother Particular that this piece of calico won't fade, and that neighbor-so-and-so sells the same at twelve cents a yard while he sells it at eleven and three-quarters; in

trying to buy Deacon Doubleday's corn, who wants just three-quarters of a cent a bushel more for the corn than the merchant gets for it, with the privilege of the rise of market for the next six years; in trying to make 'Squire Woolhead satisfied with his account, there having been three sticks of candy charged eighteen months ago, whereas 'Squire Woolhead thinks there was only two sticks got, he having but two candy children at that time. And then the burning of life-oil that takes place in making collections and in meeting his obligations. It is ten times more mental exercise than a man ought to have, and it will surely wear out his nervous system.

All occupations where the brain has to do more than the body, are liable to produce nervous exhaustion. The too great exercise of the passions and emotions, as in excessive anger and grief, will wear a person's mind. Excessive passion, or grief, or fear, is, perhaps, more exhausting to the mind than any other mental exercise, and would soon prostrate it if kept continually under their influence. But the passions and emotions do not last long. We frequently work ourselves into consuming passions, but the fire don't last but a few hours and then goes out of its own accord. Our grief is quenched by a flood of tears. A wicked and criminal way of living destroys both the intellectual and moral part of our mind. Honesty is the best policy, so far as the well-being of our brain is concerned, at least. A confidence and implicit reliance in our Creator, believing he has made and directed everything for the best, gives the mind a contentment that goes far toward the preservation and increase of its powers. The most fruitful source of debility of the brain, however, comes from

its connection with the body, being affected by the ills and improprieties of all parts of the body.

Our food is not the right kind for the good of the brain—it is too stimulating—it excites the brain to irregular action. The peppers, the vinegars, and spices, and jellies, and concentrated mixtures of various kinds, are the very things to make the brain irregular in its action and imperfect in its structure. For the brain is formed from the blood, and the blood is formed from the food, so that the brain cannot help but be influenced by the nature of our food.

Our drinks are even more deleterious to the brain than our food. Water, pure water, unmixed with anything else, was undoubtedly the drink our Creator designed for us and for every other animal, as a drink; but it has become now so that we seldom drink water alone; it must be mixed with something that will excite the nervous system to an unnatural action—with tea or coffee, or some kind of spirits. Now there is no nourishment, or the next thing to none, in tea, coffee, or spirits. They are purely stimulating to the nervous system. They do not add to the power of the system, but merely produce an irregular action of the powers of life, causing them to be more active than natural, while under the influence of their stimulus, and to be less active than natural when the stimulus has gone off. Tea, coffee, and spirits act as agents for the nervous system to borrow strength from the succeeding hours, and when pay-day or pay-hour comes, the system finds itself just as much short of natural strength as its agents borrowed for it; and it will be nervously embarrassed until this loan is paid up, and the system is again out of debt. But generally we pay up this loan by employing these agents,

tea, coffee, or spirits, to make another loan. Now these loans all draw interest, consequently, we have to increase these agents, or their power, every time we use them, if we wish to keep up the excitement. And finally, we run our face to such an extent, that we drain the bank and it has to suspend. Then we must dismiss our agents, go to work naturally, and recover our powers, or undergo complete bankruptcy and prostration of our nervous system. The best way for us, then, is to dismiss these agents and depend on the natural resources of our systems for capital. Follow John Randolph's rule — pay as we go — and not run our brains on a fictitious capital.

There is another set of artificial agents pretty generally in use in this country, for the purpose of keeping the nervous system under an unnatural excitement. I mean the different preparations of tobacco and opium. These act directly on the extremities of the nerves, when taken in the mouth in a solid form or in the form of smoke, or when taken in the form of snuff. They act on the same principle that tea, coffee, and spirits do; that is, as agents to borrow strength—they do not generate any strength themselves.

Another view of the manner in which these artificial stimulants act on the nervous system, is taken by some writers who view them as poisons. They say that the excitement they produce in the nervous system, is an effort of nature to rid the system of these poisons. This much is certain, that the active principle of most of these artificial stimulants, is rank poison, and if given in too large quantity to a system unaccustomed to their use, it will produce death.

These artificial stimuli, such as tobacco and ardent spirits, are taken up into the circulation after they

produce their first impression on the extremities of the nerves, and become part of the blood; now the brain is nourished by the blood, consequently these deleterious agents become part of the brain, and impart to it their baneful influence. If you dissect the brain of a person who has been indulging freely in the use of alcoholic drinks immediately before death, you can smell the alcohol in the brain.

That these substances enter into the blood, any of you can become satisfied by smelling the breath of a person who uses them; this taint does not come from the mouth, for you can introduce them into the stomach by pouring them through a tube, so that none of the substance shall touch the mouth, but the breath will smell of the liquor or tobacco just the same. It is because they enter the blood, and while the blood is going through the lungs, Nature does her best to throw off these enemies to the system by the breath. This is the reason why the brains of habitual drunkards become so dead and torpid. The alcohol changes the structure of the brain, making it harder and less active. If you take the brain and keep it in alcohol a while, you can see with your own eyes the effect alcohol has on the brain, and, consequently, on the mind. But I don't know as it has any worse effect than tobacco, or opium, or coffee, or tea, if these articles are used in the same excess and concentrated form that alcohol is used.

It is my candid belief, that each one of these articles, tea, coffee, or tobacco, does more harm to the human family than alcohol, for the reason that where there is one person that uses alcohol to excess, there are a hundred that use tea, coffee, and tobacco; and those who use tea, coffee, or tobacco, do it continually,

keeping their systems under the influence of them all the time; while those who use ardent spirits to excess, as a general thing, have periods of abstinence from its use, giving the system a chance to regain its healthy condition. Now I contend, that it does a person's system less harm, to get gloriously drunk once in a while—drunk enough to make one loathe the sight of liquor or food for two or three days after—I say it does the system less harm than to keep it continually under the influence of the more mild stimuli.

As to opium, its bad effects on the one who uses it habitually, are worse probably than that of any other artificial stimulant. The pleasurable effects that it produces, temporarily, are greater, consequently the debt that the system has to pay afterward, is greater than that after any other stimulant in use; and the habit of its use seems to be harder to be overcome than any other bad habit.

LECTURE VI.

THE NERVOUS SYSTEM—(*Continued.*)

How then are we to have a sound and strong brain? First, by exercising it in a proper way, so that it may be growing stronger continually; for I believe that our brain should grow stronger to the end of our lives. Secondly, by keeping the whole body in a healthy, strong, and natural condition, so that the brain, in its connection with the other parts of the body, may not have to suffer from their defects or improprieties.

To educate the brain to the best advantage, so that it may acquire the greatest possible strength, the mental training must commence early. In early childhood the brain is soft, and has more of a singleness of action. The different parts of the brain, to which the different faculties of the mind belong, have not become developed, or at least have not become distinct in their action. In childhood, the brain, and consequently the mind, is in a chaotic condition. The soft clay, if I may use the expression, is there; it is roughed out into something of a shape, like the soft ball of clay that the potter puts on his wheel to turn out the elegant vessel from; but this soft, imperfect mass has to undergo a long process of finishing, and baking, and glazing, and polishing, before it assumes the shape of the well-formed and perfect brain. As much depends on the general shape the potter first gives to the lump of clay, while it is soft enough to be pressed into any shape, as to the character of the

future vessel he designs to make from it; so, also, much depends on the first shape that is given to the brain, as to its future character. If the potter first models out a milk-crock, all the sticking on of spouts and handles, and covers, and all the subsequent polishing will not make a perfect tea-pot of it; it will cost him more labor than to have made two tea-pots from the start, and will be a botched-up affair after all. Precisely so is it with the brain and its mind; you can give it almost any character you wish, according to the circumstances with which you surround it at first. The circumstances that surround the mind when it is in its formative stage, will affect its shape the same as the mould into which you pour the melted iron, will affect the shape of the casting. You might just as well expect to get a tea-kettle by pouring melted iron into a plow-point mould, as to expect to form a mind different from the circumstances with which it is surrounded. Something, as a matter of course, depends on the quality of the material of the infant brain. There is a difference in the quality of brain in different infants. The pulp or substance of the brain itself is of better quality in some than others; the same as there is a difference in the quality of Swedish iron and common bar-iron; or between the material our common stoneware is made of, and the material the beautiful china-ware is made of. This difference in the quality of brain is generally hereditary; that is, it comes from the peculiarity existing in the brain of the parent or parents. The quality of the brain of the child will be like that of the parent. No fact in relation to the brain is more certain than this. There is not one among us but has noticed that the children of weak-minded parents are also weak-minded. Whenever

you find a family of weak-minded children you will find a parent or parents in the same fix. Sometimes you will find in the same family weak-minded and strong-minded children. In this case, there is a deficiency in only one of the parent brains. Starting then, with the brain of the child that is supposed to be of ordinary quality; that is, not of the best quality or of the poorest quality, we find it in a soft, imperfect condition; its mind (if it may be said to have a mind at all), as a consequence, in the same imperfect condition. How does this chaotic mass of brain become perfectly organized? How is the mind formed? The first indication of a mind in a child is manifested in its crying and nursing. We call this instinct. The young of all animals have the same manifestations: what this instinct is, we do not perfectly understand; what causes its development before any other powers of the mind we are unable to tell. This is one of the facts that physiology has not been able to explain. At this period, I believe there is no more mind in a child than there is in a young colt; but there is the material to make a mind with; the pulp of the brain, which does not exist in so great quantity in the colt. How then is the mind formed? It is formed first from the exercise of the senses; of sight, hearing, smell, touch and taste. When a child first notices a candle, it has no idea what it is; it must learn what it is by the senses. It looks at it frequently, and for weeks and months before it forms an idea of its appearance; but the idea it forms of a candle would be a very imperfect one, if it only knew it by means of the sense of sight; it could not distinguish it from the picture of a candle. It must form an idea of its shape and feeling, by the sense of touch. It does not know

that the flame of the candle will burn and produce pain until it sticks its finger in it; after burning its fingers a few times, it gets an idea of this quality of the candle. It has no idea of the taste of the candle, until it puts it in its mouth. Its ideas of sound are just as imperfect, until the organ of hearing has experienced all kinds of noises, and experienced their effects frequently, so as to enable it to distinguish one kind of sound from another. By hearing the mother's voice more frequently than any other sound, it gets an idea of that first. By seeing and feeling her face oftener than any other face, it is able to form a definite idea of it so as to distinguish it from any other face. In this way our first ideas of external objects are formed. These ideas do not exist in the brain until they are formed there by the brain coming in contact with these external objects, through the medium of the senses. A person who is born blind has no idea of color or the appearance of objects. One who is born deaf has no idea of sound. This is the reason why all who are born deaf are also dumb. It is not because their vocal or talking organs are imperfect, for they exist in a deaf and dumb child as perfectly as in one who is not deaf and dumb. It is because they cannot hear their own voice; they have not the least idea of the nature or use of the voice. And when they make a noise, as some of them do, they are not conscious of making a noise. They get in the habit of using the muscles connected with their chest and vocal organs under certain circumstances, and putting these muscles in operation, produces a sound which we hear but they do not. And so the child and the colt go on getting ideas of external objects—the colt about as fast as the child. But after a while, the

child begins to use these ideas—compare them the one with the other—and here is where the child advances ahead of the colt. The colt has no organ, or next to none, to enable it to use these ideas that it has obtained of external objects. But the child has an organ, or the material to make the organ with, that will enable it to compare these ideas together and use them in different ways; this organ is the Cerebrum, and the using of these ideas of external objects, that have been obtained by means of the senses, is what forms the mind. These first ideas got by the senses are like the brick, and stone, and timber in architecture, with which the building is constructed; they are the materials with which the mind is constructed. When the cerebrum first begins to make itself manifest, by putting these original ideas together in various ways, and thus forming comparisons and reasonings, and laying the foundation for a mind, it leaves the colt, which remains where it was without farther progress, because it has no part in its physical constitution that is capable of being the organ of the mind. But the child's cerebrum is capable of being improved indefinitely, with which it can form a mind, and go on enlarging and strengthening its mind so long as the being lives.

When the brain first commences exercising this new power—that of the mind—is the time when the education of the brain should commence. Before this, not much can be done but to bring the child in contact with the external world by means of its senses, so that it can get its first ideas in this way. All you have to do is to let the child paw, and feel, and scratch, and see, and hear, and smell, and taste as much as it can with safety. But when its mind shows itself, you

cannot use the mould, whose shape you wish the mind to assume, too soon.

And here I cannot help noticing a certain religious doctrine that was drilled into my head when I was a youngster: that of human depravity, which sent children not a span-long to hell for the sins of their parents. I was taught to believe that the soul was that part of our life to which the thoughts, the desires, and the volitions or will belonged; and that it was the part that lived after our bodies died, and was answerable for the acts of the body; that it was our spiritual part; in a word, that it was our mind. Now physiology teaches me that in the first periods of infancy, there is no mind. It teaches me that the mind does not exist until it is formed by the exercise of the senses, and by the reasoning powers of the brain. How, then, can the reasoning part of an infant, its mind—its soul, if you please to call it so—be answerable for good or evil, or be answerable for anything at all, when it does not exist? The child does not know good from evil—does not even think any more than the colt does of the same age, until its mind has been formed in the manner I spoke of. You ask me then, very naturally, what becomes of the spiritual part of the infant dying before the mind is formed? I answer that I do not know, nor am I anxious to know. I believe as sincerely as any one, that there is a creator of all things. I believe that Creator is infinitely wise and just. I am satisfied of this from studying his works. I find them perfect, and consequently I have implicit confidence that the spirit of the infant, as well as that of every other living being, will be dealt justly with. And I further think there is no need of prying

into the business of the Almighty in relation to the future, to see whether he gives us all justice or not.

My idea in reference to a future existence is this: that it is a continuation of this existence; that we take with us when we leave this state of existence, the same spiritual part that we have here; that the spiritual part of our nature is governed by fixed laws, the same as the bodily part, and that a violation of these laws brings its own punishment, the same as when we stick our hand in the fire, thus violating the laws of our body, we suffer punishment. So when we live wickedly, the effects of that wickedness is our punishment, we experience some of the effects in this world; but I believe that we still continue to experience those bad effects hereafter until we cease violating the laws of our nature. What becomes of the spirit of an infant dying before it has a mind I cannot imagine, or how it can acquire those first ideas necessary to the formation of a mind; whether it goes into some material organization elsewhere, to form those ideas, or whether it can progress hereafter without them, is a matter resting only in the bosom of the Almighty.

You begin to think that I have got off from the track, and have commenced preaching. You can call it preaching, or lecturing, or anything else you choose. I prefer looking into these matters in a natural, common-sense way, to surrounding them with all the mystery and superstition of bigotry.

We will commence back again where we left off before flying off on the theological side-cut. This fly ing off on to side-cuts, leading to some other intellectual region, is a natural fault of mine in engineering

the train of thought; if the switch is the least turned, so as to favor the digression, off goes the train.

When the mind first begins to show itself, endeavor to surround it with circumstances best calculated to favor its full and perfect development. Show natural objects to the child first, and explain their construction and uses. Encourage the child in asking questions, and always answer them truly. It is by this familiar way that the mind acquires its first strength. If you show me an intelligent child, I will show you a parent or parents that talk with that child as with an intelligent being, taking a pleasure in answering its questions and in explaining things that it does not understand. You might as well answer the child's questions in the first place, and make the matter as clear to its mind as possible; you will gain time by it, for if you put the child off with "O don't bother me!" the child will bother you, and continue bothering you, perhaps a hundred times, with the same question, until it is satisfactorily answered. It is much better to educate a child in this familiar way, during the first four or five years of its life, than to send it to school to have reading and grammar drilled into it before it has mind enough to comprehend them. This is the time that the disposition and moral character of the individual, to a great degree, are determined. If a child is continually teased—his combativeness excited—the part of the brain devoted to that faculty will grow too fast and will fix the character of the individual as a contentious, quarrelsome person. It will require a great deal of self-denial and long practice to change this character after it is once formed. If, on the contrary, you discourage the exer-

cise of this faculty, and encourage the exercise of its opposite faculty, benevolence, the disposition of the individual is almost sure to be of a different character—he will be mild, peaceful, getting along with his fellows with much less difficulty, than if the opposite disposition had been encouraged in him.

No truer simile ever was written in reference to the mind, than this: "Just as the twig is bent the tree's inclined." Just as you shape the young mind, so will it be in after life. It will have a tendency to keep on in the same direction through life, that you give it when it first starts. A man is courageous or cowardly just as his parents make him when a child. If you make your children mind you by means of "black-man," or "booger," or some other hobgoblin, they will be afraid of hobgoblins through life. The reason that the ancient Spartans were such brave men, was, that their parents educated or encouraged the growth of this faculty of courage from infancy. They would set their children on the eaves of their houses, as soon as they could sit alone, to make them fearless.

During this period of childhood, if any particular taste should be noticed in the child, such as a taste for the use of tools, or farming, or trading, or speaking, or singing, that taste should be encouraged, not stimulated beyond its powers or inclination, so as to produce disgust, but let the child gratify its taste as long as it wishes to. By thus noticing the direction the mind naturally takes, you will find out what pursuit the child will best succeed in; for a person must have a taste for a pursuit or he never will accomplish much in it. If the child do not seem to have any strong predilection for any particular pursuit, and you have a preference for one, place circumstances around him to

develop a taste for the pursuit you wish him to follow. If you wish him to be a farmer, give him a hoe and a strip of ground to work; take him out in the fields and among the stock; give him a calf, or a colt, or a lamb, and encourage his care and love for it. In this way you will form in him a taste for agriculture. If you wish him to be a mechanic, give him tools and materials to work with. If the child be a girl, encourage a taste for doing housework; for this must necessarily be a part of her legitimate business, no difference what sphere she may be placed in.

You need take no thought for your boy, as yet, if you would wish him to be a professional man. Give him a physical education first; let him get common-sense ideas of common things that surround him; and then, as his mind grows stronger and is able to investigate and understand them, let him study books. It is time enough to put a child in books when he is five years old; he will form just as good a mind, and probably better, than if he commenced sooner.

When you do put children in books, let them study but a small portion of the day — say, two or three hours—and exercise out doors the balance of the day; their minds and their bodies will improve better than if you confine them twice that length of time to books. In training the brain, as in training the muscles, strength is to be acquired by alternate exercise and relaxation, according to the strength of the part.

When the child grows up to be a youth and has acquired a knowledge of the rudiments or first principles of knowledge, such as reading, writing, composition—which includes grammar, arithmetic, geography, chemistry, natural philosophy, astronomy, the science of government, and above all, physiology—he is then

prepared to select the pursuit he intends to follow through life; for every one, however rich he may be, ought to have some occupation. Without occupation it is impossible to enjoy life. The wish for independence as a means to enable one to be idle, is the worst wish for your happiness that you can make. In a youth selecting his business, he should select that business which he likes best; for, if he is satisfied, he will continue to like the business as he practices it.

Never select a business merely as a means of getting rich; if you follow a business merely with this object, without experiencing any pleasure in the pursuit of the business itself, you never will derive the proper enjoyment from it. Your principal pleasure should be in the labor of carrying it on, and the pleasure and convenience the business affords others. If you follow farming, take a delight in it; cultivate your land to the best possible advantage; study the business as a science; endeavor to have the best implements, the best stock, the best varieties of grain and fruit. Here is where your greatest pleasure will be. By farming in this spirit, you will enjoy yourself, and be contented, but if you farm merely for the purpose of making money, you will not derive a-tenth part of the satisfaction from the business. You will live in constant dread of a failure of your crops, and will not take that pleasure in the labors of your farm. To a farmer who likes the business, the labors of carrying it on are an enjoyment. So it is with every other kind of business. If you are a mechanic, glory in the calling; try to excel in your particular business. Aim to be No. 1, in whatever pursuit you follow. If you are in public business, consider yourself an agent for the community in which you operate. Consider

it your duty to be prepared to perform those duties properly that your patrons expect of you. If you undertake to supply a community with any particular article or articles, consider it your duty and your pleasure always to have such articles on hand, and of a satisfactory quality, so that your patrons may not be disappointed. When a person becomes discouraged and discontented with his business, and there is a probability of the business always being disagreeable to him, the sooner he quits it the better; for it is seldom that one will succeed in a business he does not take a pleasure in.

These remarks, in reference to the culture and occupations of the mind, are but natural inferences from a knowledge of the structure and nature of the organ of the mind, the brain.

The different powers of the mind are located in the different parts of the brain. Now, if you wish to succeed or excel in any particular pursuit requiring the exertion of any particular faculty of the mind, and consequently any particular part of the brain, you must exercise that particular faculty of the mind repeatedly, and for a long time, in order to develop its organ in the brain. This is the way one man becomes more proficient and skillful in one kind of business than another, because he exercises, and consequently enlarges and strengthens, that part of his brain which is brought into use in the practice of that particular business. Skillfulness in mechanical pursuits is generally supposed to reside in the development and education of the muscles; but as I said before, the muscles are merely the tools of the brain; they are large when the brain uses them much, but in the construction of intricate and beautiful pieces of workmanship it is the

brain that directs them, and to whom the credit of the work belongs. All of you that have ever had any blacksmithing done, are aware of this fact. There are some blacksmiths who have learned their business in the same way that a horse is learned to work in a tread-mill—by rote, without being told, or without having inquired into the whys and wherefores of their business. They hammer their whole lives out without doing a single skillful job. While there are other blacksmiths who have not done half so much hammering, but more thinking, that seem to know just how to go to work to do you a job as you want it done. This shows the necessity of taking pains to give an apprentice a theoretical, as well as a practical knowledge of his business. If a carpenter sets an apprentice to sawing or boring without telling him what it is for, and without encouraging him to learn so that he can become a skillful workman soon, it is like setting a dog to churning on the old-fashioned churn-wheel—as soon as his master's back is turned, the dog's head is turned also, and the churn stands still; so it is with an apprentice that is learned mechanically only—he has no interest in his work—the sawing and boring operation are in reality a saw and a bore to him. But as soon as you make it interesting to him by explanation and encouragement, he progresses much more rapidly, and is of much more use to his employer. The strengthening of a particular faculty of the mind, by a gradual enlargement and strengthening of a particular portion of the brain, by a proper exercise of that portion of the brain, shows also the necessity of a person sticking to one kind of business, if he wishes to excel and succeed in that kind of business. We see the folly of men leaving a business that they have educated their

brain for, and in which they are doing well enough, to go into a business that their brain has had no training for. As a general thing, they make a failure of it. For instance, a substantial farmer, who has got everything fixed to his notion—who has got things in this favorable condition by a long practice of agriculture, in which he is thoroughly skilled, and which he is capable of carrying on skillfully and profitably: he takes it into his head that he can do better merchandising—goes into it. Things go on swimmingly for a while; he despises his old dirty business. He takes his wife's home-made linsey off, and makes her wear silk. His hands, that had become large and strong in holding the plow and swinging the ax, he covers up with gloves. He wonders how he should have missed his calling so long. But after a while, he finds his stock gone; no money to buy more with, and a pack of drummers dogging him in full blast. He can't understand how all this comes. He commenced business with two or three thousand dollars; he has made thirty-three per cent. on his goods; he has not been very extravagant, but still, he is out of pocket; he is troubled with that very disagreeable complaint, called the "shorts."

I will tell you how this comes. He has undertaken to play merchant with an agricultural brain. There is no use of your telling him this, for he won't believe you. He refers his ill success to a change in the times—to the rascality of his customers, and all that sort of thing. The true secret of the matter is that he is a greenhorn in the business, and the sooner he throws away his gloves, takes hold of the plow-handle, and gets out of the scrape generally, the better it will be for him.

As a man's intellectual or business character is formed by a continued exercise of that portion of brain to which that portion of the intellect, or that branch of business belongs; which exercise develops, enlarges, and strengthens that portion of the brain, and consequently, that portion of the mind; so also is his moral character formed by a continued exercise of the portion or portions of the brain to which the moral faculties belong.

If you continually tease and plague a child; encourage him to contend and quarrel, and thus to bring into continual exercise that portion of the brain to which this quarrelsome faculty belongs (wherever it may be placed; phrenologists call it combativeness), that portion of the brain will gradually become stronger in that particular faculty, until a quarrelsome disposition becomes a fixed trait of his character, and cannot be changed except by a long practice of the better faculties, and a disuse of the quarrelsome one, until that portion of the brain to which it belongs, is reduced in size and power to a proper standard.

If you encourage in a child the exercise of the musical part of its brain (the part that phrenologists call the organ of tune), you can make a musician of almost any child. All that is necessary is to enlist the will of the child to engage in it. There is not so much difference naturally in the talents of children as is generally supposed. Take a healthy, well-formed brain in its infancy, and you can make anything you please of it, or rather, of its owner; you can make a mathematician, a mechanic, a musician, an honest man, or a rascal of him. The future character of the individual depends entirely on the direction that is given to the will of the individual on the start. It is

like the direction that a ball takes when it is shot from a gun, it may hit objects that will make it glance, but the general direction of the ball will be the same.

There is in every intelligent being a mysterious power called the Will. We imagine it to be connected, in some way, with the mind and its organ the brain; but how this connection exists, or how it influences the powers of the mind, we know not. It is the ruler or governor of the mind, of the different parts of the brain, and of the voluntary nerves. It is not despotic in its sway; although it rules over the nervous system it seems to be influenced or swayed in its government by the very parts over which it rules. Its power is to the body what a limited monarchy is to a nation. Although the head of government gives the general direction, and originates or suggests the necessary improvements and measures, the operations themselves are perfected and carried out by organizations and departments constituted expressly for that purpose.

It is the will that directs any particular part of the nervous system to be exercised. If there is a necessity for a certain muscle to be contracted or relaxed, the will sends an order along the nerve going to that muscle, and the muscle contracts or relaxes according to the wish of the will. If we wish to speak, the will sends orders to a variety of muscles about the face, mouth, throat, neck, and chest, to contract or relax to produce the required sound. If we wish to calculate mathematically, the will directs the nervous energy to be concentrated on that portion of the brain devoted to this faculty of the mind, and the process of calculation goes on. Now, in the development of any particular part of the muscular or nervous system, which is accomplished by a proper exercise of the part, it is the

will that directs the part to be exercised. This brings us to the practical point at which we wished to arrive—that, in order to educate or train a child in any particular calling; in order to develop and improve his moral or intellectual faculties, you must induce the will of the child to apply its energies in that direction. Now when this general direction is once given, and the organs of these faculties become partially developed, they have a direct power or tendency to influence the will in their favor. They have the power to become the pets or favorites of the will.

As you often see illustrated in the social world, a monarch will take up an insignificant being from the rabble, as the king of Bavaria did Lola Montes, for instance, and by cultivation and favor, become influenced in turn by this creation of his own. So if the will directs the energies of the nervous system on any particular part of the brain, and thus encourages the growth of the organ, and the development of that faculty of the mind which belongs to that part of the brain, after a while this faculty acquires a supremacy over all the other faculties, and monopolizes the favors of the will entirely.

This is the way, then, that any particular talent is developed. This is the simple manner in which superiority in any human endowment is obtained. So you see it rests in your own will to make of yourself what you choose. Do not blame your Creator for inferiority in any respect: he gives you the batch of brain in a soft, pliable condition. He gives you the will to shape that batch of brain into just such a form as you choose; in other words he constitutes you the maker of your own intellectual and moral character. How necessary it becomes then, in parents, to direct

the wills of their children in the right way. After the character of the mind is once formed, it is no easy matter to change it. No entire change of character can be formed except as its organ or instrument, the brain, is changed; and this requires a long and patient exercise of another set of organs of the brain, and a constant restraint on the organs that have already become developed, so that they may grow less from disuse.

A man's character cannot be changed in a day, any more than the muscles of a blacksmith's right arm can be much reduced in size in a day. The man's character can be changed no faster than the parts of the brain to which his peculiarities of character belong can be changed.

And here permit me to make a remark in reference to a doctrine that most all evangelical churches adhere to—the doctrine of human depravity and of the necessity of a sudden change of character before a man can be good—a sudden transition, as it were, from moral darkness to heavenly light. I have had some experience in this matter, and therefore can speak feelingly on the subject. I was brought up, from my earliest childhood, in the belief of Christianity. I was taught to pray and read the Scriptures daily. I was taught to believe in, and obey the precepts of the New Testament implicitly. The moral part of my brain was formed in this fashion, and it was impossible for me to believe any other system, or to change my moral character unless the structure of that portion of my brain underwent a corresponding change, by a due course of training in a different manner. It was always my intention to join the ———— Church, the one my parents belonged to. When I was sixteen

years old I applied for admission. I did it of my own free will, being away from home at school at the time, and among strangers.

The ———— Church sets apart a particular day before communion, for the examination of applicants for admission, to see whether they are sufficiently orthodox. When the minister came around to me, I answered all the questions satisfactorily, until he asked me the question whether I could point out any particular time in my life that I had experienced a sudden change of character, from one of depravity to one of regeneration. I told him my history; that I had always been brought up in a Christian spirit, and consequently I could not point to any such time. I was rejected.

I relate this incident to illustrate to you the physiological fact that our moral character is the result of a peculiar training of the different portions of the brain. Since I have come to study physiology, I am convinced the more that I was right; that it was physically impossible for me to have changed suddenly my moral character. Now it seems to me that this is much the most plausible view of the matter—the most in accordance with Nature. This view of the matter would give us more sympathy and forbearance with those who are trying to change their character for the better. We should not expect a person who has made a will to reform, to be perfect at the start; we would be led to overlook his occasional errors, that his old, vicious brain is constantly prompting him to commit. By using this forbearance with him until he is able to change the nature of his brain, by a long and continual practice of virtue, we make a reformed man of him indeed. Every one, I think, must see the

plausibility of this who has witnessed our revivals of religion, and who has witnessed the lamentable backsliding that takes place among three-fourths of the converts. It all comes from the erroneous and unnatural doctrine that a human being can change his character without changing the part of the brain to which the peculiarities of that character belong. When the penitent sinner is brought to the mourner's bench, it is only his will that is operated on by the persuasions of the preacher; he resolves to change his character, in the same way that a man with a swelled leg comes to a physician and resolves to have the swelling removed. Now the physician cannot remove that swelling suddenly; but he tells him, perhaps, how it can be removed: by his persevering in a certain course of practice. Precisely the same relation exists between the diseased sinner and his spiritual physician, and precisely the same kind of advice ought to be given to him. But depend upon it, if this spiritual physician tells him he can cure him instantly, can change his bloated, diseased character suddenly to a pure and healthy one, I say if he tells him any such thing as this, he is a spiritual quack.

The bad effect of telling the reformed sinner that he is entirely changed, is, that it leads him to think there is nothing for him to do but to live right along, a regular Christian. It puts him off his guard against the old enemy, generally called Devil, but which may be to a great extent, vicious brain. And then, if the old devil, or this old vicious brain gets the start of the will at any time, and the poor fellow happens to say a bad word, what an awful fuss is kicked-up. He is hauled over the coals at once; is disgraced, excommunicated, turned adrift, and in the language of the

Scripture, takes to himself seven other devils worse than the first. But tell the penitent, who has resolved to do better, that he cannot be changed at once, that he has got to acquire a better character by long and patient practice, the same way that he acquired the bad one, and with this additional obstacle, that his will has got to contend constantly against the bad influence of the old brain, as long as any of it remains, that the old character belongs to. And then, if he does happen to say a bad word once in a while unintentionally, don't run and tell the schoolmaster, and have him turned out of school; but encourage him to do better in future. If this plan was carried out, and sinners converted naturally and permanently, there would not be a tenth part of the backsliding that there is.

I could dwell much longer on the brain and its mind, but I must devote a little time to the other parts of the nervous system. Going directly from the brain to be distributed to the different parts of the face, eyes, ears, mouth and throat, are nine different nerves; some of these nerves go to the muscles of the face; some have feeling; one of them takes cognizance of sound—it goes to the internal ear; it is the only nerve of the body with which we can hear; it is called the Auditory nerve. Another takes notice or cognizance of light and colors; it goes to the eye, and is called the Optic nerve. The Olfactory or smelling nerve, goes to be distributed over the lining membrane of the nose; this takes notice or cognizance of the different odors that different objects have. Another nerve is distributed over the surface of the tongue and inner structure of the mouth; it takes notice or cognizance of the taste of substances, it is called the Gustatory

nerve. No one of these nerves can take cognizance of any quality of an object but one. The Auditory nerve, only of sound; the Optic, only of sight; the Olfactory, only of smell; the Gustatory, only of taste. Why this is so, we cannot tell; it is undoubtedly owing to some peculiarity of the structure of the nerve, or that portion of the brain from which the nerve starts. What that peculiarity of structure is, that enables one nerve to notice sound, and another light, and another taste, we have not yet ascertained. At some future time we shall undoubtedly progress far enough in physiology, to tell. Many things that appeared fully as mysterious, five hundred years ago, are now well understood. Some of the nerves going directly from the brain have control over the muscles of the face, the eyes, the mouth, the lower jaw, the tongue, and the muscles of the throat. Some of them also are ordinary sensitive nerves, which produce pain when they are injured, acting as sentinels to let the brain know when the part is being injured. The nerves of special sense, the Auditory, the Optic, the Gustatory, and the Olfactory have no other sensation except by their connection with the nerves of ordinary sensation. The connection of the Auditory nerve with nerves of ordinary sensation accounts for the pain it produces in some persons to hear a saw filed. The connection of the optic nerve with nerves of ordinary sensation accounts for a strong light producing pain in the eye. This is a wise provision to prevent the nerves of special sense from being injured by improper use.

We leave the brain now, and the nerves going directly from it, and follow the great Spinal nerve out from the skull, through the large hole at the base of the skull, called the Foramen Magnum. This spinal

nerve or Spinal Marrow, as it is generally called, is a bundle of minute nervous fibres coming from every part of the body, and going to unite with the brain. Each one of these little fibres has its commencement in some part of the body, and its termination in the brain, constituting a complete telegraph, extending from every part of the body to the brain, the centre of the nervous system, by which sensation, or the condition in which each part of the body is in, is communicated to the brain, and by which, the orders of the brain are carried back to the part. For carrying on this correspondence between the brain and the different parts of the body, two sets of nerves are employed. One set conveys to the brain a knowledge of the condition that the part is in, from which the nerve starts. If the part is being injured, it conveys a painful sensation to the brain; if the part is experiencing a pleasant sensation, it conveys a pleasurable sensation to the brain. If nothing unusual is going on in the part, the nerve remains quiet, and does not make a report to the brain. The other set of nerves convey the orders of the brain to the muscles of the part to contract or relax, in order to produce the different motions of the part. These two different kinds of nerves go together bound up in the same sheath, to be distributed to the same part. The nerves go out from the spinal cord in pairs; one from each side of the cord; they go out from between the bones of the spine or back-bone, between each of which, at the sides, is a hole formed for this express purpose. There are thirty-one pairs of the spinal nerves, twenty-five pairs going out from between the bones of the spine, and six pairs going out from the sides of the sacrum, or continuation of the back-bone.

Each of these nerves starts out from the spinal marrow by two roots; one root coming out from the front part of the spinal cord, which is the nerve that presides over or carries the order to the muscles to contract or relax, another root starts from the back part of the spinal cord; this presides over the feeling or sensation of a part, and carries an account of the condition of the part to the brain. This root has a little enlargement or knot, called a Ganglion, just after it leaves the spinal cord. Now these two roots unite before they go out of the back-bone, forming one nerve, in which shape it goes to be distributed to that part of the body to which it belongs.

If you cut off the root of the nerve that comes from the front part of the spinal cord, you destroy the motion of the part to which the nerve goes, but the sensation or feeling of the part remains. If you cut off the root that comes from the back part of the spinal cord and let the front root remain, you destroy the feeling of the part, but the motion remains. If you cut off both roots, you destroy both the motion and feeling of the part; and generally whenever you cut off a nerve, after it leaves the spinal cord, you destroy the feeling and motion of the part to which it goes; or you produce a paralysis of the part. Sometimes paralysis is produced from some difficulty in the brain; in this case, the paralysis extends to one half of the entire body, and this half is the one opposite to the half of the brain that is affected, because the nerves going from the body cross after they enter the skull — the nerves from the right side of the body going to the left half of the brain, and the nerves from the left side of the body going to the right half of the brain.

If the spinal cord is injured in any way, all the

nerves coming out from below the injury, are affected. If the spinal cord is cut off or destroyed, all the parts that are supplied with nerves coming out from below where the spinal cord is destroyed, are paralyzed—their motion and sensation are destroyed.

There is one more set of nerves to be spoken of, and we are through with the nervous system. These are the involuntary nerves, over which the will has no control. This system of nerves is called the Involuntary or Sympathetic system of nerves, and is supposed to have its centre in a collection of nervous knots or ganglia situated behind the stomach, between that and the backbone. This system of nerves extends itself over the whole body, forming in its course little knots or ganglia, from which, as from independent centres, this peculiar nervous influence seems to go to the parts to which its branches are distributed. This system of nerves presides over those operations of the body over which the mind should have no control; as over the nutrition or growth of every organ, over the heart, bowels, lungs, liver, kidneys, spleen, stomach, and over every part, in a word, which is not governed by the will.

If the mind or brain had control over these functions, our bodies would continually be getting out of order. Our brain having so many things to attend to, would forget to attend to the nutrition of the body, to the circulation of the blood, and to the action of the other vital organs.

This system of nerves seems to have no rest; the functions over which they preside are continually in operation. Nutrition, breathing, the circulation of the blood, and the action of the different glands of the body are continually going on, while we are asleep and while we are awake. These sympathetic nerves

never get tired as the voluntary nerves do. This involuntary system of nerves is connected by small branches with the voluntary system of nerves, which causes the two systems to sympathize with one another slightly.

Although the two systems are entirely distinct in their individual action, yet where they join, as they do in some parts of the body, it makes the part to which these mixed nerves go, affected both by the involuntary and by the voluntary system of nerves. The operations of the stomach and the heart are affected by the mind slightly, because the brain sends a small nerve that unites with the sympathetic nerve supplying them. This nerve is so small, however, that the mind can have but a small influence over these parts, compared to the influence that the sympathetic nerves have. This influence of the mind is noticed in the effect that different emotions have on digestion and the action of the heart. Tell a person some very bad news just after he sits down to eat, and however hungry he may be, it will take away his appetite. Fright will cause the heart to beat more rapidly.

FIG. 9.

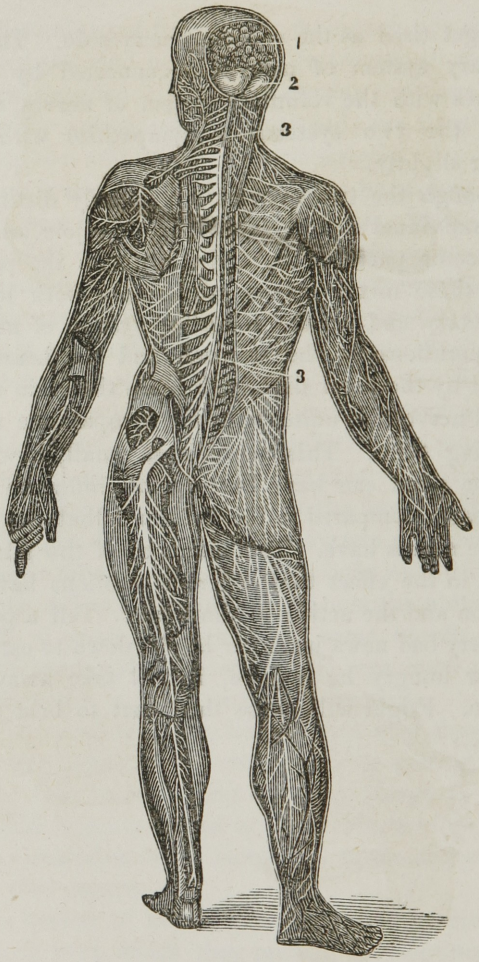


Fig. 9, represents a view of the Voluntary Nervous System. 1, The back part of the Cerebrum. 2, The Lobes of the Cerebellum. 3, The Spinal Cord, issuing from the lower part of the Brain, and giving off branches to all parts of the body. The white lines represent the distribution of the Nerves.

FIG. 10.

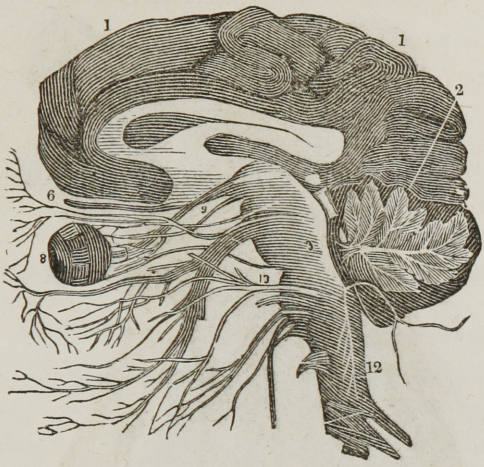


Fig. 10, represents a Vertical section of the Brain. 1, Cerebrum, and 2, Cerebellum. 3, Medulla Oblongata. 12, Spinal Cord. 9, The Optic Nerve going to 8, the eye. 13, Auditory Nerve. 6, Olfactory Nerve.

FIG. 11.

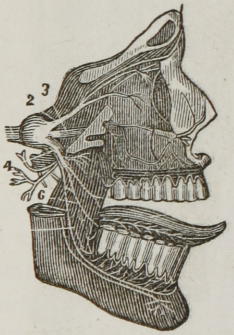


Fig. 11, A view of the distribution of the nerves to the Face and Jaws. The white lines are branches of nerves.

FIG. 12.

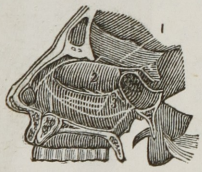


Fig. 12, A view of the distribution of the Olfactory (smelling) nerve through the Nose.

FIG. 13.

Fig. 13, is a view of the Ganglionic System of Nerves, called the "Sympathetic or involuntary Nerves," which preside over the circulation of the blood; over nutrition; respiration; secretion—over every function, in a word, beyond the control of the will. A, A, The Solar plexus or center of this system situated behind the stomach. The other letters represent the different Sympathetic Ganglia, in supplying every part of the system, as from centres, with this peculiar nervous influence.

LECTURE VII.

THE CIRCULATORY SYSTEM AND THE LUNGS.

(THE BLOOD, HEART, AND BLOODVESSELS.)

You all know what the Blood is. You have seen it often. It is that red fluid contained in the veins and arteries. If blood is permitted to stand it separates into two parts: a thick, clotted portion called Crassamentum, and a thin portion called Serum. What it is that keeps these portions mixed intimately together, when in the living body, and what causes them to separate, when drawn from the body, we cannot tell. It is not the heat of the body, for you can keep the drawn blood at the same temperature that it was before it is drawn, and it will thicken just about as quick. It is not the motion that the blood has in the body, for you can keep it warm and keep it in constant motion, but it will still form into clots, its thin part separating from the thick part.

The blood is principally formed from the food and drink we take. A portion of it is formed from the old parts of the system that are taken up by a system of vessels called Absorbents. The blood contains a variety of constituents for the nourishment and formation of every structure of the body. It contains the nourishment for the growth of the muscles, the bones, the skin, the hair, the ligaments, and every other part of the body. The blood penetrates every part of the

system except the hair, the nails, the cuticle, and the enamel of the teeth. These grow from underneath. What is it that circulates this blood through the system? The heart and bloodvessels. The heart is the principal moving power. The bloodvessels assist in the circulation of the blood by their elasticity; and the minutest bloodvessels, into which the arteries terminate, and from which the veins commence, which are called Capillaries, assist the circulation of the blood by a power called *capillary attraction.*

To commence, then, with the Heart. The heart is a muscular body; the muscles so arranged, as by their contraction, to lessen the size of the cavity that they surround. The heart is divided into four apartments or cavities. The two at the upper part of the heart are called Auricles; the muscles that surround them are thin, their office being only to force the blood from their cavities into the other cavities or ventricles of the heart. The two other cavities of the heart are called the Ventricles: they occupy the lower portion of the heart; their walls or muscles that surround them are much thicker than the walls of the auricles: for the muscle of the ventricles, by its contraction, forces the blood through the lungs and through the whole system. The muscle of the ventricle, on the right side of the heart, by its contraction, forces the blood through the lungs. The muscle of the ventricle, on the left side of the heart, forces the blood through the general system.

The heart is situated in the left breast, between the right and left lung, just above the diaphragm or midriff, (the membrane that separates the chest from the abdomen). The heart is inclosed by a serous membrane that secretes a thin fluid that is spread out over

FIG. 14.

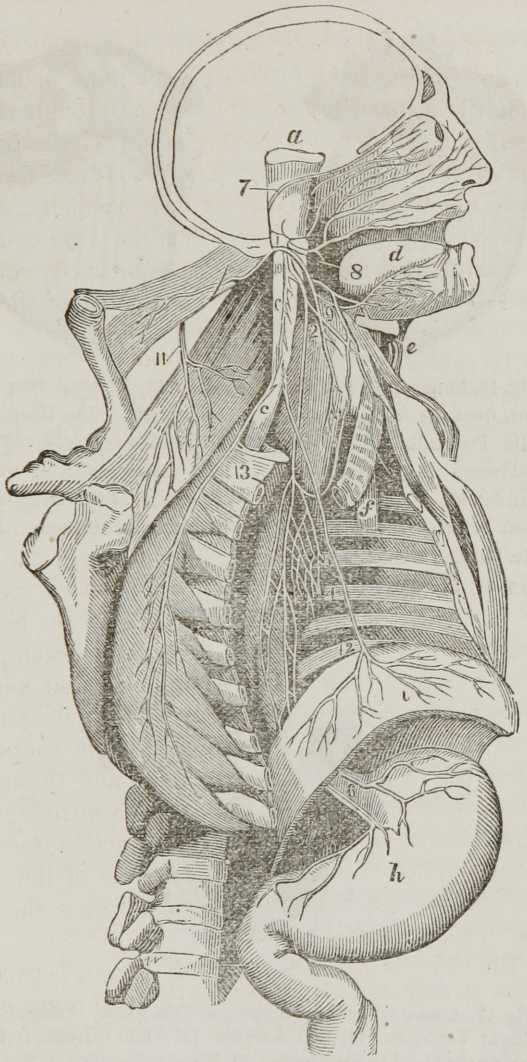


Fig. 14, represents what are called the Respiratory Nerves. They are distributed to the muscles of the Face, Throat, Chest, Heart, Diaphragm Esophagus, Stomach and Neck They are partly under the control of the will. They convey the nervous influence that gives expression to the passions and feelings more than any other nerves.

FIG. 15.

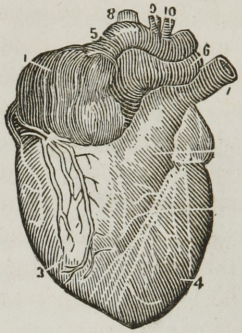


Fig. 15, External view of the Heart, from the front, divested of its Pericardium, and the bloodvessels going from the heart, cut off. 1, Right Auricle. 2, Left Auricle. 3, Right Ventricle. 4, Left Ventricle. 5, 6, 7, 8, 9, 10, Bloodvessels.

FIG. 16.

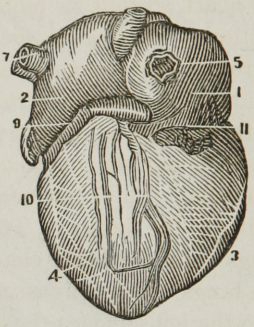


Fig. 16, External view of the back part of the Heart. Description the same as for Fig. 15. The vessels ramifying over the ventricles of the Heart, are its Nutrient bloodvessels.

FIG. 17.

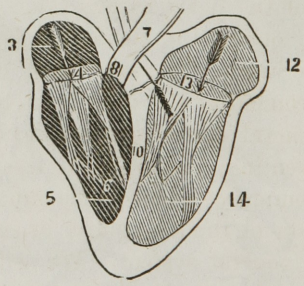


Fig. 17, A view of the Inner Structure of the heart. 3, Right Auricle. 5, Right Ventricle. 12, Left Auricle. 14, Left Ventricle. 7, Vessel carrying the blood to the Lungs. 16, The Aorta, carrying the blood to the general system. The valves closing the openings between the auricles and ventricles can be plainly seen.

the heart, so that its motions may be free, and without friction. A similar membrane and a similar fluid surround the brain. Now the philosophy of the action of the heart is this: the blood from the veins of the general system is poured into the right auricle; the right auricle contracts and forces it into the right ventricle. The right ventricle contracts and forces it through the lungs. The blood returning from the lungs, having been changed while passing through the lungs, from venous into arterial blood, is received into the left auricle: the left auricle contracting, forces the blood into the left ventricle. The left ventricle contracting, forces the blood through the whole body. But, you ask, What prevents the blood going back into the auricles, when the ventricles contract? There are placed at the openings, going from the auricles to the ventricles, little valves that permit the blood to go from the auricles to the ventricles, but prevent it going back into the auricle when the ventricle contracts. Likewise, there are valves placed at the commencement of the great vessel that carries the blood from the right side of the heart to the lungs, that permit the blood to go outward to the lungs, but prevent it returning to the heart. The same kind of valves are at the commencement of the great vessel carrying the blood to the general system, permitting the blood to go out but preventing it returning to the heart.

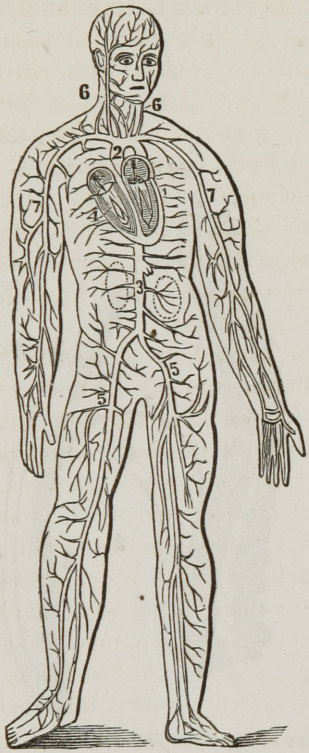
I will now commence and give a connected account of the circulation of the blood, and of its physiology or use to the general system. We will commence with the left ventricle, supposing it to be full of arterial blood, containing the healthy aliments for the support and growth of every structure of the body. The left ventricle contracts and sends the blood through

the arteries until, by their continued subdivisions, they merge into capillaries, the minutest divisions of the bloodvessels, the little hair-like vessels that connect the terminations of the arteries with the commencement of the veins. Here in these minute vessels, too small to be seen by the naked eye, the nutritive properties of the blood become separated from it, and go to the nourishment and growth of the different structures of the body. The blood becomes changed in passing through these minute vessels, its nutritive parts being taken from it, and thus changing it from arterial to venous blood.

The minute veins that commence at the termination of the capillaries, unite with one another and form larger veins; these unite together until all the veins of the lower part of the body unite together into one vein, called the Vena Cava Ascendens, which empties into the right auricle; and all the veins of the upper part of the body unite into one vessel, called the Vena Cava Descendens, which also empties into the right auricle. Here then, in the right auricle, is collected all the returned, impure venous blood of the whole system. This must be purified before it can nourish or sustain the system; how is this purification to take place? Why, in the same way that you purify your bed-clothes—by airing it. The blood must be aired, must come in contact with the atmospheric air: for this purpose, the lungs are made.

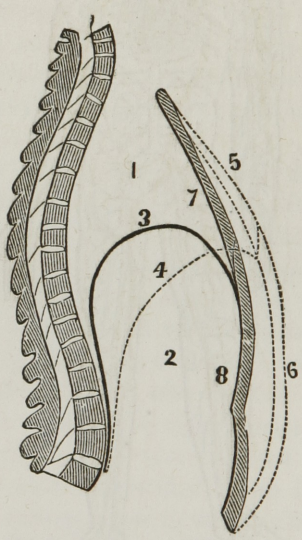
The lungs or lights, as they are generally called, are composed of an infinite number of little air cells, each cell connected with a minute tube, which tube is connected with a larger tube, and that with a still larger one, called the Bronchia, until they all unite into one large tube, called the Trachea, or windpipe. In

FIG. 18.



A view of the Arterial System—that system of vessels carrying arterial blood to all parts of the body. 1, The left side of the Heart, showing the Auricle above and the Ventricle below. 4, The right side of the Heart, showing the Auricle and Ventricle. 2, The arch of the Aorta, giving off the main Arteries supplying the Head and upper extremities. 3, The Aorta, giving off branches to the abdominal organs. 5, 5, Divisions of the Aorta, supplying the lower extremities.

FIG. 19.



A vertical section of the Chest and Abdomen. 1, The cavity of the Chest. 3, The position of the Diaphragm in expiration. 4, Position of the Diaphragm in inspiration. 5 and 6, Enlargement of Chest and Abdomen in inspiration.

FIG. 20.

A view of the Venous System (that system of vessels returning the venous blood from the general system, to the right side of the Heart) 1, The right side of the Heart, showing the Auricle and Ventricle. The currents of the Venous blood are in the direction of the arrows 4 and 5, Veins of the extremities. 6, Veins of the Head and Neck.

FIG. 21.

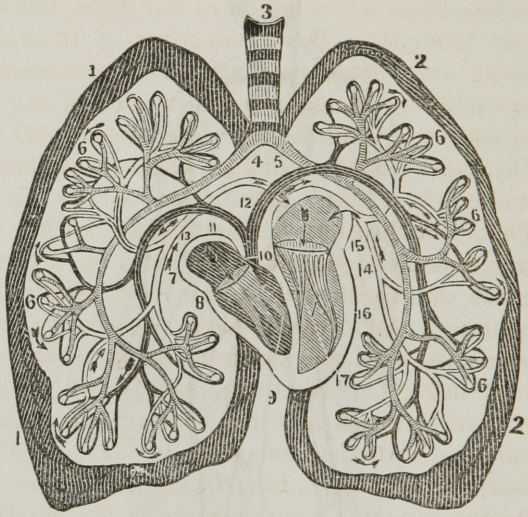


Fig. 21, represents the circulation of the blood through the Lungs. 1 and 2, The right and left Lungs. 3, Trachea (windpipe), dividing into 4 and 5, bronchial tubes which subdivide through the Lungs, until they finally terminate in, 6 6, Air-cells, around which the blood circulates, coming from, 10, bloodvessels from the right side of the Heart. The blood returns from the Lungs through, 13 and 14, bloodvessels emptying into, 15, the left Auricle, which by its contraction forces it into, 16, the Left Ventricle; which by its contraction forces it through the general system. 7, the right Auricle. The valves shutting the openings between the Auricles and Ventricles, are plainly seen.

breathing, the air passes through the windpipe, and along its divisions or bronchia, until it finally reaches the air cells. Now, each of these air cells is surrounded with a tender vascular membrane, in which the bloodvessels coming from the right side of the heart terminate. The terminations of these bloodvessels are minute capillaries of the same size as the capillaries through the other parts of the body, the connecting link between the arteries and veins. When the venous or impure blood which has been returned from every part of the body to the right side of the heart, is diffused through this vascular membrane surrounding the air cells, it comes in contact with the air that is drawn into the air cells in breathing. And here the blood becomes changed, by its contact with the air, from impure, dark venous blood, into pure, bright-red arterial blood. When it becomes so changed, by the passing off of the carbonic acid and other impurities of the blood and the absorption of oxygen from the air, the blood passes into the minute commencements of the bloodvessels that carry this purified blood back to the heart; but this pure blood goes to the left side of the heart, entering into the left auricle; the left auricle contracting, forces it into the left ventricle, and here is where we started with the pure blood.

This is the manner in which the blood circulates through the system, being changed twice in its course; once in the minute capillaries of the general system, where its nutritive properties are taken from it, and once in the lungs, where its life-giving properties are returned to it again. But how is this loss made up, that the blood is undergoing continually, by supplying nutriment to the different parts of the body, and in

throwing off the discharges from the lungs, skin, and other evacuants? The blood is replenished from two sources, from the food and drink, and from the continual taking up of the old, worn-out portions of the system, by an apparatus called the Absorbent System. When the food is taken into the stomach, it becomes dissolved there, and changed into a homogeneous substance, called Chyme; it then passes into the first bowel, where it becomes mixed with the bile and pancreatic fluid and changed into Chyle, and is taken up by a set of minute vessels called Chyliferous vessels, whose mouths open into the first bowel; this Chyle is collected in a little sack, called the Receptaculum Chyli; from this, it is carried through a tube, called the Thoracic Duct, up through the back part of the chest, and emptied into the Subclavian vein; it goes along this vein with its venous blood into the right side of the heart; from thence to the lungs, to be mixed with the air, where it receives oxygen, and is converted into pure arterial blood. The other source from which the system is replenished, is from the old, worn-out portions of the system that are continually being taken up by the absorbent vessels. Along these vessels are little glands, called Lymphatic glands, through which the blood goes to undergo some change that we do not exactly understand. These little absorbent vessels keep uniting and forming larger vessels, until a part of them pour their contents into the Receptaculum Chyli, and thus pass into the Subclavian vein; and another part of them unite and pour their contents directly into the Subclavian vein. We see by this arrangement, that Nature is a great economist, using up all the old materials to form new ones with. It is a good example set before us to be

FIG. 22.

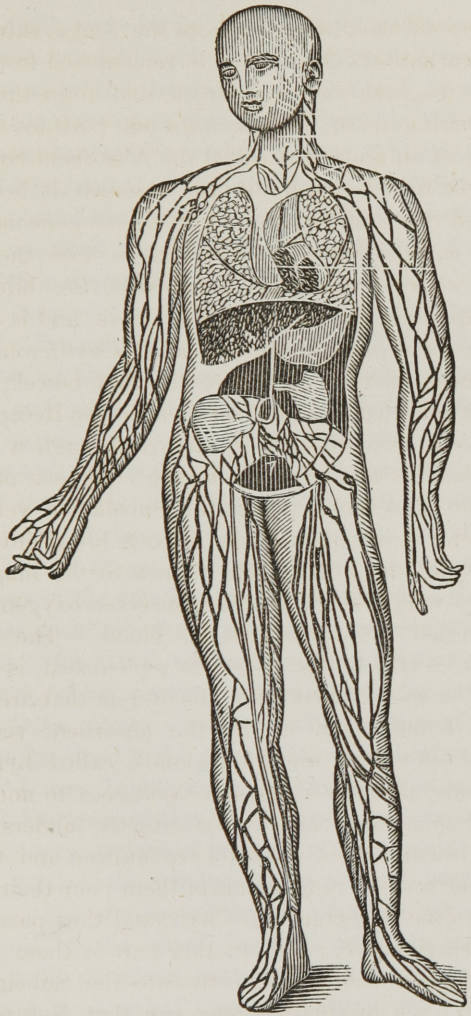


Fig. 22, represents the Lymphatic or Absorbent system. The lines showing the course of the Lymphatic vessels, and the little knots in their course, the Lymphatic glands through which the contents of the vessels pass, undergoing a change in the passage. When a poison is taken up by the absorbents, these glands are affected first, acting as sentinels to arrest the passage of injurious influences into the system.

economical, and use up all the pieces and scraps and old, worn-out articles for some purpose or other. The arteries assist the circulation of the blood by an elasticity that their coats possess. When the left side of the heart contracts, it sends a volume of blood through the arteries, and thus expands them; immediately the elastic coat of the artery contracts, and keeps the blood going on, until another volume of blood is forced in by another contraction of the heart.

But what is it that carries the blood along the veins? Probably the force from behind. The arteries, acting through the capillaries, may have some effect, and then the suction of the heart, when the right auricle opens, may have an influence. The veins coming from the lower part of the body, as well as the large lymphatic vessels, have valves all along their inner surface, which prevent the blood going back but let it go upward toward the heart. The openings of the small veins of the brain into the large ones are peculiar; they enter at an angle against the current of the blood, so that they form a valve at their openings, which prevents congestion in the substance of the brain taking place so readily in case of a stoppage of the blood in the great veins of the brain or neck.

The Lungs, beside changing the blood so as to prepare it for the nutrition of the body, are the seat of another very important function of the animal economy — that of the production of animal heat. The union of the oxygen of the air with the carbon and hydrogen of the blood, forming carbonic acid and water, both of which pass out from the lungs by the breath, is a chemical operation which produces heat whenever the operation is performed. It is the same chemical operation that produces heat in the burning

of wood in a stove or fireplace, that takes place in the lungs for the production of heat. All the difference is, that the combustion or burning does not go on so rapidly in the lungs as in a stove; and a draught of air is just as necessary for the burning to go on in the lungs as in the stove. This is proved by the well established fact, that a person cannot live where a fire will not burn. Hence the propriety of letting a burning candle down into a well or deep hole, where carbonic acid is apt to settle (it being heavier than the air), before one descends. If the candle continues to burn, the person is safe in going down; but if the candle goes out, the person's lamp of life will go out there just as quick.

The food and the old worn-out particles of the system furnish the fuel to be burned in the lungs. In this burning operation in the lungs, Nature accomplishes two objects at the same time — kills two birds with one stone. The very impurities that she sends off from the lungs, to render the blood proper to be circulated through the system for its nourishment, she burns there by the draught of air drawn into the lungs in breathing. She acts as economically in this respect as the man who keeps up the fires of a steam sawmill by the sawdust and slabs.

This power of generating heat, that the lungs have, enables the body to exist in very cold situations, provided sufficient fuel, or blood, is supplied. This shows the necessity of eating more nutritive food in cold climates or in the winter, than in warm climates or in the summer. The inhabitants of northern regions, where they have almost constant winter, understand this, living almost entirely on oils and fat meat in order to supply sufficient fuel to keep up the heat

Such strong food would soon destroy them in a warm climate. It would be hard to keep up sufficient animal heat with vegetable food in those cold climates.

Any exercise that increases the circulation of the blood and hurries the breathing, increases the production of animal heat, in the same way that an increase of the draught of wind in a stove will increase its heat; but both, under such circumstances, require more fuel. It is on this principle, that one warms himself by active exercise.

When treating of the skin, we showed you how the body is prevented from getting too hot; we have now shown you how it is prevented from getting too cold. By means of these two functions of perspiration and respiration, the temperature of the human body is kept the same under all circumstances.

The necessity of breathing a pure air with sufficient oxygen to produce this change of the blood and to keep up the necessary combustion, appears evident at once. Our sitting, and eating, and above all, our sleeping rooms should be well ventilated, so that one coming into them from the open air, does not experience a closeness or oppression of the atmosphere. Our schoolhouses, and churches, and public conveyances should all be thoroughly ventilated. No practice will depress the nervous system sooner, than for one to be obliged to breathe the exhausted air of a public assembly-room tainted perhaps with the breaths of a hundred diseased lungs.

There is much more I would like to say on this subject, but a want of time will prevent me. If you will bear in mind the general principles I have laid down, they will guide you correctly in this matter.

The heart and lungs are subject to disease, as is every other structure of the human body, and I shall merely have time to glance at them.

The walls of the heart sometimes grow too thick, and act too powerfully. The serous membrane, surrounding the heart, sometimes pours out too much fluid, impeding the action of the heart. More commonly, the valves of the heart become partially changed into a bony substance, allowing the blood to flow back into the large vessels when the heart contracts. All diseases of the heart are very serious, keeping the person, so afflicted, in danger of instant death at any time.

The serous membrane surrounding the lungs, called the Pleura, is subject to inflammation producing pleurisy; a very common disease in this climate. When the lining membrane of the air tubes of the lungs or bronchia are inflamed, it is called Bronchitis. When the substance of the lungs themselves, the part that forms the air cells, is inflamed, it is called Pneumonia or Inflammation of the lungs. This inflammation is of two kinds — the common inflammation of the lungs without other complication, as in the lung fever of our climate, and that peculiar inflammation that exists in what is commonly called Consumption. The first kind of inflammation is produced by a stoppage of blood in the lungs—the blood becoming clotted or thickened there, changing the porous substance of the lungs into a more compact substance resembling very much the substance of the liver. In order to remove this, Nature goes to work and excites inflammation, and turns the hardened lung into matter which is raised and spit out in coughing. But in consumptive inflam-

mation of the lungs, the seeds of the disease exist there generally from birth, being transmitted from parent to child. Whenever favorable circumstances occur for inflammation to commence in these little seeds of consumption, called Tubercles, they commence turning into matter, the inflammation extending from one tubercle to another, eventually involving the whole lungs — the tubercles being scattered all through the lungs before the change or ulceration commences. These tubercles or seeds can be seen in a consumptive lung very plainly, resembling a millet seed. A person may live a long life with these seeds of consumption in his lungs, and finally die with some other disease. But if the ulceration once commences in these tubercles, and they begin to change into matter, it is almost certain to go on until the lungs are entirely destroyed.

The inference is that if a person has reason to believe that his lungs contain these tubercles or seeds of consumption (which can generally be ascertained by any intelligent physician), it stands him in hand to take those precautions necessary to prevent a development of the disease, to prevent ulceration commencing in these tubercles. This is best done by a proper and temperate way of living, by exercise in the open air, by an avoidance of exposure to sudden changes of temperature, and by a change of residence from a cold, variable climate to a warm and regular one. Place no reliance in the nostrums you see advertised for the cure of consumption; they are infamous lies. Believe not the quack who tells you he can cure the consumption, for he is either ignorant of the disease or a willful liar.

DIVISION OF THE BODY INTO TWO APARTMENTS.

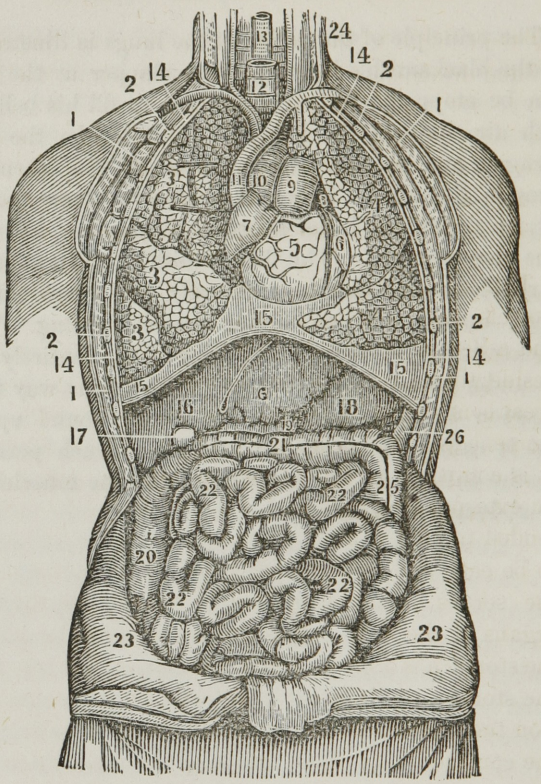
The trunk of the body is divided into two apartments by the Diaphragm (Midriff). In the upper apartment, called the Chest, are contained the lungs, and heart, and the Pleuræ which surround them. In the lower apartment, called the Abdomen, are contained the stomach, liver, intestines, kidneys, spleen, pancreas, and bladder.

The structure of the diaphragm is partly muscular and partly tendinous. When its muscular portion contracts, the diaphragm stretches across the body in a straight plain, enlarging the chest downwards; this occurs in inspiration, or drawing in the breath. When the diaphragm relaxes it assumes a convex shape above and a concave below, diminishing the cavity of the chest upward; this occurs in expiration, or forcing out the breath. Now the philosophy of breathing is this. In inspiration the ribs are raised by a set of muscles attached to them for this express purpose, thus enlarging the chest laterally; the diaphragm contracts, thus enlarging the chest downward, as before said; this enlargement of the cavity of the chest laterally and vertically produces a vacuum in the chest, and the air rushes in to fill it. It is the pressure of the atmosphere outside that forces it into the lungs as fast as the vacuum is produced there. The air, in like manner, will rush into any cavity whose size you enlarge suddenly.

Expiration, or the forcing of the air out of the lungs, is produced by the ribs being drawn down by means of muscles, and by the diaphragm being forced up by the muscles over the abdomen contracting and pressing the contents of the abdomen up against the diaphragm.

The principle of the action of the lungs is illustrated by the blacksmith's bellows if the clapper at the bottom be stopped. When he wishes to fill his bellows with air, he lets the lower board fall like the diaphragm, and the air rushes in to fill the vacuum, through the nose. When he wishes to force the air out, he draws the lower board or diaphragm, up, and thus forces it out. The blacksmith's bellows using no ribs to expand the lungs laterally, like a fashionable chest, makes the comparison more striking. The blacksmith's bellows does its breathing entirely by the under board, or diaphragm; in the same way that a person breathes, who has the breast bound up so that it cannot be expanded laterally. Such persons breathe entirely by the diaphragm and the muscles of the abdomen or belly.

FIG. 23.



Front view of the Internal organs of the body. 1, The divided muscles of the Breast. 2, The cut ends of the Ribs. 3, Right Lung. 4, Left Lung. 5, Right side of Heart. 6, Left side of Heart. 7, Right Auricle. 9, Large bloodvessel, carrying blood from left side of the Heart to the Lungs, lying in front and to the left of, 10, the Aorta, which carries arterial blood through the general system. 11, The large bloodvessels returning the blood from the upper part of the body to the Heart. 12, Cut end of Trachea (windpipe). 13, Esophagus (gullet). 14, Pleura (membrane covering the Lungs). 15, Diaphragm (midriff). 16, Liver. 17, Gall-bladder. 18, A part of the Stomach. 19, Duodenum (first bowel). 22, small bowels, (Jejunum and Ileum). 20, 21, 25, Colon (large bowel). 23, The Peritoneum and external muscles of the Abdomen.

LECTURE VIII.

THE ABDOMINAL ORGANS.

The contents of the Abdomen are the Stomach, Bowels, Liver, Spleen, Kidneys, Pancreas, Bladder, and a Serous membrane that covers all these organs; beside, there are numerous Lymphatic glands, and the great centres of the Sympathetic nervous system. The stomach is situated in the upper part of the abdomen. It is composed of three coats, as are also the bowels, an external or serous coat, called the Peritoneum, intended to hold it in its place, and to enable its motions to be easy and free from friction. This is the use of the serous membranes that surround all the vital organs of the body. The middle or muscular coat of the stomach is a layer of muscular fasciculi surrounding the stomach in different directions, by whose contraction the motions of the stomach are produced. It is the contraction of these muscular fasciculi, when they contract in the natural way, that forces the food, after it has become dissolved in the stomach, into the first bowel. But when these muscular fasciculi contract in an inverted or unnatural way, they force the contents of the stomach in another direction, that is, upward, producing vomiting. The inner coat of the stomach is a continuation of the mucous membrane or internal skin that lines the mouth and throat, the air tubes, and every other internal passage. In the stomach it is found in the ridges and folds to admit of expansion

as the stomach becomes filled. Opening through this mucous membrane are the mouths of numerous glands that secrete and pour out into the stomach a fluid called the Gastric juice—the object of which is to dissolve the food and convert it into a thin fluid called chyme. After the food has been received into the stomach, through the Esophagus, and its opening into the upper part of the stomach called the Cardiac orifice, and has become dissolved by this gastric juice and been converted into chyme, it is forced out of the stomach through the Pyloric orifice, by the contraction of the stomach into the first bowel called the Duodenum. Here the chyme becomes mixed with the secretions from the liver and the pancreas, being changed into chyle, and its nutritive portions become absorbed or taken up by a set of vessels that open into the bowels, called the Chyliferous vessels. These little vessels carry the chyle and empty it into a sack called the Receptaculum Chyli, where the chyle also becomes mixed with the old, worn-out portions of the lower part of the body that are taken up by the lymphatics and carried and emptied into this receptacle; from this, the chyle is carried up through the back part of the chest, by the thoracic duct and emptied into the right subclavian vein, which mixes it with the venous blood and carries it to the right side of the heart, whose contraction forces it through the lungs in order that it may be converted into perfect blood for the nourishment of the system.

The Duodenum or first portion of the small bowels, is called thus from its length, being about twelve fingers' breadth. The next portion of the small bowels is called the Jejunum, meaning empty, because it is most always found empty; it is much longer than the

duodenum. The last portion of the small bowels is called the Ileum, being the longest portion; this joins with the Cœcum, the first portion of the large bowels. The cœcum, which is very short, joins with the Colon or second portion of the large bowels. The Colon is much the largest of the large bowels. It makes a curve surrounding the small bowels and terminates in the Rectum, the last portion of the large bowels.

The bowels have three coats the same as the stomach. The middle or muscular coat is formed of two layers of muscular fasciculi; one layer running lengthwise of the bowels; another layer goes around the bowels. By the contractions of these two muscular layers of the bowels, the motions of the bowels are produced. Irritating substances taken into the bowels stimulate these muscular layers to contract more forcibly. This is the way cathartics affect the bowels: they stimulate these muscular layers to increased action.

THE GLANDULAR SYSTEM.

A Gland is a body of a peculiar globular structure, whose function is to separate some particular fluid from the blood. The Liver is a gland, whose function is to separate bile from the blood. When speaking of the skin I showed you the oil glands, whose function is to pour out a delicate oil on the skin and hair. In the mouth are glands that separate the juices of the mouth, called Saliva, from the blood. These are the Parotid, Sublingual, and Submaxillary. One of these, the parotid gland, situated above the angle of the jaw, is the seat of the disease called "mumps." The glands of the mouth are stimulated to increased action by substances taken into the mouth, either for

food or for mere excitement, as in the use of tobacco. It was undoubtedly intended that the salivary glands should furnish sufficient fluid to mix our food with during mastication or chewing, so that there should be no necessity of using drink while eating. We see the lower animals follow this rule; they do not drink while eating. It would undoubtedly conduce to our health if we should follow their example.

In salivation from the use of mercury, these glands become inordinately excited. Above the eye is a gland that separates the tears from the blood. It is called the Lachrymal gland. All through the bowels are little glands that separate fluids from the blood that are poured into the bowels. The kidneys are glands secreting urine. The secretion of the liver or the bile, as it is separated from the blood (which is abundantly sent through the liver for this purpose), is carried along little tubes which empty into larger ones until it is finally collected in the gall-bladder. The bile is carried from the gall-bladder by a little tube, called the Gall-duct, which empties it into the first portion of the small bowel.

The principal use of the bile is probably to act as a cathartic to stimulate the muscles of the bowels to contract, and thus carry off the indigestible portion of the food. It is Nature's cathartic, much better than any "Sovereign balm," or "Sovereign poplar," or "Sovereign butternut" pill. And our object should be, when the liver becomes torpid, and consequently the bowels become inactive, to restore the action of the liver, thus giving the bowels their natural purgative. When the liver is inactive the bile remains in the blood, and is deposited in every part of the system,

giving a yellow tinge to the different structures and secretions.

That the bile is intended for a natural purgative is proved by the way its duct empties into the bowels, forming a valve that prevents the bile being poured out when the first bowel is full; but as soon as the chyliferous vessels have taken up the nutritive portion of the contents of the bowel, and the bowel becomes partially empty, the valve opens and the bile is poured into the bowel and stimulates it to carry off the indigestible portion of the food. You see that there cannot be bile in the stomach under ordinary circum stances, because it is emptied not into the stomach, but into the first bowel. The reason that we vomit bile sometimes is, that by the inverted muscular contractions the bile is forced up into the stomach from the bowel, and the stomach then forces it out at the mouth.

Sometimes there are little, hard bodies formed in the gall-bladder, called Gall-stones, that get down in the duct going from the gall-bladder to the bowel, and stop it up; if it remains there and is unable to pass, it will finally cause the death of the individual.

THE PANCREAS.

The Pancreas is a glandular body lying behind the stomach; it secretes a fluid which is emptied into the duodenum by means of a duct. It performs some office in digestion.

THE SPLEEN.

There is another body in the abdomen, situated in the left side immediately under the ribs, called the Spleen; the precise use of which we do not fully

know, unless it be a reservoir for the blood before passing through the liver. It does not secrete any fluid, nor does it seem to change the blood that passes through it in any way. It becomes congested with blood from any cause that sends the blood from the surface and extremities to the internal organs, as for instance, in a chill of the ague. By being frequently congested in this disease, it eventually becomes permanently enlarged, forming what is called the "Ague Cake."

In reference to the hygiene of the organs contained in the abdomen; that is, in reference to the keeping those organs in a state of health, I would refer you to the remarks made in reference to the hygiene of the nervous system, inasmuch as they are applicable not only to the hygiene of the nervous system, but to the hygiene of the digestive system and to every other system of the body. In the first place, you want to select the proper kind of food. It should be of a light, unstimulating character, and bulky rather than concentrated. The major part of our food should be vegetable; in the summer time perhaps it would be better to be entirely vegetable. The proportion of meat diet should be in proportion to the coldness of the atmosphere. In high northern latitudes an entire animal diet seems necessary in order to afford sufficient fuel to keep up the heat of the body; but for temperate or torrid climates a vegetable diet is undoubtedly the best.

Perhaps there is not a healthier or stronger nation of people than the Irish. They may be said to be entirely vegetable eaters. And I think I can make this assertion with truth, that wherever you find, in our own country, a purely vegetable-eater, other

things being the same, you will find the healthiest and strongest individual.

The medical preceptor that I studied with, Dr. Mussey, of Cincinnati, is a vegetarian; he uses no animal food at all, and I challenge the State to produce a man of his age (near fourscore years, I believe) who is stronger, physically or mentally, than he. When I was with him, he had a boy about fourteen years old who never tasted of meat; he was a perfect specimen of health and physical development. Dr. Mussey has a large family, and sickness is a thing unknown in it. He is strictly temperate in every other respect, uses no tobacco or spirits in any form, and uses no drink but water and milk. He uses his vegetables in an unmixed, natural condition, altering them in no way but by cooking. His bread is made from unbolted flour.

The reason that I introduce this individual as an illustration, is, that I consider him as near a perfect example of propriety in living as we find now-a-days. He is deserving of no great credit for this. He merely lives as nature designed he should. He lives as men did in the first periods of the world, and he gets his own reward for it, as he goes along, in a constant enjoyment of good health. He does not lose an hour in a year from ill health; he is enabled to do twice as much, old as he is, as other physicians who live in an unnatural, modern manner.

Use then principally a vegetable diet. By vegetables, I mean grains, such as wheat, corn, rye, rice, buckwheat, and roots, such as potatoes, onions, beets, cabbages, and the like, and all kinds of healthful fruits. Let your grains be ground and not bolted, for your bread. The hulls of grain are just as necessary

for your digestion as the hulls of oats are for the digestion of a horse. Nature has mixed these things in exactly the right proportion for use, and we are interfering with her when we separate them and use only the most nutritive portions of them. The roots, as a general thing, require to be cooked. Ripe fruits are better to be eaten without being cooked.

The food should be well chewed and mixed with saliva; as little drink as possible should be used while eating. The salivary glands will afford fluid enough, unless we keep them at work too hard between meals, by tobacco or chewing gum, or by smoking. After the food is swallowed (which should not be in so great quantity as to produce uneasiness), we should rest, or, at least, not work very hard for an hour or so, in order that the vital energies may go to the stomach and supply it with sufficient power to digest the food. Very active labor, either of the body or mind, immediately after a meal, draws too much of the vital energies away from the stomach, and digestion does not go on. A gentleman fed two hounds and set one of them to running immediately after the meal; the other he let rest; at the end of two hours, he killed them both. The food in the stomach of the one that ran was in almost the same condition as when he swallowed it; while the food in the stomach of the hound that rested, was entirely dissolved and digested. An intelligent teamster always lets his team rest after eating; they will accomplish more work.

Want of time prevents me from dwelling on this subject as long as I would wish to. There are many common diseases of the digestive organs, such as dyspepsia, cardialgia, colic and the different varieties of what are called Bowel Complaints and Cholera, that I

would like to speak of, inasmuch as they are common diseases among us. But I find that if I should commence treating of the different diseased conditions of the body, it would require me to extend my lectures to two or three times the number that I had intended. If I have leisure, at some future time, I may give you a course of lectures on the human system, as affected by disease; and tell you the simplest methods of correcting those diseased conditions, and bringing them back to a healthy condition.

There is one other set of organs that I have not yet spoken of as a system, and which are considered of some importance to us all; these are the Vocal organs. These form the apparatus or instrument with which we talk, and sing, and make all the other sounds of the voice. The instrument for the production of the voice has been compared to almost every musical instrument—to the clarionet, flute, violin and drum. In order to be a little different from any of the rest, I will compare it to a bagpipe, the bellows of which, are the lungs; the leather tube, the trachea or windpipe, and the wooden finger-pipe, the larynx. The sounds of the voice are produced by the forcing of the air through the windpipe and larynx by the lungs. In the upper part of the larynx is a little box made of cartilage or gristle; you can feel it with your fingers; it is commonly called Adam's Apple; physicians call it the Larynx. This little box is composed of five gristles or cartilages. The Thyroid is the largest one, called thus from its supposed resemblance to a shield; it is the one you feel in the prominence of your neck. The Cricoid is immediately below the Thyroid, called thus, from its supposed resemblance to a ring. The Cricoid joins the Thyroid and the upper part of the

windpipe, by means of ligaments. To the Cricoid are attached two little triangular-shaped cartilages, called the Arytenoid Cartilages; these are movable. Shutting over the top of the larynx like a clapper in a pump, is a cartilage, called the Epiglottis. When we swallow our food or drink, it presses down this Epiglottis, so that the food is not able to go down into the windpipe, but passes over it and goes down the Esophagus or gullet into the stomach; for you are aware that the windpipe lies in front of the Esophagus, and our food passes over the upper opening of the windpipe and goes down behind it. In the middle of this gristly box are stretched across it, two little cords, called the Cordæ Vocales, covered with the mucous membrane that lines the air passages; these little cords are fastened close together to the front part of the inside of the Thyroid cartilage; passing across the box, one is fastened to each of the little Arytenoid cartilages, forming a narrow slit through which the air passes in breathing; this little slit is called the Glottis. Now to these Arytenoid cartilages are attached muscles, which, by their contractions or relaxations tighten or loosen these little vocal cords, or separate them from one another or bring them closer together. Above these two little cords, is an enlargement of the box on each side, called the Ventricles; just above the ventricles, another slit is formed by two folds of the mucous membrane being stretched across. Now by this simple little instrument, all the modulations of the voice are produced. By the vibrations of these little cords and the variations produced by these little cords being stretched tighter or looser, or by their being separated from each other, or by being brought closer together the sounds of the voice are produced. The

farther these cords are separated from each other, the coarser the voice. This is the reason the male voice is coarser than the female voice. In man this cartilaginous box is larger than in woman, of which any of you can be convinced, by comparing the prominence in the front part of a man's neck with that of a female's. The different noises made by different animals are all produced by some peculiarity in the structure of this little music box, the larynx. Many of the lower animals, particularly some of the singing-birds, have a much better music box than man; but they lack the brain to use it in the thousand different combinations that man does. This then is the instrument of the voice. To be sure, the voice is varied in its different combinations of sounds by the palate, the tongue and the nose. But the sound itself, and the different tones from high to low, and from low to high, are produced by the air passing through and causing these little vocal cords or fiddle-strings of the neck to vibrate; and if you destroy these little cords, your talking and singing is at an end. I am well aware that the tongue has monopolized all the honor and the dishonor attached to the voice, but it is unjust; the tongue has but very little to do with the production of the voice; a person can learn to talk almost as well without the tongue as with it, so that the very common command to "hold your tongue" does not amount to much after all, toward stopping your clack.

The scientific and proper way of requesting a person to stop talking, would be—please relax the vocal cords of your larynx, so that they may not vibrate by the current of air passing between them.

FIG. 24.

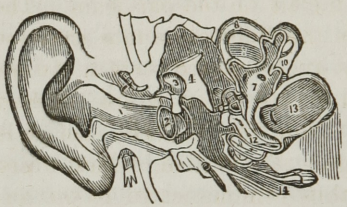


Fig. 24, A view of the structure of the Ear. The large wing is the external cartilage (penna). 1, The passage to the inner Ear. 2, The Tympanum (ear-drum). 3, 4, 5, A chain of delicate bones connected with the ear-drum. 7, 8, 10, 12, The innermost structure of the Ear, on which is spread out the Auditory nerve. 13, The Auditory (hearing) nerve going to the brain. 14, The Eustachian tube, connecting the inner ear with the back part of the mouth.

FIG. 25.

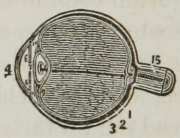


Fig. 25, The Eye, divided lengthwise. 1, 2, 3, The Sclerotica, Choroid membrane, and Retina. 4, The Cornea. 6, The Iris. 7, The opening in the Iris or Pupil, behind which is the Crystalline Lens. The part of the Eye in front of the Crystalline Lens, is filled with Aqueous humor. The part back of the Crystalline Lens is filled with the Vitreous humor. 15, The Optic (seeing) nerve, going to the brain.

THE EAR.

The ear is constructed to make impressions on the Auditory nerve, by the vibrations of the air. All sound is produced by the vibration of air. The outer or cartilaginous portion is constructed so as to concentrate the vibrations of the air on the ear-drum. The ear-drum communicates the impression to a chain of delicate little bones that are connected, so that the last one presses on a fluid contained in a snail-shaped bone, called Cochlea. Now the auditory nerve is spread out on the lining of this cochlea, so that every vibration of the air is thus communicated to the auditory nerve, and the auditory nerve conveys the impression to the brain; this is the philosophy of hearing. The chamber inside the ear-drum communicates with the pharynx or back part of the mouth by a tube called the Eustachian tube. This tube acts like the hole in the side of a drum to let air in the chamber.

THE EYE.

The eye is composed of three coats or layers; the outer coat is composed of the Sclerotica and Cornea; the middle of the Choroid coat, the Iris and the Ciliary processes; the inner coat, of the Retina and Zonula Ciliaris. The outer coat is hard and resisting, to give shape to the eyeball. The front part, the Cornea, is transparent, and shaped like a watch-crystal; it is inserted into the Sclerotica in precisely the same manner that a watch-crystal is inserted in its rim. The next coat is the Choroid and Iris. The Choroid is a thin colored membrane, the outer side of a chocolate color; the inside of a deep black. The design of this dark color is to absorb the surplus rays of light, else the eye would be dazzled and confused by a strong

light. In Albinoes, this color is wanting, which renders them incapable of seeing except in a faint light. The Iris—meaning rainbow, is so called from its variety of colors in different individuals; it serves as a curtain to divide the front, from the back chamber of the eye. It has a round hole in the center, called the pupil, through which the rays of light pass; through which we see. The Iris is composed of two sets of muscular fibres; one set radiating from the centre to the circumference, by whose contraction the pupil is dilated, and another set of circular fibres by whose contraction the pupil is contracted. A strong light excites the circular fibres to contract, so that the pupil does not admit so much light. A weak light excites the radiating fibres to contract, so that more light may pass through the pupil. The Iris has also another thin layer behind the muscular layer, of a purple color, and called the Uvea. The third tunic of the eye is called the Retina; it is merely an expansion of the optic nerve, which enters into the ball of the eye from behind, and is spread over about three quarters of the inner and back part of the eye. The Retina takes cognizance of light and conveys the impression of the optic nerve to the brain. Behind the Iris, is a transparent, crystalline body, called the Lens, the use of which, is to concentrate the rays of light so as to form a picture of the object or objects viewed, on the retina. An impression of this picture is conveyed to the brain by the optic nerve. The anterior and posterior chambers of the eye are filled with a transparent fluid, called the Aqueous humor. Behind the lens, filling the main part of the cavity of the eyeball, is the vitreous humor. The eye is supplied with nerves and blood vessels as other parts of the body.

QUESTIONS

TO

LECTURES ON ANATOMY, PHYSIOLOGY, AND HYGIENE.

LECTURE I.

WHAT is necessary for a right understanding of these Lectures? Is it necessary to tell of the utility of this subject? What is the body? Do we understand most all its Laws? Will we eventually be able to explain all its Laws?.....11

What is said about the engineer? Why is the study of physiology of more importance than any other study? Why was it of less importance in earlier times? Is sickness necessary?.....12

Are wild animals sick? Why are domestic animals sick? Are there many persons in enlightened society that are perfectly healthy? Should we be healthy in old age? What is the word Physiology derived from?.....13

What was its province in the early history of the natural sciences? What is its province now? What is an organized body? Give examples of organized and inorganized bodies.....14

Give examples of plants nearly allied to inorganized bodies. Give examples of plants nearly allied to the animal kingdom. Of animals resembling plants. What animal products resemble seeds? 15

What is said about the scale of life? What stands at the top? What are mammalia? In what does man differ from the other mammalia? What comparisons are made between men and monkeys, and in what do they differ?.....16

In studying physiology, what shall we find in reference to each organ? Give examples of herbivorous and carnivorous animals. What does this knowledge enable a skillful anatomist to do? What did Cuvier do?.....17

What comparisons are made between men and penguins? What have some philosophers argued? Prove that man was designed to walk erect.....18

Compare the brain of man with other animals. In what is man inferior to other animals? In what is man superior to other animals? What does this superiority enable him to do? What would be man's condition without this superiority?.....19

What of man's articulating powers? What of the shape of his head? Of his vision? Of his jaws and teeth? What were they designed for, and for what kind of food?.....20

Races of Men. What characteristics distinguish the races? What are the causes of these characteristics? Name the different races. Describe the Caucasian race. Why is it called thus? What is said of the present inhabitants of the Caucasian mountains?.....21

In what does this race hold the sway? What is indicated by the present mixing of races? What are the peculiarities of the Caucasian head, eyes, nose, complexion? Give a sample of the Caucasian race. Describe the Mongolian race, and give its history, and an account of some of the nations of this race. What of castes?...22

What does the American race consist of? What are its marks and habits? What civilized nations has this race afforded? What characterizes the Ethiopian race? What is its position in relation to other races? What is the fifth division of the human family? Give an account of it. What is said about temperaments?.....23

In describing man as an individual, what division is necessary? How are these parts connected? What is the object of these lectures? Illustrate by the engineer and steamboat? Do we know ourselves as we should?.....24

How is it with the beaver? Is our power of acquiring knowledge limited? What part of man shall we begin at? What ideas should we get of men and women, judging from their external appearance?.....25

How is the body divided by physiologists? What is the appearance of the body, viewing it as a whole?.....26

What is the body of man furrowed over with? How does he differ from woman in this respect? In what does the female differ from the male?.....27

Does occupation make a difference in this respect?.....28

LECTURE II.

Name the coats of the skin. Describe the cuticle, and tell its uses. What peculiar property has it on being used? Give examples.....29

Describe the rete-mucosum. What are Albinoes? Tell all that is said about them? What is said about a correspondence between the color of the hair, eyes, and skin?.....30

What description of persons seem to retain their youthful appearance longer than any other? What of the third coat of the skin? What is it composed of?.....31

What diseases are peculiar to this coat? What two important functions of the body are performed by the skin? Describe the process and use of perspiration.....32

Of what other use is perspiration, beside maintaining an equal temperature? How can the skin be kept in a condition to perform its functions properly?.....35

Is there a danger of running into extremes, and of washing the skin too much? What must we bear in mind in reference to the functions of the skin? Tell us what amount of washing and bathing are necessary? How can the body be kept clean in the absence of a regular bath?.....36

What is the consequence of permitting the skin to remain uncleansed? What is one doing with an uncleansed skin continually? Illustrate the effects of this on the cow and hog.....37

Why is it worse for this filth to be taken in by the skin than by the stomach? In what way do physicians take advantage of this power of absorption? How is this power of absorption increased? What is said of epidemic diseases having been warded off by preventing the absorption of the skin? What is the character of diseases of the skin?.....38

What are they frequently caused by? And how cured? What is the danger of these diseases? What law of disease is spoken of? Give an illustration.....39

What should be done in diseases of the skin? Is the skin more delicate in some parts of the body than others? What is the cause of blushing?.....40

What sense is the skin the seat of? What is said of a sixth sense? How do insects feel?.....41

Describe the growth and structure of the hair. What is said of rules for the treatment of the hair?.....42

What is the cause of grayness? What is said of grayness being produced suddenly?.....43

How, and to what extent can the growth of the hair be promoted by artificial applications? If the capsule that produces the hair be destroyed, will the hair grow? How is the hair moved? What is said about the nails?.....44

How do they grow, and what is their use? What are hang nails? Their treatment? What is said of the external covering of animals? Could man exist in a northern latitude without covering?.....45

Give examples of the adaptation of the external coverings of animals to the place they are intended to live. What are animals without a coating of hair, furnished with? Give examples of the coverings of fishes; of the nautilus of insects?.....46

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Fig. E, Front view of the Skeleton.

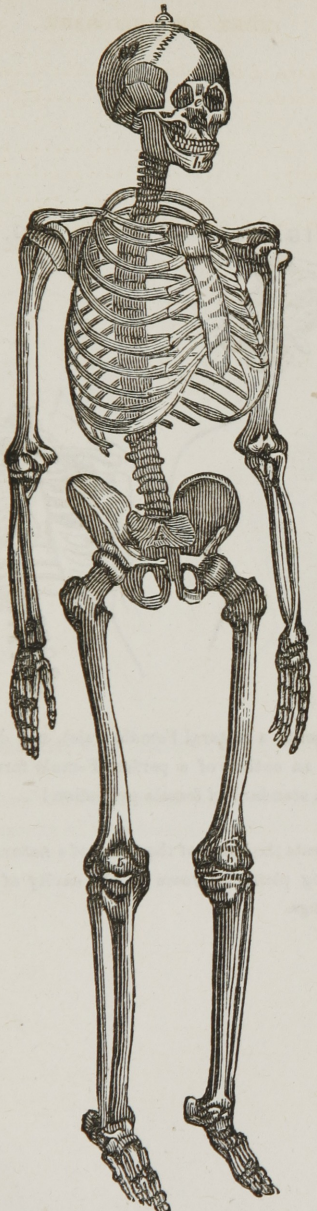

FIG. 26. FIG. 27

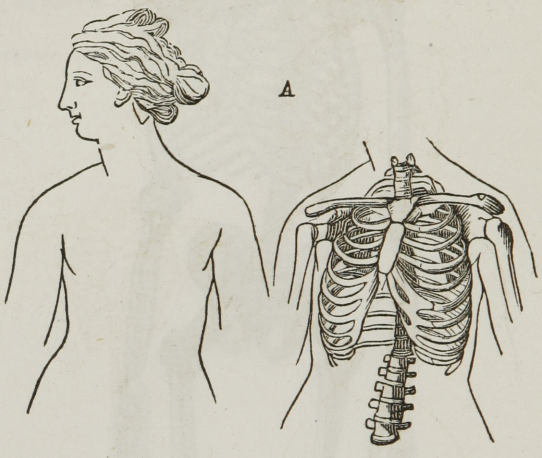

Fig 26, represents a natural Female waist, not distorted by tight-lacing. This is an outline of a perfect Female form. How different from the modern standard of female perfection!

Fig. 27, represents the bones of the Chest of a natural and well-formed Female; showing plenty of room in the cavity of the Chest for the action of the Lungs.

FIG. 28. FIG. 29.

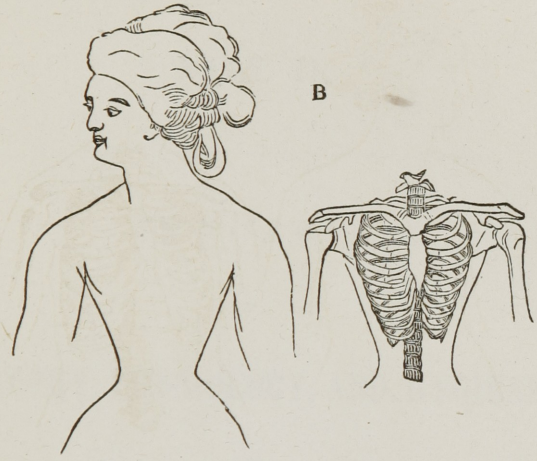

Fig. 28, A Fashionable waist, distorted by tight-lacing

Fig. 29, The bones of a Fashionable waist, showing how tight-lacing diminishes the capacity of the Chest, and interferes with respiration.

PART II.

SYNOPSIS

OF

ANATOMY, PHYSIOLOGY, AND HYGIENE;

AND

DISEASE, ITS CAUSE, PREVENTION AND CURE.

PREFACE.

A WORD to the reader, before the perusal of this book. In order to have a practical knowledge of this subject, it is necessary that you study thoroughly the following pages, from the first to the last, and that you have studied already my Lectures on Anatomy, Physiology, and Hygiene. In this way, you can acquire a thorough knowledge of the human system in a healthy and in a diseased condition; and how to preserve it in the former, or bring it safely out of the latter. It is not sufficient that you turn to some particular disease and read of it, in order to understand the disease in all its relations with the body; you should study thoroughly the whole book, and then you will learn the general principles that govern the entire system, and be much better prepared to understand any particular disease. This book does not pretend to take the place of the intelligent physician in every case. The intelligent physician is necessary, in every community, to advise with in complicated cases; cases that cannot be understood by limited experience. To an intelligent physician, the circulation of this book will be an advantage, enabling the community in which he practices, to appreciate his acquirements. To the ignorant pretender—the charlatan alone—will a dissemination of this kind of knowledge be a disadvantage. There are many simple diseases and simple diseased conditions of the body that can be understood and treated by those who are not physicians, as well as by physicians themselves. In fact, these simple diseased conditions are the commencement of a great majority of more serious diseases, and if attended to on

the start, would generally ward them off entirely. To enable the reader to prevent disease ; when it is approaching to check it at the commencement—and to treat more serious diseases where medical aid cannot be obtained, is the object of this book.

Among the remedial means recommended, are some whose great power render it necessary that they be used with caution. Among these, are Blood-letting and the Mercurial preparations. Although invaluable in many diseased conditions of the body, if pushed too far they are capable of doing harm. It is thus with almost every valuable agent; its power of doing good, when properly used, is in proportion to its power of doing harm, when improperly used. Where powerfully depleting remedies are recommended, particularly blood-letting, a strong plethoric habit and a violence of diseased action is presupposed. When this is not the case, milder means should be used. General blood-letting will seldom be found absolutely necessary, if simpler means for reducing the system be properly used. As a general rule, use the mildest means possible, to correct diseased action. Never reduce the system more than is absolutely necessary, so that the period of convalescence may be as short as possible. This subject also recommends itself to the general student, as a study of Science and Art, without reference to its practical utility. No other branch of human knowledge affords so vast a field for investigation as this ; and, although much is known of it already, sufficient remains unknown to stimulate the ardent searcher after discovery.

J. L. A.

January, 1856.

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AND TO

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LECTURE I.

INTRODUCTION.

It is unnecessary to dwell on the vast importance of the subject before us, and the many advantages a proper understanding of it would confer; suffice it to say, that just in proportion as health is valuable—just in proportion as a long and happy life is desirable—in that proportion is a knowledge of the laws of life, of health, and of the healing art valuable. We do not expect, in these lectures, to make every hearer a skillful physician; this requires the patient study of years and not of books alone; but of Nature, as she exhibits herself under every possible circumstance. A well qualified physician will always be necessary in the most intelligent community; to advise with in the most extreme cases, where the disease cannot be comprehended by those whose experience is limited, and where the ordinary means of treatment are insufficient. But I do expect to set forth the laws of Life and Health in such a manner that all may comprehend them; and by living according to them, prevent much, if not all the bodily suffering they would otherwise be subject to; for it may be set down as a fact, that nine-tenths of our sickness is owing to a violation of the laws of our system. I expect to set forth the simple, common sense principles of the healing art (which at the

beginning of almost every disease can be applied by the unprofessional, as well as by the professional, and which, in a majority of cases, if applied at first, will nip disease in the bud), so that each person can understand and apply them.

It is the inability to apply the proper remedies at first, that makes so many serious cases of sickness. When a fire breaks out in a building, a child with a bucketful of water, can put it out; but if the fire gets fiercely agoing, it baffles the power of the most skillful men. And if the child, ignorant of what course to take, throws a combustible liquid, such as turpentine, on the fire, in the hopes of quenching it, he makes the matter tenfold worse. When a person gets sick, he or his friend will do something for him; no difference how injurious their treatment may be, they must do something, until the case becomes alarming, and then they send for a physician; whereas, if the case had not been made worse by improper treatment, it would not have needed a physician. Now, my object is to enable every one to throw on the bucket of water on the start, instead of the turpentine, so as to quench the flame before the whole structure is involved. Perhaps there may be some physicians, actuated by mercenary, rather than philanthropic motives, who will censure me for thus removing the veil from medical science, so that all can see and understand. But the consciousness of doing good to thousands, will more than compensate me for bearing the ungrounded ill-will of the few. These lectures, instead of injuring the intelligent physician, will be an advantage to him; for by disseminating the first principles of medicine through the community in which he practices, it will enable his patrons to better distinguish

him from the mere empiric, who, by operating on the people's ignorance of the healing art, not unfrequently is better patronized than the intelligent physician.

I trust that the progressive enlightenment of the age will ere-long do away with that mystery which has so long kept this most valuable knowledge from the popular mind. What has been not inappropriately called "the jugglery of medicine," must eventually be done away with. The time will come when medicines will not be a whit more valuable, nor diseases or parts of the body more singular, for being dubbed with Latin names. All this mummery and mystery will give place to good, solid common sense. The science of Physiology and Materia Medica will be taught in our common schools, and will be considered essential studies. When this is done, we shall not see so much contemptible quackery and humbuggery as now exist in the practice of medicine. We shall not see ignorant charlatans grow rich from their impudence alone. We shall not see the commonest medicines (disguised under the senseless and ridiculous names that we see paraded in the newspapers,) swallowed down by the million, from the mere recommendation of the lies advertised in their circulars. In a word, we shall not see the people taking anything and everything they hear recommended for their ailments, without knowing the nature or even the names of the ingredients of these compounds.

I started out in life with the resolution of devoting what feeble powers I was possessed of to the cause of humanity, and I think I can best serve that end at present, and particularly through this new country, where the seeds of disease are so thickly scattered, by disseminating, to the extent of my small abilities, the

principles of health and disease, and of the means of preserving the former and of curing the latter Thus far my life has been principally devoted to my profession. When a student, I devoted myself to it with the ardor of an enthusiast. I not only informed myself from books and lectures, but from the sick-bed of the hospital, where disease is depicted in every imaginable shape, and where alone the medical student can properly qualify himself. The last few years have been devoted to the practical application of the principles of medicine to the removal of disease, rendering me now, I imagine, capable of imparting instruction on this subject, both from study and from practical experience. Henceforth, therefore, I shall endeavor to use my professional acquirements, not wholly as a means of enriching myself, but by teaching others, to add my mite to the welfare of the whole. "Let your light shine before men," is a maxim applicable to the physician, if to any one; because he holds in his hands the keys of life and death; and how culpable must he be, if he withholds this light of knowledge from his fellows! Every physician ought to consider himself the medical teacher, as well as adviser, of the community in which he lives. I admit, if every well qualified physician would thus consent to make himself useful, fewer physicians would be necessary; but what were necessary would be of a higher order and the people at large would be greatly the gainers.

I shall first give an outline of the anatomy and physiology of the human body; that is, give a brief description of its different parts and the duties those parts perform in the animal economy, in a healthy condition; and the way of keeping those parts in a

healthy condition. Then I shall consider the body in its unhealthy condition; the causes and effects of this condition, and the best means of changing this to a healthy condition. Next, I shall treat of the diseases of each organ separately, and their treatment. Materia Medica, or a description of the most valuable medicines used at the present day, with their properties and doses, will form the subject of the last lecture.

THE BONES.

The framework of the body is composed of the bones and the ligaments.

Bone is composed of two parts intimately mixed together; an earthy part and a gelatinous part. If you burn a bone, the gelatinous part will be removed, and you will have the earthy or limy part remaining; being shaped precisely as it was before, but whiter and much more brittle. If you let a bone lie sometime in muriatic acid, the limy portion will be eaten out by the acid, and you will have the animal or gelatinous portion remaining, having the same shape as the bone, but so limber that you can tie it in a knot like a string.

Now the mere separation of the bone into its two parts will show you its admirable composition to meet the objects for which it was designed. The limy part is to give it firmness, to prevent its bending. Where this limy part does not exist in sufficient quantity, the limbs are apt to become crooked, as in rickets, and more particularly in a disease called Mollities Ossium or softening of the bones. The thigh-bones of Madame Supiot were so flexible, from a deficiency of lime, that she could lay her feet on each side of her head; her other bones were equally flexible. At her death,

she was two feet two inches shorter than before she was afflicted with this disease.

The animal or gelatinous portion of the bone is as important in its structure as the limy or earthy portion; it serves to make the bone tough and difficult to be broken. Where there is not a sufficient quantity of animal matter in the bone, it is brittle, liable to be broken by the slightest jar. The contractions of the muscles alone have been known to fracture the bones. This state of the bones constitutes the disease called Fragilitas Ossium or brittleness of the bones. Old persons are most subject to it. It often is produced by the scurvy. During Lord Anson's voyage around the globe, his seamen were so afflicted with brittleness of the bones from the effects of scurvy, that all whose bones had been broken, however well they might have been united, had them to come apart again.

The bones, in a healthy state, have but little feeling, but when diseased, they become exceedingly painful, more so than the flesh when it is diseased, because the enlarged bloodvessels press the nerve against the sides of the bone; but when the flesh is diseased it yields from the pressure of the nerve.

The bones are subject to a disease called Caries, which acts on the bones as an eating sore does on the flesh. It is caries that causes the teeth to decay. Exostosis is an enlargement of the bones. I have seen cases of exostosis in the Commercial Hospital, Cincinnati, where the bones were twice their natural size. The bone sometimes changes into a fleshy substance. Necrosis, or death of the bone, corresponds to mortification in the flesh. Spina Ventosa, is where matter forms in the interior of a bone and afterward makes its way outward beneath the skin.

INDIVIDUAL BONES.

Bones of the Head. The bones of the skull are separated from each other at birth, so that in passing into the world, they can lap over each other and thus occupy less space. They are flat; concave internally, and convex externally. They are formed of two plates, between which is an elastic, spongy substance called the Diploe. This diploe is elastic, and serves as a protection to the brain from blows. And here I will remark that all bones are endowed with this elasticity to prevent the constant jarring that would otherwise take place. If our bones were as inelastic as lead, the jumping from a fence would produce such a concussion or shock of the brain, that we should instantly die.

We see illustrated here, as in every other part of the human body, and in fact, in every part of the animal and vegetable kingdoms, the infinite wisdom of an all-wise Creator. The most insignificant part of the most insignificant insect is eloquent of the wisdom of God. Everything in nature is perfectly adapted to the purpose for which it was designed. No improvement in any organized thing, can be suggested by the acutest human mind.

The two plates of the skull are in some places separated from each other, forming cells; as is the case behind the eyebrows, forming what are called the Frontal Sinuses. These frontal sinuses communicate with the nose and discharge matter into it not unfrequently, when a person has a bad cold. The bones of the skull, during childhood, gradually unite, until they become as one bone, inclosing the brain in a firm case, best adapted, by its spherical form, to counteract the effects of blows. Wherever you strike the skull, you

strike an arch whose columns go in every direction—and an arch is the most resisting of all structures.

Through the skull are holes, in different parts, for the passage of nerves and bloodvessels. At the base of the skull is a large hole, through which passes the spinal marrow—the largest nerve of the body—down through the middle of the back-bone.

The Upper jaw-bone and the bones of the nose are joined to the skull. The lower jaw is articulated with it by ligaments. A great part of the nose is filled with thin plates of bone, on the surface of which is spread out the Olfactory or smelling nerve. From this arrangement we see that the odors drawn in at the nose, have a much larger extent of nerve to act upon than if the nerve was expanded only on the sides of the nose. In the upper jaw-bone are two cavities—one on each side—opening into the sides of the nose, which are sometimes the seat of a very painful disease—the inflammation of its lining membrane. When matter collects in these cavities and does not get exit, a tooth has to be drawn and a hole bored from the socket of the tooth into the cavity of the jaw to let the matter out. There is another small hole opening into the nose on each side; it leads from the nose, through a small tube, called the Ductus ad Nasum, up into the socket of the eye. Through this tube the tears pass from the eye into the nose. When this tube is stopped up the tears run down over the cheek, producing a constant weeping. This difficulty may be remedied by enlarging it with bougies or by inserting a small silver tube in the duct.

The Lower jaw is shaped like a horse-shoe, bent up at the heel. In infancy it is bent but very little at the back part, called the Angle of the jaw; as the teeth

come in it becomes more bent; as the teeth fall out it becomes more straight again, as in infancy; thus the child's lower jaw and the aged person's have the same shape. This provision is to enable the jaws to come together at all ages. When this change takes place in persons with long noses, they are apt to be provided with a pair of pinchers, the nose and chin making the forks thereof.

The Teeth are composed of ordinary bone internally, and of a hard enamel externally. When this enamel is destroyed, which is done by hot drinks, acids, and biting hard substances, the internal structure quickly decays, as all bones do when long exposed to the air; hence the necessity of preserving carefully the enamel of the teeth by carefully avoiding the destructive influences spoken of above. Each tooth is provided with a nerve, an artery, and a vein, which enter it at the point of the root. When the nerve of the tooth becomes exposed, or the inner structure of the tooth becomes diseased, it is subject to the painful affection known to almost every one—the toothache. The reason why the toothache is so painful is that the bloodvessels become enlarged and press the nerve against the side of the tooth, there being no chance for the nerve to yield as there is in a fleshy part.

Next we come to the Spine or back-bone.

The spine is a column of twenty-four bones, one placed above another. Through each of these bones, vertically, passes a large hole which, when the bones are together, forms a continuous tube from the large hole at the bottom of the skull, where the uppermost bone is attached, to the lowest extremity of the sacrum—the bone on which the spine rests. Through this Spinal Canal, as it is called, passes the Spinal Cord

or Spinal Marrow — the largest nerve of the body, or rather all the nerves of the body bound up in one cord. Between each of the bones of the spine, on each side, is a much smaller hole, through which comes out a nerve from the spinal cord to supply the parts nearest it with nervous influence. There are twenty-five pairs of these nerves coming out from as many pairs of holes between the spinal bones. The upper and lower bone, each, forms half of the hole for the exit of the nerve: five more pairs of these holes for the exit of nerves coming from the sacrum.

The spinal bones or vertebræ have little prominences of bone protruding from each side and from the back part; to these are attached muscles for bending the spine in different directions, and for moving other parts of the body. Between each of the bones is a cartilaginous or gristly substance to make the spinal column more elastic, preventing concussions or jarrings of the brain, and to afford easier motion between the bones of the spine.

The bones of the different parts of the spine are a little different in their shape. Those of the neck (the Cervical vertebræ) are flat, and shaped so as to afford great rotary motion, enabling us to look in all directions without turning our body. The cervical vertebræ are seven in number. Below these bones are the Dorsal vertebræ, behind the breast; they are twelve in number. They admit of but little motion, because much motion of the breast would interfere with the action of the heart and lungs. To the sides of the dorsal vertebræ are attached the heads of the twelve ribs. The other extremeties of the ribs are attached to the sternum or breast-bone.

The five lower bones of the spine (the Lumbar vertebræ) are larger and their articulating surfaces more convex, so as to allow of much motion backward and forward, and sidewise. The spinal column or backbone rests on the pelvis or bones of the hip.

The bones of the Pelvis are large and strong for the attachment of the muscles that move the legs. They constitute the foundation to which the rest of the frame is attached. The pelvis is much larger and broader in the female than in the male, which makes her hips appear so wide. This female peculiarity is made more prominent in our times by the superabundance of clothing used about the lower part of the body. The pelvis sits on the heads of the thigh-bones, which are round like balls, and fit into corresponding round sockets in the pelvis. They are held there by a strong ligament which covers the whole joint, and by a round ligament that goes from the head of the thigh-bone into the socket. The pelvis has a shape something like a basin, from which it derives its name.

In the cavity of the pelvis are the lower intestines, the urinary organs, and the female organs of generation. The cavity is much larger in the female than in the male, to allow the passage of the child. This wideness of the hips and largeness of the cavity of the pelvis is a very important point in female perfection. Where the hips are narrow and the cavity consequently small, it is with difficulty children are brought forth. Sometimes the cavity is so small that the child cannot possibly pass through; then the child has to be cut to pieces and taken away piecemeal; or the mother has to be cut open, and the child taken out through the abdomen or belly.

Extending an inch and a half or two inches below

the lowest point of the sacrum, is a small tapering bone, with two or three divisions, called the Coccyx. This might well be named the tail-bone of man; and especially by those philosophers who contend that man wore originally a bona fide tail. This Coccyx turns inward and is sometimes broken in parturition (child-bearing), especially in those who have no children until a late period of life.

The thigh-bone (Femur) is large and strong; this is necessary, because the weight of the whole body rests on these bones. Here, I would remark, that bones are divided into flat, round, and long bones. Round bones are those thick, hard bones, comprising the wrist and back part of the foot. Long bones are those forming the arms, legs, fingers and toes. They are cylindrical, larger at the ends than in the middle, and hollow within the shaft. The ends are large and solid, to articulate with other bones. The shaft is hollow because it is much stronger than if the same quantity of bone of which it is composed, were in the form of a solid shaft. The hollows of long bones are filled with a very nutritious substance—the marrow—which supports the body, by being absorbed and taken up into the blood, when the body is deprived of its natural food. The heads of the thigh-bones, where they articulate or join with the pelvis, are round like balls, and fit nicely into sockets, where they are held by a large, round ligament going from the upper part of the ball to the upper part of the socket, and by a capsular ligament, which surrounds the ball, and is fastened to the edge of the socket, inclosing the head of the thigh-bone in a shut sack. To the thigh-bones are attached large muscles, fastened at the other end to the bones of the pelvis and

spine. These muscles move the thigh in different directions. Another set of muscles commence at the thigh-bone and are inserted into the leg, moving that. The lower end of the thigh-bone is articulated with the upper end of the tibia or leg bone; before this joint, between the extremities of the two bones, is the flat, short bone, called the Patella or knee-pan, designed to protect the joint, and assist the motion of the leg; it is attached below, by means of a strong ligament to the tibia or leg bone; and above, to the muscles that form the fleshy part of the fore-part of the thigh, designed by their contraction to throw the leg forward. Beside the tibia or large bone of the leg there is another smaller one of the same length, lying on the outside of the tibia, to give better support to the muscles of the leg. This bone is called the Fibula. These bones, the tibia and fibula, are articulated with the bones of the foot.

BONES OF THE FOOT.

The back part of the foot is composed of several thick, short bones, closely connected together, admitting of but little motion, but giving great strength to that part of the foot on which the weight of the body generally rests. Extending before these, are the bones of the instep and toes. The first row of five bones, is called the Metatarsal bones; they are very strong, and have but little motion. The next three rows or phalanges decrease in size and strength till the last row. The different joints of the bones of the foot are bound together by ligaments. The bones of the foot are put together so as to form an arch, on which the weight of the body rests.

The arm has one large bone, called the Humerus.

The fore-arm has two bones; the Ulna and Radius. The ulna is attached firmly to the large bone of the arm, while the radius is attached at the lower end to the bones of the wrist, and so connected with the ulna as to revolve over it, producing what is called Pronation and Supination of the hand.

The bones of the wrist are of a similar character as those of the back part of the foot, and the bones of the fingers are of the same description as those of the toes, with the exception of their greater length, and of their admitting of more motion.

THE RIBS.

The ribs are twelve in number: seven are what are called true ribs; that is, they are fastened at both ends; one end by a joint to the back-bone; the other, by a gristle or cartilage to the breast-bone or Sternum. The other five false ribs are only fastened at one end to the back-bone, the other end being loose. The ribs are constructed so as to expand the chest laterally, much more than vertically; that is, sidewise more than up and down. Hence the impropriety of girding the bosom tightly; it prevents the due expansion of the lungs, and consequently the due inhalation of air. There are thousands in our country that are opposed to capital punishment who are hanging themselves daily; the only difference being, that strangulation is effected a little higher up in the one case than in the other.

The shoulder-blade or Scapula, is situated on the upper and backside of the chest, being held in its place by muscles, ligaments and the collar-bone (Clavicle), which is fastened at one end to the shoulder-blade, and at the other end to the breast-bone (ster-

num). The Os Hyoides is a small bone of the shape of a letter *v;* it resembles the wish-bone of a chicken as near as anything I can compare it to. It is situated in the throat, and serves to protect the vocal organs, and to assist them in making sounds.

The bones of the ear are of the most curious workmanship. There is a large external channel which goes into the internal organs of the ear. Then there is a chain of bones connected with the tympanum or ear-drum, which goes to the innermost bone of the ear, which is hollow and filled with a fluid, which fluid is compressed more or less as the tympanum or ear-drum is vibrated by the air; which vibrations communicate a motion to the little chain of bones compressing the fluid in the internal bone, before described. Now this fluid presses on some delicate nerves spread out inside the innermost bone, which communicate the impression to the brain through the nerve called the Auditory nerve. This is the mechanical operation of hearing.

LECTURE II.

THE MUSCULAR SYSTEM.

We next come to the muscular system — the lean meat of the animal.

The muscles are not made merely to cover up the bones and give beauty to the shape; every muscle is of use in giving motion. There is not a fibre of muscle in the whole body but what assists in giving motion to some part; and there is not a movement in any part of the body but what is produced by the contraction or relaxation of muscle. Walking, talking, the motions of the eye, the mouth, face and throat in swallowing, laughing and the like, are all performed by muscles; as likewise the circulation of the blood, breathing, the motions of the bowels, the movements of the hands and arms, of the legs and feet.

Muscles are composed of a number of strings or fibres—of lean flesh bound together by membrane. They are fastened at each end to the parts they are intended to move. When a muscle contracts, its substance becomes more compact; it becomes shorter, swelling out in the middle, and by this shortening, moves the part it is attached to. This swelling of the muscle can be felt, by grasping the middle of the arm, while the fore-arm is drawn up.

To each muscle goes a nerve, conveying the orders of the will from the brain to the muscle, forming a sort of electric telegraph through all parts of the body

centering at the brain. The way motion is produced where and when we want it, is this: our will sends the order along the nerve to the muscle moving the part we wish to move, to contract; it contracts, and the motion is produced. For instance—I wish to put an apple to my mouth; my hand is directly above the apple. My will sends an order along the nerve going to the extensor muscles of the fingers; these muscles contract, and my fingers open. Now I send an order to the muscle holding my hand up, to relax. It relaxes, and my hand falls on the apple. I now want to shut my fingers. I send an order to the contractor muscles of the fingers to contract. They contract, and my fingers shut, grasping the apple. If you take a chicken's leg and pull the white cords shown when the leg is cut off, you can open and shut the toes in the same manner that I open and shut my fingers. Now I wish to raise my hand to my mouth and turn it over. I send an order to the flexor muscles of the fore-arm to contract. It contracts, and draws my hand up. At the same time, I send an order to the muscle that turns the hand to contract. It contracts, and turns my hand over. Thus the operation is performed in a hundredth part of the time I have spent in explaining it. In this manner every voluntary motion of our body is performed, and not only of our body, but of every animal, insect, fish, bird, or reptile. This is what enables the flea to jump, the snake to crawl, the elephant to walk. To describe all the muscles of the body, would occupy more time than we have to spare. I will merely notice some of the most important ones.

The face and scalp are full of muscles; some to draw up the skin of the forehead; some to move the ear in all

directions (but few persons can use these muscles for moving the ear). Some muscles are to open and shut the jaw; some to draw up the nose and lip; some to draw up the corners of the mouth, as in laughing. The eyelids and mouth have each a circular muscle to shut them; there are others to open them. The eyeball has muscles that turn it in every direction. When one of these is too short, it draws the eye to one side, producing strabismus or cross-eye. The head is turned in every direction by muscles arising in the neck and attached to the lower part of the skull. The voice is produced by the vibration of two little cords, like violin-strings, drawn across a box of cartilage, which produces the promi nence in front of the neck, called "Adam's Apple." This box of cartilage is called by physicians, the Larynx. The vocal cords stretching across the larynx, are attached to small movable cartilages, which are moved by little muscles tightening the cords when we wish to make a fine sound, and loosening them, when we wish to make a coarse sound. Every time we alter the tone of our voice, these little muscles either tighten or loosen the vocal cords. The chest is expanded by muscles attached to the ribs and spine. It is drawn in or compressed by the contraction of the muscles of the abdomen or belly, which are attached to the lower part of the ribs at one end, and to the bones of the pelvis at the other. Hence the impropriety of girding the loins tightly. It prevents a due action of the abdominal muscles, and consequently a proper expulsion of air from the lungs. It is less pernicious to bind the region of the chest than that of the loins, because the abdominal muscles have as much to do with respiration as the muscles of the chest; beside, girding the

loins tightly, compresses the great bloodvessels more than girding the chest can possibly do. Swelling of the lower extremities is a complaint among females, brought on by this cause oftener than by any other. If you are determined then on tight-lacing, put your corsets up around your breast, so that you will not stop your breathing and the circulation of your blood at the same time.

The thighs are moved in all directions by muscles commencing about the pelvis and the lower part of the back, and attached to the sides of the thigh-bone. In like manner, the leg is moved by muscles arising from the pelvis and the thigh-bone, and attached to the fore and back part of the bones of the leg. You can feel the tendons or cords of the muscles that flex or draw up the leg behind the knee; they are commonly called the Ham-strings. Tendons are little white cords fastened to the ends of muscles and going to the part the muscles are designed to move.

This arrangement is a great advantage, because there is more room in some other parts for the situation of muscles, than where the power of the muscle is required; hence a small cord goes from the muscle to the part to be moved.

The muscles that extend the leg and foot are fastened to the upper part of the knee-pan, by means of a stout tendon; from the lower part of the knee-pan goes a strong ligament that is fastened to the front part of the large bone of the leg. The muscles that move the foot commence from the bones about the knee; some are attached to the heel-bone and the under part of the foot and toes, to flex the foot; others are attached to the upper part of the foot and toes, to raise the foot. In persons who walk a

great deal, and in dancers these muscles become largely developed.

The arm is moved forward by muscles arising from the front part of the chest, and inserted into the front part of the bone of the arm. It is moved backward by muscles originating from the shoulder-blade and bones of the spine, and inserted into the backside of the bone of the arm. It is moved up or down by muscles whose contraction draws it in those directions. The fore-arm and fingers are moved by muscles in a similar way that the leg and toes, before described, are moved.

THE NERVOUS SYSTEM.

The nervous system has two centres from which nervous influence radiates. That of the Voluntary nerves, and that of the Involuntary nerves. The centre of the voluntary nerves, or the nerves over which our will has a control, is the Brain. The centre of the involuntary nerves, or nerves over which our will has no control, is the Solar Plexus — a ganglion of nerves lying behind the stomach along the spine.

From the brain issue, first, the nerves of the Senses, to each of which belongs the peculiarity of the sense of which it is the instrument.

The Auditory, or nerve of hearing, takes cognizance of sounds, and nothing else. It goes from the brain and is distributed on the lining of the little bone of the ear filled with fluid, as before described. The impressions of the vibrations of the air on the nerve spread out on this little bone, and those impressions being conveyed to the brain, constitute the sense of hearing.

The Olfactory, or smelling nerve is affected by odors alone. It goes from the brain, and is distributed on the bones of the nose, which are formed so as to afford

a large surface for the expansion of the nerve and consequently a large surface to be acted on by the air.

The Gustatory, or nerve of taste is affected by the taste or sapidity of objects. It is distributed on the tongue.

The Optic nerve, or nerve of sight, takes cognizance of light. It is spread out on the back part of the eye.

The fifth sense is that of Touch, located mostly in the parts that we use in feeling, as the ends of the fingers.

Next come from the brain the nerves that go to all the voluntary muscles of the body and to all the sensitive parts. These nerves convey pleasurable or painful sensations to the brain, and carry the orders of the will to the muscles. These nerves going to the body, come from the lower part of the brain all bound up together and surrounded by a sheath. This bundle of nerves is called the Spinal Cord ; a very different kind of substance from that found in the hollow of long bones, which is nothing but fat. Each nerve, in this bundle, goes to some particular part in the body. They issue from the spinal marrow or cord, between the bones of the spine.

If you cut off the spinal cord at any particular place, all the parts supplied with nerves issuing below where you cut it off, will be paralyzed, because you have cut off their communication with the brain ; and invariably, where the nerve of a part is cut off, the feeling and motion of the part are destroyed. A part of a nerve may be destroyed, however, and the feeling or motion remain. The motion of a part may be destroyed without destroying the feeling, and the feeling of a part may be destroyed without destroying the motion ; because there are two parts to each of these nerves—a motor part and a sensitive part ; at their

departure from the spinal cord, these parts are separate, but they are joined again before being distributed over the body.

The brain, beside controlling muscular motion and being the seat of the will and the senses, is also the organ of the intellect and the passions. That a part or the whole of the brain exercises these functions we are well aware; but that each branch of the intellect and of the passions has some particular part of the brain for its organ, we are not prepared to say; and much less are we prepared to say, that each of these portions of the brain has a corresponding protuberance of the skull, for several of these protuberances are produced, not by a growth of the brain, but by a growth of bone.

The Involuntary or Ganglionic nervous system has its centre behind the stomach; it is called the Solar Plexus. This system presides over the heart, lungs, bloodvessels, glands, capillaries, the stomach, and the nutrition of the whole body. The functions of the parts over which the ganglionic system presides, are such that should be entirely free from the control of the will. How long would life remain if we had control over our heart, lungs, bowels, and liver? They would constantly be subjected to the caprices of our changeable will.

THE CIRCULATORY SYSTEM.

The Circulatory system is composed of the Heart, Arteries, Veins, Capillaries, and Absorbents. The heart is a muscular body, which, by its contractions, circulates the blood in the same manner that squeezing a bladder filled with water, will project the water with force. The heart is divided into four apartments.

Each apartment is surrounded by muscle. The two surrounded with the weakest muscles are called the Auricles; by whose contraction the blood is forced into the other apartments, called the Ventricles, which are surrounded with much more powerful muscles. By the contraction of the right ventricle the blood is forced through the lungs to be purified by coming in contact with the air, from which it absorbs oxygen and gives out in exchange carbonic acid gas.

When the blood has passed through the lungs, it returns to the left auricle of the heart, whose contraction forces it into the left ventricle. The left ventricle contracting, forces the blood into every part of the body, until the blood comes to the little tubes found in every structure, called the Capillaries. While the blood is passing through these little capillaries, just large enough to let a globule of blood pass at a time, the nutritive part of the blood is taken away from it, changing it from arterial, to venous blood. The nutritive portion of the blood, thus taken away, goes to the growth of the part. Before the bloodvessels are subdivided into these capillaries they are called arteries, and the blood in them, arterial blood. If you cut one of them the blood will issue in jets, corresponding to each contraction of the heart. But after the blood enters the capillaries, it is not affected so much by the force of the heart, but is carried through them by the force called Capillary Attraction, which enables a fluid to rise, of itself, in a very small tube.

After the blood has passed through the capillaries, it goes into the veins, into which the capillaries terminate, forming a connecting link, as they do, between the arteries and veins. From the small veins the blood is carried into the larger ones, like the water of

brooks into rivers, until the whole venous blood is collected into two large streams, one coming up from the lower part of the body and the other coming down from the head, and both emptying into the right auricle of the heart, by whose contraction it is forced into the right ventricle. By the contraction of the right ventricle the blood is forced into the lungs, from which it returns to the left auricle; the left auricle contracting, the blood is forced into the left ventricle; the left ventricle contracting, forces the blood through the general system again. This is the simple course of the circulation of the blood.

From the blood are derived the growth and maintenance of the body, and all the secretions thrown off from the body by various channels; such as the secretions of the kidneys or the urine, the secretions of the skin or the sweat, the vapory secretions of the lungs, the secretions of the bowels, and others which will be mentioned in due time. But from whence does the blood derive the supplies to keep up all these expenditures? From what is taken into the stomach, and what is taken up in every part of the body by what are called the Lymphatics.

When we take food in the stomach it is dissolved by a peculiar fluid called the Gastric juice, formed by little follicles in the stomach for that express purpose. When it is properly dissolved by the gastric juice, it is passed into the first bowel and sucked up by little tubes, whose mouths open into the whole course of the bowels. These tubes are called the Chyliferous vessels, because they suck up the food after it is changed into a milky substance, called Chyle. These little vessels open most numerously into the first bowel, called the Duodenum. When the chyle is thus taken

up by the little vessels, it is emptied into a main duct, which empties into a large vein, and is mixed with the blood. This is the way the food gets into the blood, to replenish it and to keep up the system.

In every part of the body are little vessels called Lymphatics, that are constantly taking up the old, worn-out parts of the body and sending them into the blood, to be renovated again. The whole system can be affected by a medicine being rubbed on the skin, it being taken up and carried into the system by lymphatics. We don't know the exact nature of the changes of the food into blood; the blood into flesh, bone, skin, ligaments, glands, hair, nails, and the various secretions; and the returning of the old matter to be renovated again. Pro. Leibeg, a celebrated chemist, has attempted to explain these changes on purely chemical principles. The body is compared to a steam engine—the stomach being the furnace; the lungs the bellows; the blood the water; the heart and bloodvessels the boilers; and the nerves the conducting-pipes, which convey the steam or moving power to the muscles, which act as straps and wheels to keep the machinery of the system in operation. These operations are not sufficiently explained at present, but they will eventually be satisfactorily explained by the known laws of physics.

THE GLANDULAR SYSTEM.

A Gland is a soft, round structure for the separation of some peculiar fluid from the blood. The Liver and Kidneys are glands. You can form no idea of the nature of the fluid a gland secretes from its structure. What peculiarity there is in the structure of the liver to enable it to separate the bile from the blood; or

why it should separate the bile rather than some other secretion—the saliva, for instance—we cannot, from its structure, tell. Each secretion has its use. The secretion of the Salivary glands of the mouth is to moisten the food, and thus facilitate swallowing. It is probable that Nature designed no other fluid being taken while eating; as we see illustrated by the feeding of the inferior animals. The cow and horse, though using much dryer food than man, seldom drink while eating. The Bile or secretion of the liver is designed to stimulate the bowels to carry off the refuse and superfluous portions of our food. It is the natural purgative of the system; better by far, than all the "liver" and "antibilious" pills or "purifying extracts" that were ever mixed up.

While digestion is going on and the chyliferous vessels are taking up what nutriment the system requires, the bile accumulates in the Gall-bladder; for the opening of the gall-duct, which conveys the bile from the gall-bladder into the bowel, is so constructed as to prevent the bile flowing out while the first bowel, where the chyliferous vessels mostly open, is full. But after the bowel becomes partially empty from the absorption of chyle, then the mouth of the gall-duct opens; the bile runs into the bowel and stimulates it to carry off the useless matter. The manner of the bile being poured into the bowel, shows the impropriety of eating at too short intervals, thus keeping the bowel continually full, and keeping the mouth of the gall-duct pressed shut.

The Kidneys are to prevent a too great accumulation of fluid in the system, as we are continually using more fluid than the system requires. The kidneys also separate and carry off improper substances that

get into the blood. The secretion of the kidneys is called the Urine. After it is separated from the blood, it is carried from the kidneys by two ducts, called the Ureters, into the bladder. It is carried from the bladder by a duct, called the Urethra.

The Skin also separates and carries off the watery part of the blood. It is filled with little tubes, called Perspiratory Ducts, for this purpose, connecting with the bloodvessels at one end, and opening externally on the skin. The principal function of the skin, beside carrying off the effete matters and superabundant fluids of the blood, is to maintain an equable temperature of the body, by the evaporation of the sweat or perspiration from the surface. When fluids evaporate, they carry off a certain amount of heat. In this way the evaporation of the sweat from the skin carries off the excess of heat of the body. If it were not for this wise provision, the body would melt down, in hot weather.

This effect of evaporation is illustrated by boiling water in a kettle. You cannot melt the kettle so long as there is water in it, for the changing of the water into steam carries off one thousand degrees of heat, which, if retained in the kettle, would soon melt it. It is this power of sweating to keep down the heat of the body, that enables men to remain in a hot oven until a piece of meat is roasted. If they did not keep down the temperature by evaporation, they would roast as soon as the meat. The reason of our drinking so much in the summer is to afford fluid for evaporation. The necessity of keeping the skin clean, so that the pores may exhale this fluid, is apparent. The exhilaration one feels after washing his body proves this.

You observe that where the skin passes from the outer to the inner part of the lip, it changes in its nature. This inner skin is called Mucous Membrane. It lines the mouth, throat, stomach, and all the bowels, the windpipe, the air tubes and cells of the lungs, the urinary and uterine systems, the nose, and eyelids.

Mucous membrane secretes a soft fluid, called Mucus, which protects the membrane and facilitates the passage of the various substances over it.

SEROUS MEMBRANES.

These are membranes of a different structure and for a different purpose. The lungs, heart, bowels, womb, liver, spleen, kidneys, and brain have a covering of Serous membrane. It is generally shaped like a sack, one side of which is attached to the organ that it covers, and the other side to the walls of the cavity that the organ is in. They serve also to separate the different organs from one another. Serous membrane exists also in the joints, in the shape of a shut sack. This membrane secretes a watery fluid, called Serum, designed to facilitate the motion of the parts with which it is connected.

THE HAIR.

The Hair grows from a capsule at its roots. It is barbed like wheat, so as to make it lie in one direction. Its use is to protect the part it covers, as on the head, and to prevent chafing, as under the arms. The exact use of the beard has not been decided upon. By civilized nations generally, it seems to be considered of no use, as it is kept shaved off. Perhaps its principal design might have been to distinguish the sexes, which has been rendered unnecessary heretofore by difference in dress.

THE NAILS.

The Nails grow very much in the same way as the cuticle. They are designed as a protection to the ends of the fingers and toes, and to render the sense of touch more acute.

We have given now a general description of the different tissues and organs that constitute the human body in a normal or healthy condition.

LECTURE III.

TREATMENT OF DISEASE.

Next we shall treat of the unhealthy conditions of the body, and of the different tissues and organs as affected by disease; and of the best treatment to cure these diseased conditions.

FEVER.

Fever seems first to claim our attention, inasmuch as it is a cause, or accompanying symptom, or a consequence of most every diseased action. Fever is that condition of the system in which there is an increased circulation of the blood with increased heat and diminished action of the secreting organs. The feeling of the skin is generally sufficient to detect fever. There is an indescribable sensation of pungent heat experienced by the healthy skin coming in contact with a fevered part, that cannot be mistaken. The other symptoms accompanying fever generally, are a sense of weariness, loss of appetite, thirst, restlessness, headache, dryness of the tongue, costiveness, want of sleep or disturbed with dreaming.

Fever first affects the nervous system, producing bad sensations, then the secreting system, preventing the separation of those fluids from the blood, which ought to be thrown off from the body by the liver, kidneys, bowels, skin, and lungs. It next affects the circulating system; the heart beats faster and harder,

until general fever becomes established. If the fever is not checked, congestion and inflammation of some vital organ takes place—some master-wheel of the machine becomes destroyed—without whose action the operations of life cannot go on, or the whole system becomes prostrated and vitality is extinguished in every part.

Nearly all the ordinary cases of fever might be warded off, as well as not, by the simplest means, if used in the first or forming stage. When you have the unpleasant feelings described as those ushering in fever, don't go and take more stimulating food and drinks to rouse your weary spirits; if you do, you will be but fanning the slumbering sparks of fever into a flame; but rather lessen your amount of food; for a few meals take nothing but the simplest articles of diet, such as thin corn-meal gruel, or rice-water. If you have been confined too closely within doors, take more exercise in the open air. If you have worked too hard with your head or hands, ease up a little, give yourself rest. Dismiss care from your mind; and be sure and give yourself a good scrubbing from head to foot, with water and a coarse towel. If your bowels are costive, take a brisk cathartic, Salts, or Oil, or Senna. If your skin is yellow, and you have a bitter taste in your mouth, and your urine is high-colored, take ten grains of Calomel just before going to bed, and work it off in the morning with a dose of Salts. If the skin, hands, and feet are cold, and you are subject to chills creeping over you, give yourself a good steaming, which can be done by putting a blanket around you and sitting over a basin of hot water, into which an assistant will hold, by means of a pair of tongs, hot bricks or flat-irons, letting them into the water so as

to produce as much steam as you can bear. By these simple means you can ward off an ordinary attack of fever. But, if you neglect using these means until the fever fairly sets in—until the skin, liver, bowels, and kidneys have stopped secreting their fluids—until you are hot and dry—"burning up with a fever"—as the phrase is, then you must resort to more energetic means. If there be a weight and sickness at the stomach, as though some indigestible substance were there, take an emetic. Twenty grains of Ipecac., with two grains of Tartar-emetic; to be followed, when vomiting commences, with copious draughts of warm water until the stomach is thoroughly evacuated. After the vomiting is over, put the same quantity of ipecac. and tartar-emetic in a pint of warm water, and use a tablespoonful every half hour, or hour, just often enough to keep slightly nauseated; at the same time using from two to four grains (according to the strength of constitution or violence of the fever) of Calomel every two or three hours, until it operates freely on the bowels.

If the bowels are not operated upon after six or eight doses have been taken, take a large dose of Epsom-salts, or Castor-oil, or Senna. About two tablespoonsful of either will probably be sufficient. The spoonsful of senna should be heaped up. After the senna is steeped, it can be rendered more palatable by the addition of sugar and milk. The forehead and face should be kept constantly wet with cold water, which can be done by keeping one thickness of thin muslin, wet, lying over it all the time. If a cloth, about the size of a pillow-slip, be kept wet with warm water and laid over the breast and bowels, it will favor sweating greatly. Cold water in any quantity, and

that acidulated with lemons, or vinegar, or tartaric acid, if it is more agreeable, can be allowed.

No food should be taken while there is a high fever, unless it should be some thin, corn-meal gruel. If the fever gives way, and you then break out in a sweat, and the pulse becomes softer, it is not necessary to continue the use of the tartar-emetic and ipecac. longer; the use of which is designed to reduce the heart's action, and to overcome the heat and dryness of the skin: when this is accomplished it is unnecessary to continue the remedy longer. If the fever returns, resume the same treatment again until you have subdued it. If the person be strong and full of blood, and the above treatment does not subdue the fever in the course of twenty-four or thirty-six hours, he should be bled from the arm in a sitting posture, until fainting or until a pint of blood has been taken. If there be much tendency of blood to the brain, or pain in the head, cupping on the back of the neck will greatly relieve it. Cupping can be performed with a common thin tumbler and a sharp razor. Set fire to a small piece of paper, throw it in the tumbler, and clap the tumbler over the part to be cupped. When it has drawn five or ten minutes, take it off, and make a few gashes with the razor; clap the tumbler on again and let it draw as long as it will.

If, after all these means have been used, there still remains a feverishness, take twenty grains of Dover powders, or enough to make you sleep, when you will probably break out in a profuse sweat. If there be oppression in the chest or under the ribs, or in the bowels, keep cloths wrung out of hot water over the part. If the oppression continues for twenty-four or forty-eight hours, indicating congestion in some inter-

nal organ and threatening inflammation, or if inflammation has already commenced, more violent external applications must be used—a mustard plaster or a blister, and a large one, covering a space larger than you suppose the internal surface to be that is inflamed. If inflammation of the brain is threatened shave the back part of the head, and put a blister on, letting it extend down along the spine, being careful to keep the forehead constantly wet with cold water.

There are different kinds of fever. The Intermittent fever, the Remittent fever, and the Continued fever, according as there is a complete intermission of the fever at regular times, or an abatement of it, without a complete intermission, or a continuance of the fever without any abatement. Then there is the Bilious fever, where the liver does not perform its functions properly. The Inflammatory fever, where some important organ is inflamed. The Eruptive fever, where there is an extensive eruption on the skin.

Fevers are of different grades also; the high, active form of fever, called Synochal, and the low form of fever, called Typhus fever. The Intermittent fever, commonly called Fever and Ague, comes on regularly every day, or every other day, or every third day, or even at longer intervals. It commences with a chill, caused by the blood leaving the extremities and surface of the body and rushing to the internal organs; this chill is succeeded by a fever, caused by a re-action, which drives the blood to the surface again with increased force. The fever or hot stage, is succeeded by the sweating stage; after which the circulation seems to be restored to a healthy action.

The intermittent and bilious fevers, and remittent fevers, are generally caused by a poison in the atmo-

sphere, called Marsh Miasm, that is generated by stagnant water or decaying vegetable matter. This is the reason of its great prevalence in new countries, where the water-courses are obstructed and the forests are full of decayed leaves and timber.

There are many means by which the periodical return of the intermittent fever or fever and ague, chill-fever, dumb-ague, ague in the face, sun-pain (all of which proceed from the same cause) can be stopped; and if the person is careful, as regards exercise, diet, and exposure to wet or cold, he may remain exempt from the disease; but so long as one remains in a miasmatic district, and more especially with irregular habits, there will be a liability to a return of these periodical complaints.

A very good way to shorten the immediate attack of intermittent fever is to use the steam bath in the cold stage, until sweating is produced, using, at the same time, nauseating doses of Ipecac. or Tartar-emetic. After the sweating stage is over, commence using two grains of Quinine and four of Blue-mass every two hours, until eight doses are taken; eating nothing but the lightest kind of food, such as gruel, rice-water, or weak chicken-broth. After the ague is stopped, it will be necessary to eat lightly and work lightly until the body has regained its healthful vigor. A tea made of some tonic bitter, such as Wild Cherry-tree bark, Quassia, or Peruvian bark, would be very useful, taken every morning before breakfast.

Remittent fever, or that where there is a slight abatement of the fever, generally toward morning, should be treated in the same manner as laid down for the treatment of simple fever. After the fever has been broken up by this treatment, Quinine should be

taken in doses of about two grains, every two hours, until eight doses are taken.

Continued fever should be treated in the same manner as described for simple fever, also; perhaps a little more energetically, if necessary, until the fever is subdued; and after it is subdued, if it be in a fever and ague district, use a few doses of Quinine to prevent a return of the fever.

Typhus fever is marked by an early prostration of the powers of life, a wandering of the mind, a dryness and brownness of the tongue, a stoppage of the secretions, involuntary discharges from the bowels and bladder, and generally an implication of some vital organ, as the brain, lungs, liver, or bowels. In the treatment of typhus fever, if bleeding be necessary at all, it is at the commencement of the disease, and that by means of cups over the part most oppressed. Then you want to introduce the mercurial influence into the system as speedily as possible; by which means you expect to restore the different parts of the system to a natural and healthy action. Mercury is the sheet-anchor of hope. If you can affect the system by Mercury there are strong hopes of recovery. If you cannot do this, it is reasonable to suppose the case is dangerous.

In my experience there is nothing that gives so much satisfaction in restoring the natural secretions as Mercury; it seems to act directly on the skin, bowels, kidneys, and more especially on the liver. You must keep constantly in mind that an action on these vital organs is the desideratum in the treatment not only of typhus fever, but of every other disease where these organs are in an inactive condition. Give then, two grains of Calomel (Calomel is a preparation

of Mercury), every two hours, until the skin softens and is inclined to become moist; until the discharges from the bowels become more healthy; that is, more yellow and of a natural consistence, and until the tongue loses its dryness and becomes moist and soft. When Mercury has accomplished this, it has done all the good it can, and requires to be used no longer, or else salivation will ensue, which is to be avoided if possible.

If there be not much irritability of the stomach, that is, much nausea or vomiting, combine the two grains of Calomel with half a grain or a grain of Ipecac., according as the stomach will bear it. If there be a looseness or running off at the bowels, combine each dose of Calomel with two grains of Dover Powder. If there be obstinate vomiting, put some hot cloths or a mustard plaster over the stomach; if this does not stop it, combine the Calomel with an eighth part of a grain of Morphia, until the vomiting stops. As long as the head is hot and feverish, it should be kept wet with cold water. If any of the internal organs become congested or inflamed, a blister must be put over the part. Cold water is the best drink, and it can be freely used. If a cloth be kept wet with warm water over the breast and bowels, it will have a tendency to prevent internal congestion, and will favor sweating.

If nourishment is desired at all during the active stage of typhus fever, or when a favorable crisis has taken place, the lightest kind of nourishment only, should be used, such as corn-meal gruel or rice-water, or thin chicken-broth. When the system sinks very low, stimulants may be used, although I must confess, I never saw much advantage from their use in typhus

fever. Hot, highly-seasoned chicken or beef-broth combines nourishment with stimulus, and probably is the best that can be used in such cases, given in small quantity every four or five hours. In very low cases, Brandy toddy or Wine may be used as necessity requires. Cloths wrung out of hot camphor and laid over the body and limbs, is a good way of applying stimulus. When there is a difficulty of introducing nourishment and stimulus by the mouth, it can be introduced in an injection. Rubbing the limbs with salt and water, by means of a coarse towel, either in the first or last stages of the disease, is a very useful means. If a diarrhea sets in during the latter stages of the disease, it must be checked. This can generally be done by keeping flannels wrung out of hot camphor, over the bowels, and by giving four grains of Dover Powder, four grains of Mercury and Chalk, and two grains of Tannin every four hours, until the diarrhea is checked. During the course of this fever, great care must be observed in the use of purgatives, for, sometimes three or four large discharges from the bowels will carry off the patient. When it becomes necessary to move the bowels, it had better be done by injections.

During convalescence from this disease, one cannot be too careful in regard to diet, and exertion, and exposure. The lightest diet, the lightest exercise, and the least exposure is urgently indicated. Some bitters made of Peruvian bark and port wine, used in small quantities, is often of much benefit in giving tone to the system.

TYPHOID FEVER.

This is a grade of fever between an active synochal fever and a typhus fever; its treatment resembles that laid down for typhus in the main. Changes must be

made as symptoms occur. If there be a high, active fever, the system must be reduced; if there be prostration, stimulants must be used; if internal congestions, counter-irritating applications to the surface, as cloths wrung out of hot water, mustard plasters or blisters.

YELLOW FEVER.

The Yellow fever is the most aggravated form of remittent; sometimes carrying off its victims in twenty-four hours. It is characterized by a most violent fever at first; a yellowness of the skin; a vomiting of yellowish matter, and a great derangement of the nervous system. After these symptoms come great prostration of the whole system, and a vomiting of black matter, like coffee-grounds. There is no certain method for the cure of this disease; it too frequently baffles the skill of the most intelligent physicians. The only course that can be taken, is to treat the symptoms as they arise, depleting where the action is too high, and stimulating where there is prostration. The first may be accomplished by cupping over the region of the stomach, by small mercurial cathartics (four grs. Calomel every three hours), and by sponging the surface. The latter, by rubbing the surface with Mustard and Brandy, and introducing what stimulus, internally, that will be retained. A new treatment has been recommended by some physicians, who say they have tried it with good success; it is to use saline medicines, such as the muriate of ammonia, the salts of magnesia, common salt and the like.

We next come to the Eruptive fevers, or those accompanied with an eruption on the surface.

SCARLET FEVER.

Scarlet fever is so called, from the peculiar scarlet appearance of the skin in this complaint. It is contagious; the fever is ushered in by chilly sensations, weakness, headache, pains in the limbs, and the symptoms generally that usher in an ordinary fever. The eruptions appear two days after the fever. In its treatment, the object is to keep the system in as favorable a condition as possible, so that the fever does not get too violent. Sponge the face and head, if there is too great tendency of blood to the brain; if the bowels are costive, open them gently with Salts or Senna. If there is a want of action of the liver, give a dose of Calomel—fifteen grains to a grown person, eighteen years old or upward. Half this dose to a youth half this age, and half the dose for a youth, to a child half the youth's age, and half the dose for a child, to an infant half the age of the child. This is a good rule to go by, in administering medicines to persons of different ages—dividing the dose as the age corresponds with the age of an adult (which may be considered eighteen years). If the throat is sore, gargle it frequently with a strong solution of alum. Spirits of Mendereri may be given; a teaspoonful every hour, to keep the skin moist. This can be made by putting carbonate of ammonia in vinegar, so long as the vinegar will effervesce.

MEASLES.

Measles commence like a common cold. On the fourth day, the eruption appears, which is distinguished from the eruption of scarlet fever, by its being of a darker color, and coming more in separate spots, than in scarlet fever. The nose, eyes, and lungs are

generally affected. And here, I will speak of a principle that holds true in irritation or inflammation in any particular structure. When irritation or inflammation exists in any particular structure of the body, it is more likely to extend along that structure than along another structure, although the other structure lies next to it. And if irritation or inflammation leaves one part of the body, and goes to another part, it is more likely to fall on a structure similar to the one it first existed in. For instance, in an irritation or inflammation of the mucous membrane of the intestinal canal, which extends from the mouth downward, it is apt to go along the whole length of the bowels; and wherever this mucous membrane extends. Mucous membrane lines the throat, windpipe, and all the bronchial tubes or divisions of the windpipe, which communicate with the air-cells of the lungs. Mucous membrane lines the nose, and a small duct opening into the nose, which conveys the tears from the eyes. The eyeball is covered with a mucous membrane, called the Conjunctiva, which also lines the eyelids. Now the extension of the irritation along the mucous membrane into the nose, eyes, and lungs, is the cause of all these being affected in measles.

The object in the treatment of this, as in the foregoing disease, is, to keep the arterial action or fever, from getting too high. Give an emetic of Ipecac. at first, to be followed by a dose of Salts; then give half a grain of Ipecac. and a teaspoonful of the spirits of Mendereri every two or three hours, until the active stage of the disease is over. When there is much oppression of the lungs, cupping may be practiced in the first stage of the disease; or the use of mustard plasters or blisters in the latter stage.

SMALL POX.

Small Pox is an eruptive fever, ushered in by the same symptoms as other fevers, the eruption appearing on the fourth day. On the eighth day the suppuration is complete, and on the tenth or eleventh the sores break and begin to dry up. Its treatment is very simple.

Keep the room cool and shaded. Let the patient use as a drink cold water, in which is dissolved cream of tartar. Use, every three or four hours, six or eight drops of the Diluted Sulphuric acid, which is formed by mixing one part of sulphuric acid with thirteen of water. At the onset of the disease it is best to give a Mercurial Cathartic—say ten grains of Calomel and ten of Jalap. If the fever is too violent blood must be taken. Let the diet be very light. The room must be well aired. If sinking occurs, as often is the case in what is called the confluent or malignant variety, where all the sores run together and form one continuous sore over a great part of the body, stimulants must be used to support the powers of life. Where an excessive diarrhea occurs in this malignant variety, it must be checked; which can be done, probably, by the use of small doses of opium.

Some physicians are in the habit of opening the pustules on the face, before they burst, and putting in a little lint dipped in some mild ointment to prevent, in a measure, the formation of what are called "pock marks." The system may be protected against the small pox by Inoculation and by Vaccination. The former is the application of small pox matter to the cut or scratched skin, by means of which it is absorbed, and excites a very mild form of the disease; and once

having the disease, as is the case with the measles and scarlet fever, exempts one from having it again. Vaccination is the application to the scratched skin of the matter from a cow that has had the small pox, which excites a still milder form of the disease and still protects the system from the small pox. Vaccination is generally practiced with matter or the scab from another person that has been vaccinated. Dissolve a small portion of the scab in a drop of water, then scratch the skin on the arm with a sharp instrument until you start the blood, put the matter on, and then put a wet wafer over it and a rag around the arm, and let it be until it takes, which will be in from three to five days.

I consider vaccination a sure preventative of the small pox. I have tested it in my own case. I was vaccinated when I was five years old, and have since been exposed to small pox in its most virulent form without taking it. Sometimes persons who have been vaccinated take a slight eruption on being exposed to small pox, called Varioloid, which is not a serious disease.

CHICKEN POX.

Chicken Pox has some of the symptoms of small pox, though much milder. In ordinary cases nothing is necessary to be done but to keep the bowels open, give cooling drinks, use light diet, and keep the room well aired.

There is another kind of eruptive fever called Miliary fever. After the fever has existed three or four days, the body breaks out in a kind of a rash or little red pimples, gradually extending over the extremities and abdomen.

TREATMENT.—Keep the bowels open by mild cathartics. Use cooling drinks. If there be much fever, keep up a slight nausea by means of small doses of Ipecac. If sinking occurs, give tonic, stimulating remedies, such as Quinine and Wine.

LECTURE IV.

INFLAMMATION.

The next subject we shall treat of is Inflammation. No word, literally, can better express this morbid condition than the one that is applied to it—inflammation—for the word is derived from the Latin verb, *inflammo*, which means, *to burn*. For inflammation is really a burning and destruction of the part in which it exists. Inflammation is characterized by increased heat and redness in the part, attended with pain and swelling. The redness, and heat, and swelling are produced by too great a quantity of blood in the part. It is an established principle of medicine, that, wherever there is irritation there is an increased flow of blood. The pain is produced by the pressure of the enlarged bloodvessels on the nerves.

Inflammation may terminate by a return of the part to its natural condition, without any alteration of its structure; this is called a termination by Resolution, and is the most favorable termination. It may terminate by the formation of matter called Pus. This is called a termination by Suppuration. It may terminate by an absorption or eating away of the part, forming an ulcer. This is called a termination by Ulceration. And lastly, it may terminate by a complete destruction, or death, of the part. This is called a termination by Mortification. Where parts, cut by a sharp instrument, unite by being glued together

with an adhesive fluid thrown out for the purpose in all such cases, the slight inflammation accruing, which is necessary for the healing of the part, is called Adhesive inflammation.

Inflammation is of two kinds, Acute and Chronic. Acute, when it is violent and apt to excite fever in the general system. Chronic, when it is slow and has existed for a long time, the symptoms not being so violent as in acute inflammation. The treatment of inflammation in any organ, is General and Local. General, by keeping the whole body in a proper condition; which is done by the use of the common reducing means, used as circumstances require; such as blood-letting by the lancet or cups, nauseants, the warm-bath, cathartics, light diet and sedatives. The Local treatment is, when the inflammation first occurs, and there is a probability of being able to drive it away without the formation of matter, to apply something that will excite the enlarged bloodvessels to contract and force out the accumulated and stagnant fluids. The means to be used are compression with a tight bandage; very cold or very hot applications, as ice-water, the shower-bath, flannels wrung out of hot water; stimulating applications, such as turpentine, the various stimulating liniments, mustard, hartshorn confined to the part, or a blister of Spanish Flies, or of the common potato flies; astringent applications, such as a solution of the sugar of lead or alum, or a strong decoction of oak bark or nut-galls. If you cannot drive away or "scatter," the swelling by these means, which you can ascertain in the course of from twenty-four to forty-eight hours, and the formation of matter is certain, you must then use means to promote the formation of matter—to "bring the swelling to

a head." A poultice will accomplish it better than any other means. As good a way to make a poultice as any, is to cut a slice of light bread, take the crust off, lay the bread on a plate, and then saturate it with warm water. Lay the slice thus prepared on the affected part, and keep it moist and warm until the matter is collected sufficiently to be discharged. We will commence now with the inflammations of the several structures of the body.

THE SKIN.

The Skin is composed of three coats. The outer coat, called the Cuticle, a transparent covering without color or feeling, designed as a protection to the coats beneath; it is the coat that is raised up in blisters. The middle coat, called the Rete-mucosum or Mucous Net-work, is a very delicate membrane, with difficulty separated from the other coats. It is the seat of the coloring-matter of the skin; it is the color of the rete-mucosum that distinguishes the sooty Ethiopian from the fair Circassian, so that beauty does not in reality lie even skin deep, as is generally supposed, but only half skin deep. The third, or inner coat of the skin, is the one in which is situated the bloodvessels, nerves, absorbents, and exhalants of the skin. This third coat, called the Cutis Vera, or true skin, is the seat of inflammation.

DISEASES OF THE SKIN.

Erysipelas is an inflammation of the skin. In this disease a shining redness is diffused continuously over the skin, attended with a burning, itching pain. It commences on all parts of the body, sometimes on the

arms or legs, and sometimes on the body or face. It extends with great rapidity, often commencing at one point on the face and extending over the entire face and scalp during twenty-four hours. When it is on the face, the eyelids are apt to become shut by the swelling. When it occurs on the scalp, the brain is very apt to become affected. It is generally produced by derangement of the bowels or of the system generally—from "bad blood," as the common expression is. The least scratch will serve for a starting-point, when the system is in the proper condition for the reception of the disease. Sometimes the atmosphere seems to be impregnated with some sort of poison that favors its extension, causing it to assume an epidemic form.

Its treatment consists, first, in purging out the bowels with a mercurial cathartic; ten grains of Calomel and ten grains of Jalap. If this does not operate in eight hours, repeat the dose, until a brisk operation is produced. At the same time, apply over the part a strong solution of Lunar Caustic, ten grains to the ounce of water. Draw a stick of the Lunar Caustic, moistened, around the inflamed part; it will sometimes prevent the erysipelas going over it. A narrow strip of Blister-plaster put round will have the same effect to prevent its extension. Where there is much arterial excitement, and the person is full of blood, it would be well to draw some blood. Where the erysipelas is changing about from one place to another, and the head seems to be affected, there is danger of its going to the brain, and a Mustard-plaster or Blister had better be put between the shoulders to concentrate the irritation there.

BOILS.

Boils are situated in and under the skin; they can sometimes be driven away before matter forms, by cutting them open and letting out the blood, and then applying compression and cold over the part. Or they can be driven away by some stimulating application, as a Mustard-plaster, Spirits of Ammonia, or a Blister; but where matter is forming or has already formed, which is apt to be the case after forty-eight hours, a bread-and-milk poultice had best be used.

TETTER, OR RINGWORM.

Tetter, or Ringworm, can be cured by washing with a solution of Corrosive Sublimate.

ITCH.

The Itch, which is caused by little vermin, like lice, too small to be seen with the naked eye, can be cured by anointing with Sulphur and Lard a few times, and then washing the entire body with soap and water, and putting on clean clothes. Red or Blue Precipitate ointment will also cure the itch.

ULCERS, OR SORES.

Ulcers on the legs, commonly called Fever-sores, should be treated by bandaging the leg from the toes upward, using an ointment made of Jamestown-weed, lard and tallow, and Mercurial ointment. If there be much pain, put a little Sugar of Lead and Opium with the ointment. The patient should keep still and use light diet. If there be much heat and fever in the leg, keep the bandages wet with water. Use internally two tablespoonful of the following syrup, three times a day: Make a strong tea of Sarsaparilla, using

about two quarts of water with as much Sarsaparilla as it will cover, and boiling it down to a pint. Dissolve in this, half a dram of the Hydriodate of Potassa, and use as directed above. The Sulphur-bath is very efficacious in the cure of cutaneous eruptions. A Sulphur-bath can be given by putting the person in a box with a close door. In the top of the box have a hole, large enough to put the head through, around which is fastened a collar of oiled-silk with a draw-string to prevent the gas strangling the subject. The gas can be let in at the bottom by means of a tube attached to a tight vessel, into which is put about a tablespoonful of Sulphur, and set on fire.

SHINGLES.

There is a very common eruption of vesicles that encircle the waist, like a girdle, called "Shingles," which can generally be cured by using a brisk Cathartic and washing the part with some astringent wash, as a solution of Sugar of Lead or Alum.

SCALD-HEAD.

In Scald-head the hair should be closely cut off and the scalp washed every morning with soap and water, after which an ointment of Mercurial Ointment and Sugar of Lead should be applied.

CORNS.

Corns are morbid growths of the skin pressing on the extremity of a nerve, caused by too great pressure on the parts, as by the use of tight boots. They will generally get well themselves by wearing large boots. They can be cured by paring them down to the quick, and then putting on a drop of Sulphuric Acid.

Warts can be cured in the same way.

CHILBLAINS.

Chilblains are caused generally by the parts being frozen; they are characterized by an intense itching. They may be cured, at first, by rubbing them with turpentine or some stimulating liniment. If they break and form an ulcer, use a stimulating ointment such as the Citrine Ointment.

THE EYE.

The Eye is composed of three distinct coats or layers. The outer coat is composed of the Sclerotica and Cornea; the middle, of the Choroid coat, the Iris, and Ciliary processes; and the inner coat, of the Retina and Zonula Ciliaris. The outer coat is hard and resisting to give strength to the eyeball. The front part, the Cornea, is transparent and shaped like a watch-crystal. It is inserted into the Sclerotic coat in precisely the same manner that a watch-crystal is inserted into its rim. It would seem as though the watch-maker had got the idea of the crystal from the eye.

The next coat of the eye is the Choroid and Iris. The Choroid is a thin-colored membrane, the outer side of a chocolate color, the inside of a deep black. The design of this dark color, is to absorb the surplus rays of light, otherwise we would be dazzled and confused by a strong light. In Albinoes, this color is wanting, which renders them incapable of seeing, except at twilight or by moonlight. The Iris—meaning rainbow, is so called, from its variety of colors in different individuals. It serves as a curtain to divide the front and back chambers of the eye. It has a round hole in the centre, called the Pupil, through which the rays of light pass, through which we see. The iris is composed of two sets of muscular fibres, one

set radiating from the centre to the circumference, by whose contraction the pupil is dilated, and a set of circular fibres, by whose contraction the pupil is contracted. A strong light excites the circular fibres to contraction, so that not so much light is admitted into the eye. A weak light excites the radiating fibres to contraction, so that more light may be admitted into the eye. The iris has also another thin layer back of the fibrous or muscular layers, of a purple color, called the Uvea. The third tunic of the eye is called the Retina. It is merely an expansion of the optic nerve, which enters into the ball of the eye from behind, and is spread over about three-quarters of the inner, back part of the eye. This coat is the seat of our sight. On this, the light forms a picture of the object we see, and the impression is carried to the brain along the optic nerve, which goes to the brain. Behind the iris is a transparent, crystalline body, called the Lens, the use of which, is to concentrate the rays of light, so as to form a picture small enough for the size of the Retina. Before this lens, filling what are called the Anterior and Posterior chambers of the eye, which are separated by the iris, is a thin, transparent humor, called the Aqueous humor. Behind the lens, filling the main part of the cavity of the eyeball, is what is called the Vitreous humor; there is a delicate, transparent membrane, going all through this vitreous humor, dividing it into cells. The eye is supplied with nerves and bloodvessels, as is every other organ of the body. The appendages of the eye are the eyebrows, the eyelids, the Tarsal cartilages, the Meibomian glands, the eyelashes, the muscles, the lachrymal gland ducts, sack, and nasal duct. The eyebrows and eyelids have

muscles that move them, opening and shutting the eyes. The eyebrows are designed to shade the sight, and turn the perspiration from the eye. Along the edge of the eyelids are the Tarsal cartilages, designed to give a shape to the eyelids, and enable them to shut closely, and to give a firm basis to the eyelashes. Along the edge of the eyelids are a set of minute glands, called the Meibomian glands, which secrete a fluid that anoints the edges of the eyelids, keeping them from stickiug together.

The Lachrymal gland is situated above the eye, and secretes the tears. It pours them out, so that they run over the eye, after which, they go into two little holes in the edge of the eyelids, in the inner corner of the eye; one hole is in the upper, and one in the lower eyelid. These holes are the mouths of the Lachrymal Ducts, which open into the Lachrymal Sac; from the lachrymal sac, the tears are conveyed into the nose, through the Nasal Duct. The front portion of the eye-ball and the inside of the eyelids are covered with a mucous membrane, called the Conjunctiva, which continues on through the lachrymal and nasal ducts into the nose.

DISEASES OF THE EYE.

The Conjunctiva or mucous membrane covering the eye and lining the lids, is subject to inflammation, caused generally by substances such as dust, and insects coming in contact with the external covering of the eye, or "getting into the eye," as it is generally called. These should always be removed as soon as possible. The best way to remove them is to do it with a pin, the head of which, is guarded by a thickness of silk handkerchief. After the irritating body

has been removed, there will be a soreness and a feeling as though it were still there, and often, the soreness is made much worse by a constant rubbing of the eye. This rubbing of the eye should be carefully avoided in all its diseases. Inflammation of the conjunctiva is often the result of catarrhs or bad colds; the irritation extending from the throat and nose up the mucous membrane that lines the tubes that carry the tears from the eyes to the nose. The best treatment is to bathe the eyes frequently with cold water, or cold water in which is dissolved some astringent substance, such as alum or sugar-of-lead. The eyes should be kept from a strong light, either by a dark room or by a green sun-shade. A light diet should be used, and the bowels should be kept regulated, or rather loose, by cathartics, such as Salts, Senna, or Castor-oil. The eyes should be used as little as possible. These directions apply to all inflammatory affections of the eyes.

Cataract is an opacity of the lens of the eye, preventing the rays of light from passing through and forming a picture on the retina, destroying vision. Cataract can be easily told by the appearance of a white cloud behind the iris, and from a dimness or complete loss of sight. The removal or destruction of the lens by means of a surgical operation, is the only way to cure it.

Amaurosis is a palsy of the optic nerve. No alteration in the structure of the eye can be noticed; it is a loss of power in the optic nerve, to take cognizance of light. The only means that can be used, with any prospect of benefit, are those that will have a tendency to stimulate the optic nerve to action, such as Moxæ, Electricity, Strychnine, either applied on a blistered surface over the eye, or dropped in the form

of a tincture, into the eye. Where amaurosis has existed any length of time, the prospect for cure is very poor.

When ulcers or fungous growths form on the cornea or sclerotica, or on the lining of the eyelids, they should be touched with Lunar Caustic. In the treatment of all diseases of the eye, too much attention cannot be paid to those dietetic rules necessary for keeping the body in a healthy condition.

THE NOSE.

The walls of the Nose are composed of Bone and Cartilage, covered externally by skin, and lined internally by mucous membrane. On this mucous membrane is spread out the Olfactory nerve or nerve of smell. To afford a larger surface for the expansion of this nerve four little bones are placed in the nose like shelves, two in each nostril, which are also covered with mucous membrane, on which this nerve is expanded. Animals having very acute smell, as the hound, have a still larger surface for the expansion of this nerve. The air, impregnated with odors, coming in contact with the olfactory nerve spread out on the lining of the nose, communicates that peculiar sensation to the extremities of the nerve called — Smell or Odor. Catarrh or cold produces an irritation of the lining membrane of the nose, causing it to secrete a mucus; this difficulty generally goes away of itself.

There are serious diseases pertaining to this handle of the face. Polypus is a pulpy growth inside the nostrils that must be removed either by ligature or the knife. The end of the nose is sometimes the seat of a most painful disease, called *Noli-me-tangere*, or "Touch-me-not." It is cured by some application

that will kill the nerve, generally some preparation of arsenic.

FOREIGN BODIES IN THE NOSE.

Foreign substances, Beans or Peas, for instance, can be removed from the nose, simply by punching them out at the back part of the nostrils, unless a small wire, bent double, can be passed up the nose and thus haul the substance out in front.

THE EAR.

The Ear is a most beautiful machine, taken as a whole, perfectly adapted to the purpose for which it was designed; that is, to communicate the vibrations of the air to the Auditory or Hearing nerve. The vibration of the air is the cause of all sound. The outer or cartilaginous portion of the ear is formed so as to collect and concentrate the vibrations of the air on the ear-drum, which is a delicate membrane, stretched across the auditory passage, dividing the external from the internal ear. This ear-drum could not vibrate unless there was an opening for the air to go out and in from the inner chamber, no more than the head of a military drum would vibrate if it had no hole in the side. Now there is just such a hole, connected by a tube with the back part of the mouth; sometimes when a person has a bad cold and the lining membrane of this tube, called the Eustachian tube, inflames, and the tube becomes closed, the hearing is destroyed. It has been restored in some instances, by puncturing the ear-drum, so as to admit air to the inner chamber. This tube is sometimes opened after it has become closed, by an operation. Connected with the ear-drum is a chain of the most delicate and intricate little bones and muscles in the whole

body. The innermost of these little bones is connected with a small spiral-shaped bone, hollow, resembling a snail shell. This little spiral-shaped bone, called Cochlea, is filled with a fluid. Lining the inside of the cochlea is a membrane in which the auditory or hearing nerve is spread out. Now the last bone of the chain is placed so as to press on the fluid in the cochlea and thus make an impression on the ramifications of the auditory nerve, so that just as the ear-drum is vibrated by the undulations of the air that produce sound, so this fluid is compressed by the last of the chain of bones, and the auditory nerve is impressed with the sensation of hearing.

Inflammation of the structures of the ear, which may be known by heat and pain in the part, should be treated by frequent washings and injections with cool and astringent washes, Such as sugar of Lead water, and by a depletion of the general system by light diet and cathartics. In Chronic Inflammations of the internal ear, attended with a purulent discharge, injections of soaped water should be used twice daily, and counter-irritation should be used by means of blisters behind the ears, or by means of pustulation produced by a use of Tartar-emetic ointment, applied so as to keep out a crop of sores behind the ears continually, until the discharge from the ears ceases.

LECTURE V.

THE MOUTH.

The Mouth contains, receives, and gives out many things. It is, as it were, the vestibule of the human temple. The Lips partake partly of the nature of mucous membrane and partly of the nature of the external skin, called Epithelium, very delicate in its structure, at least that is the opinion of most all lovers; its ruby, delicate structure is well calculated for the kissing operation.

The lips become sore sometimes, and are apt to be kept sore by the tongue licking them continually. A slight soreness can be cured by keeping them dry and applying some simple ointment. If the soreness has been of long standing and is very painful, they should be first cauterized by lunar caustic. The lips are moved in every direction by muscles. The Tongue is composed almost entirely of muscles, whose contractions move it in almost every possible direction. These muscles have their origin from different parts of the jaw-bone and from the os hyoides. Over the tongue is spread out the Gustatory or Tasting nerve. Under the tongue and under the lower jaw are glands that secrete the juices of the mouth, the Spittle or Saliva, with which our food should be moistened. If we chewed our food long enough and did not exhaust these glands by the continual use of artificial stimulants, they would afford sufficient fluid to mix our food with without any other

drink during eating. None of our domestic animals drink while they are eating; and our digestive apparatus is similarly constituted.

In the cheeks, lips, palate and throat are muscles for performing the various motions of the parts in chewing and swallowing, spitting and speaking. The Palate is a curtain suspended between the mouth and throat to enable us to breathe while we are chewing. Behind the mouth is the cavity called the Pharynx or throat, into which the mouth and the two nostrils terminate, from the upper and back part of which the Eustachian tubes commence, and from the bottom of which commences the Esophagus or gullet, and Larynx or windpipe.

The mouth is often subject to inflammation. It is oftener owing to some derangement of the digestive organs than to any other cause. Your first object then is to get these in a proper condition, and then some slightly astringent wash, as of Borax, Alum, or Sugar of Lead, will effect a speedy cure. For sore mouth in children, generally called Thrush, some Slippery-elm water in which is dissolved Alum. The bowels should first be evacuated, however, by some mild cathartic, such as Magnesia. When ugly ulcers form in the mouth they should be rubbed over with Blue-stone or Nitrate of silver. In salivation from use of Mercury, hold a piece of Alum in the mouth, or chew Oak-bark or Nutgalls.

TONSILS.

On each side of the throat, back of the mouth, are two little lumps, called the Tonsils, that are not unfrequently inflamed and enlarged. Active inflammation of the tonsils, called Quinsy, should be treated by general depletion of the system, by means of Blood-

letting, Cathartics, and light diet, and by a frequent use of astringent gargles. The application of Cups to the outside is the best way to abstract blood in this case. When inflammation of the tonsils has fairly set in, it is almost certain to terminate in suppuration, and no relief is to be expected until the pus or matter is discharged. In chronic inflammation of the tonsils, touching them with Lunar Caustic will sometimes effect a cure; when it does not, however, the tonsils must be cut off with an instrument made for the purpose.

When the little teat of the palate, called the Uvula, grows too long, producing a disagreeable tickling in the throat, try to reduce its length first by the use of Caustic; if this fails, it must be cut off, otherwise it might lay the foundation of some serious disease of the respiratory organs.

THE WINDPIPE.

The Windpipe is situated in front of the Esophagus, so that the food, in passing down the throat, must pass over the top of the windpipe. To prevent the food passing down the windpipe, a little clapper of cartilage is placed over the opening of the windpipe, which shuts down when we swallow, and rises up when we breathe. This little cartilage is called the Epiglottis.

LARYNX.

Under the epiglottis is a little cartilaginous box, called the Larynx, across which are stretched two little cords, called the Cordæ Vocales, which are fastened at the other end to two movable cartilages, called the Arytenoid cartilages. To these movable carti

lages are fastened muscles whose contraction and relaxation tighten or loosen the Cordæ Vocales. By the vibration of these cords principally, the tones of the voice are produced. It is these and not the tongue, as is generally supposed, that produce the voice. This little music-box of the throat is larger and more prominent in men than in women, producing that prominence in front of man's throat, called "Adam's Apple."

When the Larynx is inflamed, it is called Laryngitis or Croup. Children are more subject to it than grown persons. The best treatment is to keep the child constantly nauseated by small doses of Ipecac. With the first two or three doses mix a grain or two of Calomel, enough to produce an operation on the bowels. Keep a poultice of Tobacco-leaves or Snuff around the throat. If the inflammation is not subdued in a day or two, a false membrane forms in the Larynx, which is pretty sure to produce death by suffocation.

When suffocation is about to take place from Croup, an opening may be made in the Windpipe, below "Adam's Apple," and a quill inserted so that the child can breathe until the inflammation and swelling subside in the Larynx and the child is enabled to breathe through the natural passage.

When the Windpipe has been cut off, or partly off, as in an attempt at suicide, the edges of the wound should be brought together with adhesive strips, and the parts kept perfectly still. The reason that attempts at suicide, by cutting the throat, are not more fatal, is that the wound is made too high up, where much cartilage is to be cut through before the large bloodvessels of the neck are reached; lower

down, near the breast-bone, the bloodvessels lie more superficially and are more easily severed.

When foreign substances get down the Windpipe and become fast, if they cannot be coughed up, they must be taken out through an opening in the windpipe.

Below the Larynx the Windpipe continues to the lungs, a straight cartilaginous tube, rendered firm by ring-like thickenings at equal distances apart. When the Windpipe, called the Trachea below the Larynx, reaches the lungs, it divides into two tubes, the right and left Bronchiæ, going to the right and left lungs. These Bronchiæ subdivide into other bronchiæ, until they finally become minute tubes, each one going to a separate air cell.

These Air Cells constitute the principal part of the Lungs; they are covered with bloodvessels, through which the impure blood, returned from every part of the system, passes, being forced there by the contraction of the right side of the heart. The impure blood, in passing through the minute bloodvessels around the air cells, comes in contact with the air and is changed from impure venous blood to pure arterial blood. This is the object of breathing, to bring the air down the windpipe, along the bronchial tubes, until it reaches the air cells and comes in contact with the blood. When the blood is changed by passing around the air cells, it is taken up by another set of vessels and taken back to the left side of the heart, whose contraction sends it through the general system. The windpipe and the bronchial tubes are lined with mucous membrane. This mucous membrane is irritated in common colds.

The inflammation of the mucous membrane lining

the larynx is the cause of croup. When the lining of the bronchia is inflamed, it is called Bronchitis. The treatment of croup has been spoken of before. The treatment of acute or active bronchitis should be much the same; topical applications, such as hot cloths, mustard plasters or blisters, should be applied over the breast. Flannels wrung out of hot water, and frequently renewed, are excellent applications for this difficulty. Fever must be kept down by the depleting remedies used to keep general fever down, such as blood-letting, active cathartics, and nauseants. Dissolve six grains of Tartar-emetic in a pint of warm water, and give a tablespoonful every half hour or hour, sufficient to keep a slight sickness at the stomach, until the fever abates, and a moisture of the skin is produced. If fever and dryness of the skin return, use the Tartar-emetic water again, in the same way. The warm-bath in this, as in most other inflammatory diseases, is of great utility. After the disease has existed some time, and the patient is weakened with a cough and difficulty of breathing, the Syrup of Squills or a Syrup of Elecampane or Horehound, combined with Cherry-tree bark, and some preparation of Iron is very useful; using at the same time, some irritation on the outside, as a blister or mustard plaster; and using the salt-bath every three or four days; and being careful to avoid exposure; — nor use the voice more than is absolutely necessary. Many cases of chronic bronchitis have been mistaken for consumption, and when cured, they are reported as cases of consumption cured.

Consumption is a very different disease; it is not situated (at least in the first stage,) in the bronchial tubes, but in the substance of the lungs themselves.

Some persons are predisposed to consumption; that is, they have from their infancy, the seeds of the disease in their lungs, transmitted to them from their consumptive parents; these seeds of consumption are called Tubercles; they can easily be detected in the lungs of those predisposed to this disease, resembling little yellow seeds. These seeds may lie dormant in the lungs during life; but it is seldom they do. In the spring-time of life, generally, and from a slight cold they are germinated, and rapidly grow into the most incurable disease. When these seeds begin to be developed into disease, they enlarge, inflame, and finally change into matter, which is discharged through the bronchial tubes, thence up the windpipe, and out at the mouth, forming sores in the lungs, which rapidly increase in size, eating away the substance of the lungs, until there is not lung enough left to purify the blood; then the patient dies. You can always detect these cavities in the lungs, by putting the ear to the chest, when you will hear the gurgling of the matter within, especially when the patient coughs. The chest sinks as the lungs decay. By tapping on the chest, it sounds more hollow than in the healthy one. The patient becomes weak, pale, poor, he has fever every afternoon; profuse night-sweats, sometimes diarrhea, hacking cough at first, afterward more violent, throwing up yellow matter. When this disease fairly sets in, and large cavities or sores are formed in the lungs, it is incurable. Those cases staring one in every quack advertisement, of consumption being cured, are vile impositions to extort money from the credulous sufferer.

The only hope of cure is in the first stage; before the sores are formed; before matter is spit up to any

great extent. In the first stage of the disease, the person should live on the most simple, unirritating food; and he should ride much on horseback; this alone, has prevented many cases of consumption; at the same time, he can use a tonic of Sarsaparilla and Wild Cherry bark, with some preparation of Iron; rubbing the body from head to foot every morning with a flesh-brush, and taking a salt-bath once a-week. Removing to a warm climate is also very necessary. Use dry cupping on the outside of the chest, and Tartar-emetic ointments in order to raise a crop of sores there; this will draw the irritation from the inside to the outside, and thus prevent the disease being developed. When the disease fairly sets in, an occasional vomit will help to throw up the matter. Nourishing food, and tonics of Bitters, Iron, and the Mineral acids will support the system. A little Opium will check the diarrhea, and allay the pain; Blisters will also be useful, but no hope can there be, of these remedies curing the disease. Medicines introduced by inhalation act more directly on the diseased lung than when taken by the mouth.

In Pneumonia or Inflammation of the Lungs, which commences with chills, pain, and oppression in the chest, the difficulty of breathing increasing as the disease advances, with cough, the skin hot, the pulse strong and quick, difficulty in drawing in the breath, tongue white, the bowels costive generally, the treatment should be of the most active kind, or the patient dies; bleeding from the arms freely, and several times, if the violent symptoms should return; then Tartar-emetic in sufficient quantity to keep the patient constantly nauseated, Cupping over the chest, mild Cathartics, and Injections; the Warm-bath. If oppres-

sion still continues, large Blisters on the chest. These means, if used actively, will generally cure the patient. There is a variety of inflammation of the substance of the lungs, occurring in malarious districts, commonly called "Lung Fever," that is peculiar in its nature, and requires a peculiar treatment. It is most apt to occur in damp, chilly weather, during the winter and spring, when the temperature is between the freezing and the thawing points — that kind of cold, damp weather that strikes a chill through one, more disagreeable than a more severe coldness, that would freeze up the moisture. The damp atmosphere, at such times, seems to be peculiarly favorable for the reception and dissemination of miasms. Such weather seems to relax and prepare the system for the reception of malarious poisons; especially is it so with systems already debilitated by malarious diseases. Persons having had the Fever and Ague, are liable, during such weather, to take a chill; the blood, leaving the surface and extremities of the body, rushes in on the lungs and congests them so much more violently than in a chill of the common Fever and Ague, that when the reaction or fever takes place, the blood is not entirely driven from the lungs, but a portion of it remains, and becomes consolidated, filling up the spongy structure of the lungs, so that it resembles liver instead of lung. Now, there is no way of removing this hardened lung, except by its becoming inflamed and changed into matter, and discharged by the mouth. This constitutes what is called "Lung Fever," in Fever and Ague districts. It is marked by fever, which continues all the time, dry skin, a dry, brown tongue, difficulty in breathing, not much pain in the chest, unless the pleuræ are also inflamed, and a circumscribed

purple flush on the cheeks, or more generally, on one cheek only. This is the most fatal disease that is peculiar to malarious districts, and requires the best of attention to be cured. Generally, the patient has already been debilitated by disease, consequently, powerful depleting means are inadmissible, such as general Blood-letting and powerful Cathartics. When called to a case that is just attacked, I prescribe small doses of Calomel and Ipecac., say two grains of each, every two hours, until the bowels are freely operated on, after which I continue the use of Ipecac. in sufficient quantity to keep down inordinate fever.

Remember, it is impossible to subdue the fever so that it will not return, until the lung has commenced suppurating, or changing into matter. Keep the face and forehead wet with cold water as long as it is hot and feverish. Flannels, frequently wrung out of hot water, or mustard plasters, must be kept over the breast. If the urgent symptoms do not subside in forty-eight hours, or if the patient has been down two or three days with it before you are called, put on a large blister, covering over one quarter of the entire chest, over the affected lung. Put the ear to the chest frequently to learn how much of it is impervious to the air, and how large a portion is ulcerating. When the hardened lung begins to be changed into matter, the object is to have the matter raised or spit up, as fast as it is formed. If the patient has sufficient strength to raise the matter as it is formed, until the whole of the diseased lung is removed in that way, he will recover. Hence the necessity of not reducing the patient's strength on the commencement of the disease more than is necessary.

Expectoration or raising of the matter, is much

assisted by keeping flannels, wrung out of some hot stimulating fluid, such as camphor and water, over the chest. During this latter period of the disease, no more nauseants should be used than is absolutely necessary to keep down too high a fever. In fact, during this period the fever should be kept down, if possible, simply by keeping the face bathed with cold water. If there is an appetite, give simple food, such as rice, chicken-broth, buttermilk, and the like. It would be well, after the patient commences throwing up matter, to give a tea-spoonful of the Compound Syrup of Squill, with two grains of quinine, every four hours, for two or three days. It will have a tendency to assist expectoration, and prevent an undue return of fever.

PLEURISY.

In Pleurisy (inflammation of that serous membrane which surrounds the lungs and holds them in their place), which is indicated by fever, a darting pain through the chest, not so much oppression generally as in Pneumonia (inflammation of the lungs), nearly the same treatment should be used as in the above mentioned diseases. Opium may be given where the action of the system is somewhat reduced.

ASTHMA OR PHTHISIC.

Spasmodic affections of the lungs, are relieved by nauseating or emetic doses of Lobelia or Squills. Smoking Tobacco, and the common Jamestown Weed have been known to cure it. Whooping-coughs, colds, and most other irritating or inflammatory affections of the lungs, can be cut short by nauseating remedies, the warm bath, light diet, and, afterward, expectorants of Squills, Gum-ammoniac, Senega Snake-root, and the like.

THE HEART.

The Heart is subject to inflammation of its substance, Rheumatism, Dropsy, an enlargement of its Structure, to a changing of its valves into Bone and to Nervous affections. Perhaps we have less control over the Heart, either in the healthy or unhealthy condition, than over any other organ of the body. In diseases of the heart the general system must be kept in proper condition; nothing stimulating should be taken into the stomach, unless in attacks where instant death is threatened; here a teaspoonful of Ether, and a like quantity of Spirits of Lavender will be useful. Dropsy of this organ exists in the serous membrane which surrounds the heart; it is apt to occur when Dropsy exists in other parts of the body; active purging is here indicated, with Jalap and Cream of Tartar. Where there seems to be a want of action in the system, tonics, particularly of Iron, should be used; Sedatives will sometimes prevent the irregular action of the heart; of these Digitalis is most generally used for this purpose: commence with three drops of the Tincture, three times a day, and increase it to fifteen or twenty or thirty. Nothing should be allowed to trouble the mind. Blisters on the thighs are recommended by the highest authorities; cupping over the heart, also.

THE DIAPHRAGM.

The Diaphragm or Midriff, divides the chest from the abdomen or belly. It is muscular and tendinous, contracting at each inspiration, drawing the lungs down, and relaxing during expiration. Hiccup is a spasmodic affection of the Diaphragm; drinking a little cold water, and holding the breath, will generally relieve it.

ABDOMINAL ORGANS.

We shall now ascend out of the chest and go down the gullet into the lower story, as there is no door that opens directly from the chest or engine-room, into the abdomen or furnace-room of the human craft. The Esophagus or Gullet, is a muscular tube, which, by alternate contractions, beginning at the top, forces the food into the stomach. This is the reason why the food goes into the stomach in whatever position we may be placed—head over heels or heels over head.

FOREIGN SUBSTANCES IN THE ESOPHAGUS.

When any substance gets fast in the throat, if it cannot be thrown up or pushed down, with a long, limber stick, with a piece of sponge tied to the end of it, it must be cut out. The gullet, called by physicians the Esophagus, terminates in the stomach.

THE STOMACH.

The Stomach is a sack lined with mucous membrane, which is full of little follicles or holes that pour out the juices of the stomach; it has muscles in its walls that contract it in vomiting, assisted by the abdominal muscles. Vomiting consists in a reversed action of the muscles of the esophagus, stomach and first bowel; this is the reason why bile is thrown up. Bile is not in the stomach naturally, but it is poured into the first bowel. When vomiting takes place, the bile is thrown from the first intestine into the stomach and thence out at the mouth. The stomach is more likely to be deranged than any other organ.

IRRITATION OF THE STOMACH.

In slight Irritation, attended with nausea and want of appetite, the best cure is to miss two or three meals, live light for a day or two, and use an injection once a day, exciting the action of the skin by a thorough washing.

INFLAMMATION OF THE STOMACH.

Inflammation of the Stomach is characterized by a burning, violent pain in it, great thirst, a fever, and generally costiveness. Here you must bleed from the arm, if the patient is full of blood, and cup freely over the region of the stomach. Take nothing into the stomach but Slippery-elm bark or Flax-seed water, with ice in it; a little at a time; swallow small lumps of ice; give injections, and if the system requires nourishment, it must be given by injections.

Mustard plasters and Blisters must be put over the stomach. When the inflammatory action is somewhat reduced, give one grain of Calomel and one-eighth of a grain of Morphia every two hours, until six or seven doses are given. Nothing but the most simple substances must be taken for two or three days after an attack.

DYSPEPSIA.

Dyspepsia is generally supposed to be a Chronic inflammation of the stomach; when the food is not properly digested there is heart-burn and water-brash, the bowels are sometimes costive and sometimes loose, the person becomes weak and poor, subject to fits of despondency.

Dyspepsia is generally brought on by excess in eating and drinking. The only way in which it can be cured is, by paying strict attention to Diet, Clothing,

and Exercise. Simple diet, composed of coarse bread, rice, weak broth and the like; cold water or milk for drink; using no grease; eating slowly; chewing thoroughly, and partaking of but two or three kinds of simple food at a meal; eating at regular times; rising early; using the flesh-brush, and exercising in the open air every morning before breakfast; using the salt-bath once a week; exercising freely during the day in the open air; keeping the mind at ease; wearing clean flannel next the skin; in a word, living temperately in everything, taking nothing in the stomach but what it can readily digest, and avoiding exposure. Two or three grains of Blue Pill, taken every night for a week or more, may be of use to correct the secretions, exciting the liver to action, and a little Rhubarb, or what is better, an injection once a day so as to produce at least one passage a day, until the habit is established at a certain time of the day, which should never be passed over unheeded.

After the irritation of the stomach has been subdued, a Tonic, for instance, five grains of Carbonate of Iron, four grains of Rhubarb, eight grains of Columbo, may be of use taken twice a day. I have seen the most inveterate cases of Dyspepsia cured by these simple means. If the stomach continues very irritable, even when nothing but milk is taken into it, one-eighth of a grain of Morphia with one grain of Calomel should be given three times a day for a day or two at a time.

THE DUODENUM.

The Duodenum, or first bowel, is often diseased with acute and chronic inflammation.

INFLAMMATION OF THE INTESTINES.

Acute Inflammation of the Intestines is known by great tenderness on pressing over the abdomen, thirst, heat, vomiting of very offensive matter, and passing of dark, offensive stools, small, wiry pulse, prostration of the strength, and great anxiety of the person. When the disease is violent and the patient is robust, bleeding from the arm is necessary, and cupping over the seat of the pain; if the bowels are costive, give a dose of Castor Oil, mixed with a few drops of Laudanum, assisting the operation with an injection. While the symptoms are violent and no indication of prostration, for the first twenty-four hours generally give nothing but the Oil and cold Slippery-elm water; after the operation of the Oil, small doses of Morphia and Calomel, using hot Fomentations or even Blisters over the abdomen. After bleeding from the arm, the Warm Bath should be used. For several days after recovery, the patient should use no irritating articles of food or drink.

Chronic Inflammation of the Intestines should be treated very much in the same manner as Dyspepsia, using counter-irritation over any painful part.

LECTURE VI.

LIVER COMPLAINT.

What is called the Liver complaint should be treated also after the same manner. Calomel or Blue Pill should be used in Liver complaint, until a healthy action of the liver is obtained. The Mineral acids are useful in this complaint, both to take internally and to use externally, bathing the bowels, and the feet and legs with a water made slightly acid with equal parts of Muriatic and Nitric acids. Nitric Acid (called Aquafortis), when taken internally for Liver complaint, should be diluted with nine times its weight of Rain-water, of this from ten to thirty drops should be taken three times a day.

DYSENTERY.

In Dysentery, which is an inflammation of the last bowel, called the Rectum, there is great pain, and griping, and a constant desire to go to stool; it is often called the "Bloody Flux." At the onset of the disease, if the symptoms are violent, Bleed from the arm, if not, Cup freely over the lower part of the abdomen or over the small of the back, give an active Purgative to clear out the bowels thoroughly, then inject a teaspoonful of Laudanum in a little Starch-water, giving nothing by the mouth but mucilaginous drinks of Slippery-elm water or Flax-seed tea, with perhaps

one grain of Calomel with two of Dover Powder, every two hours, until the symptoms abate. After Bleeding from the arm, the Warm-bath should be used. Astringent substances should not be used at first, and when they are used afterward, the Dysentery continuing, they should not be taken by the mouth, but injected. A decoction of Oak-bark is perhaps best, or a teaspoonful of Sugar of Lead put in a pint of Water. But three or four ounces of fluid should be injected at a time, and this should be cold. If these means fail, a large Blister should be put over the lower part of the bowels.

PILES.

Piles are little round tumors which grow in and near the opening of the lower gut; they are produced by sitting a great deal or riding on horseback. They occur oftener in persons who do not take much exercise; and they may be produced by a too frequent use of Aloes or of the Patent Pills, nearly all of which are composed of nothing but Aloes, Gamboge, and Compound Extract of Colocynth, with a few other ingredients to disguise their composition.

Piles are very common in females when with child. They are very apt to bleed, and weaken the person. The best way to avoid them is to use Coarse and Simple Food, so as to keep the passages of the bowels soft, be on the feet as much as possible, use Rhubarb or Oil, if necessary, to keep the bowels regular.

Local Applications to the Piles.—Cold Water is excellent mixed, perhaps, with a little Sugar of Lead or Oak-bark Tea or a Decoction of Nut-galls. An ointment, made of Blue Mercurial Ointment, Sugar of Lead, and Extract of Jamestown-weed, is excellent.

When the Piles hang out and are large, they should be cut off or the neck of them should be tied and then suffered to rot off.

HERNIA.

A Hernia or Burst is the passage of the intestine through some hole in the walls of the abdomen; it is apt to occur in infancy from straining, crying, or from injury. Herniæ are generally at the navel, in the groin, or in the bag of the testicles. When they occur, the intestine should be gently passed back and a compress put over the hole, where the intestine came out, and kept there until the hole grows up, which will soon take place in children; a truss is the best for this purpose.

We come now to speak of certain peculiar affections that attack different parts of the body, and first of

RHEUMATISM.

Rheumatism is of two kinds, the Acute and Chronic Rheumatism may exist in the muscles or in the joints. In the Acute there are all the symptoms of fever, with violent pain in the rheumatic parts; this species of Rheumatism is treated by Bleeding, Mercurial purges, Cupping over the part, the application of Cold Washes, Compresses, after which the internal administration of Opium, Digitalis, or Hyoscyamus.

Chronic Rheumatism is attended with pain but no fever; it exists in the joints principally, shifting from one to the other. It is generally produced by strains and injuries of the joints. Here the internal administration of Alterative Medicines, or such as alter the whole system slowly without any visible action, are indicated, such as the Blue Pill, the Hydriodate of Potassa with Sarsaparilla; keeping the general system

in an unirritated, calm state by the use of simple food. In fact, there is no condition of the system but what a careful regulation of the diet, clothing, exercise, and cleanliness, using temperance and regularity in all things, will aid the action of medicines, in many cases effecting a cure without the use of medicines.

Beside the Alteratives in Rheumatism some other medicines are valuable, such as Indian Hemp, the Tincture of Guaiacum taken internally, twelve or fifteen grains of the Gum taken three times a day, or from twenty to thirty drops of the Tincture of Colchicum three times a day, unless it purges too severely, then lessen the dose; at the same time washing the part twice a day with Tincture of Iodine, bandaging it afterward tightly with flannel bandages. In bandaging, the bandage should be about three inches wide, and rolled up tightly commencing at the extremity of the limb, and winding it upward evenly, turning the bandage when the limb begins to grow larger so as to have the compression equal from the extremity upward. Blisters and Stimulating Liniments are also good.

Acute Rheumatism sometimes goes from the muscular structure of some limb to the muscular structure of the heart, causing sudden death. When Rheumatism leaves one part for another, it attacks the same kind of a structure as it leaves; if it leaves a fleshy part it goes to a fleshy part; if it leaves the serous membrane of a joint, it goes to a serous membrane.

GOUT.

The Gout is a disease similar to rheumatism. It differs from it in the suddenness of its attack, in its being confined to the smaller joints, in the deposition,

in Gout, of chalky matter in the smaller joints, and in its almost invariably being produced by too high living. It is a very common disease among the wine-drinking nobility of England.

The TREATMENT is to correct the general system, keep the bowels open, giving Opium internally and bathing the limb with soothing applications during the violence of the attack. A mixture of Laudanum, Camphor, and Alcohol is a good wash. The use of the Tincture of Colchicum, as in rheumatism, is highly recommended. During the intervals of the attack, the patient should correct his intemperate habits, so as to prevent a recurrence of the disease.

DROPSY.

Dropsy is an accumulation of the serous part of the blood in different parts of the system; sometimes in the limbs, sometimes in the abdomen, sometimes in the chest, and about the heart, and sometimes in the head. When it is recent, and attended with excitement of the system with fever, depleting remedies should be used, as general Blood-letting, Cupping, Active Cathartics, such as Eleterium or wild Cucumber; Jalap and Cream Tartar; from ten to fifteen grains of Jalap, four grains of Calomel, and three drachms of Cream Tartar repeated every four or five hours, until free purging is effected, using light diet. When the disease has existed a long time, Squill, with small doses of Calomel is very useful, keeping the skin in action by daily frictions and the Salt-bath. If there is debility, Tonics of Iron and Bitters are good. Try to ascertain the seat of the disease, and remove it. Children are frequently affected with dropsy of the head. Keeping the skin in action by

frequent Bathing, light diet, rubbing the head with Mercurial ointment and the use of Blisters, frequently removes it. When there is a large collection of water in the abdomen, chest, or head, it should be drawn off by an experienced physician. I have seen two large pailsful drawn from the abdomen of a patient at a time. Compressing the dropsical parts with bandages, will sometimes cure it. Some cases are reported to have been cured, by using Alder bark in Wine.

PALSY.

Palsy consists of a loss of feeling or motion in a part. Sometimes there is a palsy of the whole of one side of the body; in this case, the cause is generally situated in the opposite half of the brain; the brain being divided into two parts, the right and left hemispheres. Sometimes the legs and hips are palsied; the cause in this case is probably situated in the spinal marrow. If you cut off the spinal marrow in the small of the back, you paralyze all the lower parts of the body, which derive their nerves from the lower part of the spinal marrow. If you cut off the spinal marrow above the chest, you destroy life instantly, by paralyzing the vital organs. When the cause of palsy exists in the brain (which is generally the case), it may arise from some unnatural growth or collection inside the skull, a thickening of the skull itself, or a depression of the skull from an injury. If it cannot be absorbed away by an extremely light diet, the use of Blue Pill, Mercurial ointment, Hydriodate of Potass, Cupping along the back, or by a surgical operation called Trepanning; there is but little hope of recovery. Rubbing the palsied part with irritating substances, such as Mustard and Pepper, Hartshorn,

Blisters, etc., is useful; also, the passing of Electricity through the part, and the use of the Shower-bath on it. Where palsy is recent and sudden, without any serious affection of the head, it is probably owing to some derangement of the bowels, and is removed by an active Cathartic.

CONVULSIONS OR FITS.

Fits, when produced by worms, are prevented by the use of Turpentine—a teaspoonful three times a-day; half a teaspoonful to a child, worked off with oil, if necessary; or Pink and Senna; ten grains of Pink root, and fifteen grains of Senna, steeped in boiling water, given twice a-day, or a few drops of Worm-seed Oil, given four or five times a-day. Children using much common salt with their victuals, seldom have worms. When fits are produced from other irritating substances in the stomach or bowels, an Emetic, afterward an active Cathartic are indicated; give an Emetic of twenty grains of Ipecac., and two of Tartar-emetic, assisting its action with Chamomile tea; afterward, four good-sized Pills, composed of equal parts of Calomel, Rhubarb and Aloes; repeating two Pills every two hours, until an operation from the bowels is produced; taking no food but thin Water-gruel, and no drink but Cold Water. This course, with the Warm-bath, will not only remove fits, but a great many other diseases and bad feelings that are produced by an accumulation of irritating substances in the bowels. If the person's bowels are very torpid, hard to be acted upon, use the same number of Pills, composed of equal parts of compound extract of Colocynth, Scammony, and Aloes. Where fits become habitual, increasing in frequency, and destroying the mind, notwithstand-

ing the foregoing efforts to remove them, the cause is probably situated in the brain; and if it cannot be removed by a surgical operation, by the use of certain mineral Tonics, as Nitrate of Silver, Bismuth, Carbonate of Iron, and Blisters or Setons along the back, it may be considered a hopeless case. This variety of fits is called Epilepsy. During a convulsion, cold water should be poured on the head.

APOPLEXY.

Apoplexy is caused by the rupture of a bloodvessel in the brain, by which blood is poured out, compressing the brain; or it is produced by the pouring out of the serous part of the blood without the rupture of a bloodvessel.

The rupturing of bloodvessels is the most frequent cause. Persons of a full habit, fleshy, with thick, short necks, are most liable to be attacked by it. When a person is attacked with apoplexy, which is generally brought on by violent exercise of the body or mind, the violent action of the sun, he falls down, breathes slow, afterward, convulsively, snoring and foaming at the mouth; the eyes and face are flushed and distorted, the pupils dilated, the eye looks dull and fixed; sometimes blood bursts from the nose. It is often a fatal disease; if he gets over it for a time, he is apt to have it again, and generally is attacked with Hemiplegia (paralysis of half of the body). The treatment must be of the most vigorous kind. Recollect, that the pressure of blood on the brain, is the cause of the disease; the only hope we have to draw away the accumulated blood, is by bleeding. Open a vein in each arm; make a large orifice, and bleed largely and frequently until the symptoms are changed, have the patient put in a cool place, where there is

fresh air; let his head be elevated; put his feet in hot water, and put the coldest water to his head; pour several bucketsful from a pitcher or a coffeepot, from a height on his head. As soon as you use these means, give active purges, Calomel and Jalap, and Colocynth; if the patient cannot swallow, drop four or five drops of Croton oil on the tongue.

Persons of an apoplectic habit, should always be on the guard against an attack; if they become plethoric, that is, full of blood, and feel an unnatural fullness in the head, they should ward off an attack by light diet, saline purgatives, such as Salts and Magnesia, or Cream of Tartar; they should sleep with the head elevated; should avoid a full supper, and never have any tight ligatures around the neck or body.

HYDROPHOBIA.

Hydrophobia means literally, fear of water. This definition is perhaps questionable, inasmuch as dogs, when first attacked, drink freely, and it is only when their throats swell, so that they cannot drink, that they make such spasmodic motions when they attempt it. This disease originates almost invariably, in the canine species; from what cause, we know not; their bite communicates the disease to every animal; to all, it is equally fatal, more particularly so to man. The poison may lie dormant in the system, from ten days to as many months.

When a person is attacked he first feels a pain in the part bitten, extending up along the nerves going from the part; he feels a drowsiness and fullness of the head. He soon becomes excited, he is agitated from the slightest causes, fearful, his eyes become unnaturally brilliant, he is sick at his stomach; after a

while he becomes unable to swallow liquids, gasping like a drowning man every time he attempts it; he raves; in a few days death terminates the melancholy scene.

When a person is bitten by a mad dog, he should wash the part constantly with the nearest water he can get—warm water if possible; pour it on the part from a height; inject it with a syringe; tie a string tightly around the limb above the bite; suck out the wound with the mouth (there is no danger in taking it into the mouth), or put a cupping-glass over the wound; keep washing this way for fifteen or twenty minutes, then cut the edges of the wound out with a sharp knife. Where a tooth has gone into the flesh, take a sharp pointed stick, put it into the place made by the tooth, and then cut the part all round the end of the stick, so as to take out a little cap of flesh on the end of the stick; when this is done, cauterize the whole wound with Nitrate of Silver, or Caustic Potash, or Ammonia; then put on a Bread-and-Milk Poultice on which is spread an ounce of Mercurial ointment; keep the sore running for several days. When you have got the wound dressed give the patient a large dose of Calomel and Opium, three grains of Opium and fifteen of Calomel, and let him go to bed and sleep as long as he can; after eight or nine hours, if the bowels are not open, give a purgative.

If, however, the disease attacks the person, medicine knows of no certain remedy. Trust not, I warn you, to the trifling herbs which are said to have cured Hydrophobia; they never did. There is but one means I should have any confidence in after the disease has commenced — it is the means I should use if I were attacked with Hydrophobia. It is the remedy for the

bite of poisonous snakes and insects, and in every case of this kind, has cured the patient. I would say, by the way, that the bite of a poisonous reptile is to be treated, at first, in the same manner as the bite of a mad dog

If then a person is attacked with the singular disease arising from the bite of a venomous serpent or insect, or of a mad dog, or from a wound received in dissecting a dead body, he should first cauterize the part wounded with Caustic Potash, Nitrate of Silver, or a red-hot iron; then commence drinking Spirits, Whisky, for instance, drinking and walking until he can walk no longer; keep him dead-drunk as long as there are any active symptoms of the disease for thirty-six or forty-eight hours. If Spirits don't do the business properly, combine them with Opium. This treatment will cure the bite of poisonous snakes, and I don't see why it will not cure the bite of the mad dog. It is the remedy I should use in my own case, and the only one I should have any confidence in after the paroxysms have commenced. If the Spirits cannot be taken by the mouth, they should be injected. Chloroform might be used.

CANCER.

Cancer is another of the diseases that too frequently, like consumption, diseases of the heart and of the nervous system, baffles all human skill. It attacks many parts of the body, but generally the nose, lips, eyelids, breasts, uterus, and testicles. It first appears as a hard, bluish lump which can be moved about with the finger, and from which goes a darting pain. Some cases are reported to have been cured, when taken at first, by compression and by the application of substances to stop at once the irritability of the part, as

preparations of Arsenic, or Corrosive Sublimate, or the Iodide of Mercury. Take ten grains of Corrosive Sublimate, put them in two ounces of Water, dip a little rag in it and lay it over the part once a day. The only sure remedy there is, and this is sometimes not sure, is extirpation, cutting it out before the disease has time to affect any other part. When it occurs in the breast, for instance, cutting it out before little lumps appear in the direction of the armpits and in the armpits.

AFFECTIONS OF THE KIDNEYS AND BLADDER.

Active Inflammation of these parts is to be treated by the general reducing plan spoken of in internal inflammation and by Cupping on the outside. Where there is a long-continued disease of the Kidneys, an irritation should be kept up on the outside by Tartar-emetic Ointment, Setons and Cupping, with the internal use of Mucilaginous drinks and teas of Uva Ursi or Buchu Leaves.

When Stone exists in the Bladder too large to be discharged by the Urethra, the only remedy is an operation, either with instruments to crush the stone or to cut it out.

EXCRESCENCES ON THE SKIN.

Little hard growths on the skin, as Corns, Warts, Moles, are cured by first moistening them an hour or more in warm water and then paring them down till the blood appears, then cauterizing them with Lunar Caustic, Caustic Potash, or Aquafortis, or a red-hot Iron; afterward put a little Cotton over them, and if it is a Corn, wear a loose Shoe for a few days.

ASPHYXIA FROM DROWNING.

In cases of Drowning the subject should be stripped and wrapped in a warm Blanket, the limbs, back and body should be rubbed well with stimulating substances, as Mustard, Turpentine, Ammonia. Warm Spirits should be passed into the stomach by a stomach-tube. Artificial respiration should be resorted to; hold the nose of the patient with one hand, and then blow into the mouth with the mouth of the operator, pressing on the chest, after each time he blows, so as to imitate the natural respiration; if a pair of bellows is used, hold the mouth and put the muzzle into one of the nostrils, holding the other nostril; don't blow hard; blow and press on the chest afterward about twenty times in a minute.

SHOCKS FROM LIGHTNING.

Persons that are struck by Lightning should be dashed with cold water, stimulating substances being rubbed on the surface at the same time, to bring back the spark of life. In fact, the treatment for drowning would, in the main, be appropriate for those struck with lightning or for poisoning, with sedative, sleep-producing substances, such as Opium, Poison, Hemlock, Henbane, Foxglove, Deadly Night-shade, Jamestown Weed.

POISONS.

TREATMENT FOR POISONING FROM NARCOTICS FOR OPIUM AND THE ABOVE MENTIONED SUBSTANCES.

After the Stomach has been emptied (which should be the first thing done in poisoning from any substance) with an active Vomit, for instance, twenty grains of White Vitriol, dissolved in a teacupful of

water, or Ipecac. twenty grains, and Tartar-emetic two grains, or with the Stomach-pump, Stimulants, such as hot Coffee, should be given, using friction continually and keeping the patient awake and in motion. For poisoning from any of the preparations of Opium, the treatment would be the same as from the Gum Opium as from Laudanum, Morphia, Paregoric, or Black drops.

Poisoning from Arsenic is remedied by the internal use of the Hydrated Peroxide of Iron, a bottle of which should be kept constantly at hand when arsenic is about; by taking it freely it changes arsenic into a harmless substance. When Corrosive Sublimate is taken the whites of eggs should be given as much as the stomach can hold. When the Mineral acids, as the Nitric, Sulphuric, or Muriatic are taken, weak ley of Ashes, Magnesia or Soap should be taken freely. When Caustic Potash or Lime, or any other caustic alkalie, acids should be taken, as Vinegar, Diluted Sulphuric or Nitric acids. When an Emetic is given to throw up a poison, it is assisted by a Poultice placed over the stomach, of Tobacco steeped in vinegar.

HYSTERIA.

Hysteria, commonly called "Hysterics," is a nervous disease, caused by indolence, affections of the mind, improper food, and the like. The Cold-bath will most always check an attack; if there is much fullness of the system, Bleeding is necessary, followed by medicines to allay the irritability of the nervous system, as Valerian, called by some Nervine or Lady Slipper root, Assafœtida, Camphor, and, perhaps, Opium.

DELIRIUM TREMENS.

This is a disease of the Nervous system principally, in conjunction with much irritation of the Stomach, caused by an excessive use of spirituous liquors. The patient is restless, sleepless, has trembling, the most horrid apparitions before his eyes continually; imagining his life is to be taken by hobgoblins that surround him. The treatment of Delirium Tremens varies according to its occurring while the patient is drinking excessively, or, from a habitual drinker, being suddenly deprived of his cups. In the former a Depletive and Sedative plan must be pursued; in the latter Stimulating and Sedative. In the former stimulating injections must be given, so as to open the bowels thoroughly; give internally pills of Scammony, Compound Extract of Colocynth and Aloes; perhaps Bleeding will be necessary. After the bowels are open give Laudanum, Camphor, and Assafœtida until the nervous system is quiet, until sleep is produced. Where Delirium Tremens occurs from depriving the patient of his accustomed drams to the above treatment, his accustomed quantity of spirits must be given until he recovers from the attack; and then if he wishes to stop the use of them he can do it gradually.

WOUNDS.

We now come to Wounds. A simple cut wound, called an Incised wound, is the simplest; its edges should be brought together and be kept there by bandages, strips of sticking-plaster (that is, common sticking-plaster, spread on muslin, and then cut in narrow strips), the plaster on the strips being melted, they should be drawn across the wound; if a muscle

is cut across whose contractions would tend to draw the edges of the wound apart, stitches should be taken every two or three inches. Let each stitch be separate. If a large bloodvessel is cut off, it must be tied, letting the ends of the string hang out of the wound. The parts should be kept at rest, and the dressing should not be removed for four or five days. In what is called Punctured wounds, where an instrument pierces the body, if there are any foreign substances in the wound that will produce irritation, they must be taken out, bloodvessels tied if they bleed alarmingly, and the parts must be held together by bandages as much as possible, and kept perfectly still; if there is feverishness in the system it may be necessary to bleed, and give saline cathartics.

Lacerated wounds are those produced by a blunt instrument, by the kick of a horse, for instance; where the edges of the wound are jagged and the parts bruised, the wound does not heal so readily as a simple incised wound. This kind of wound however, bleeds but very little, from the fact that wherever a vessel is bruised or twisted off it bleeds but little; but where it is cut smoothly off it bleeds much more. Some surgeons twist quite large vessels instead of tying them to stop their bleeding. In lacerated or torn wounds the parts should be washed clean, every foreign substance, such as dirt, hair, and the like, should be carefully removed from it, and the parts brought together by strips of adhesive plaster, and moderately tight bandages; if the inflammation of the part becomes too violent, cold applications must be applied: Cold Sugar of Lead-water is a good application; at the same time reducing the action of the system by light diet, salts, and bleeding, if necessary.

Large bloodvessels are frequently cut off which it is necessary to tie; if the blood, on issuing from the vessel, be dark, and runs in a continuous stream, it is a vein that is cut, and in tying it you must tie the cut end, that is, farthest from the heart, for you are aware that the blood in the veins runs from the circumference to the centre of the body, to the heart. If the blood, on issuing from the wound, is of a bright-red color, and comes out in jets, it is an artery that is cut, and here the cut end nearest the heart must be tied; because the arteries carry the blood from the centre to the circumference of the body or from the heart. If the artery is a large one, it is necessary to tie both extremities, for there are no valves in the arteries as in the veins, to prevent the blood running in a backward direction.

The arteries are not so apt to be cut as the veins, because they are more deeply seated. If the vessel is not too large, the bleeding can be stopped simply by scraping up some cotton, and putting it at the extremity of the vessel and then compressing it slightly. When a bloodvessel is cut which passes over a bone, as the vessels of the wrist or of the temples, a little pyramid should be made of pieces of muslin of different sizes, the smallest being put on first, and then a larger, and so on, and then a tight bandage should be drawn round the part so as to press directly on the vessel. A great many lives might have been saved in cases of wounds, if the by-standers had only known how to compress the bloodvessels until medical aid could have been obtained.

LECTURE VII.

WOUNDS OF THE ABDOMEN.

Slight wounds of the Abdomen, not penetrating the intestines, should be drawn together with strips of Adhesive plaster, with, perhaps, a few stitches, and treated as a simple wound; if the intestines protrude they are to be carefully returned, and the part drawn together — nothing should be given to evacuate the bowels, and the lightest diet should be prescribed. If fever occurs, free bleeding should be resorted to. If the intestines are cut, blood is vomited and passed by the other passages, the patient rapidly sinks: there is not much hope here in any treatment.

Wounds of the Neck are treated by tying the large vessels that are cut, bringing the parts together with separate stitches and by low diet.

In wounds of the Gullet, and in fact, in nearly all severe wounds of the throat, the food should be introduced into the stomach by a Gum-elastic tube passed into the stomach through the nose; the chin should be fixed on the breast-bone until the wound heals.

Slight wounds of the chest are to be treated as elsewhere; when they penetrate into the lungs, indicated by wind passing out of the orifice, the orifice should be closed to prevent wind from entering it, and a bandage applied; if blood collects there, it must be let out of the wound, as also when it collects, in wounds

of the abdomen. The patient should avoid talking and coughing as much as possible: low diet, and depleting remedies should be used.

In gunshot wounds, if the bone is much shattered, the limb must be taken off. If the fleshy parts are wounded only, first take out the foreign bodies, such as pieces of clothes; the ball, if it can be found, tying large vessels if they bleed much and dress the wound with lint, over which, put a piece of muslin, on which is spread an ointment of equal parts of Lard, Tallow, and Beeswax. Gunshot wounds generally bleed but very little, because the tearing of the vessels causes the ends to contract. But afterward when the ends of the vessel slough off, bleeding is apt to recur with greater violence. In a very violent wound, where the general system sympathizes, causing the person to be restless, it is best to give a large dose of Opium, so as to put the system to sleep, and make it forget the injury done to it, and not resent it by too excessive reaction.

In common bruises and sprains, apply cold water to the part; keep a rag wet with cold water, around the limb continually. If inflammation takes place, reduce the general system by light diet, and purging. When a person has received a shock so as to render him insensible, and you cannot detect a pulse, don't bleed immediately, but wait till reaction takes place, and you can tell better whether bleeding is necessary. While the person is pulseless, rather use stimulants, such as Hartshorn or Camphor until he revives. When bleeding occurs from a vessel that you cannot tie or compress, as in the extraction of a tooth, apply some astringent, such as Ice Sugar of Lead, Alum, Nut-gall, or the Nitrate of Silver.

And here I will remark, that when hemorrhage or bleeding occurs from the stomach, lungs, bowels, or excessive bleeding from the uterus, and the person is strong and plethoric, open a vein, and bleed in the sitting posture until fainting. When fainting occurs, it seems to have a potent influence in arresting hemorrhage in any part of the body. If, however, the bleeding continues, give Ice-water and small doses of Sugar of Lead, and apply cold applications over the surface. If it be uterine hemorrhage, inject cold water into the uterus, or what is better, Cold water with Sugar of Lead, a pint of the former to a teaspoonful of the latter, injecting a couple of ounces at a time. If given internally, three or four grains every two hours, until the hemorrhage stops. If Sugar of Lead is not at hand, Alum-water, or a decoction of Oak bark, or Gall-nuts will answer.

Hemorrhage from the nose may be stopped by cold applications to the face, head and genitals, or by blowing Tannin up the nostrils, or by plugging the nostrils before and behind.

Hemorrhage from the lungs should be treated by inhaling astringent vapors; vapor from water saturated with Tannin. Frequently hemorrhage is an effort of Nature to relieve some congested organ, and should not be interfered with, as where there is a stoppage of the menses or monthly discharge.

Wounds of the head are always dangerous, and if there is any probability of the skull being broken, which is generally known by the person being stupefied, appearing as though in a deep sleep, the brain is evidently compressed, either by a depression of the bone or an effusion of blood inside the skull. A skillful surgeon is here absolutely necessary to elevate the

bone if it be depressed. If the pulse is full and the person comatose and snores, Bleeding and cold applications to the head, as in apoplexy, is all that you can do. When the tendons of muscles are cut off, as those of the Wrist or the Hamstrings, or the tendon of the heel, the limb must be flexed, bringing the cut ends of the tendons as near together as possible, at the same time, bandaging along the course of the muscles, so as to keep the muscles at rest until the cut ends of the tendons unite. From the imperfect healing of wounds, as well as from exposure to wet and cold and the taking of indigestible substances into the stomach, a peculiar and dangerous condition of the nervous system is sometimes induced, called Lockjaw. It is most frequently produced by sticking forks or needles, thorns, or rusty nails into the hand or foot. It often occurs from gunshot wounds, when part of a nerve is divided, leaving the other part in an irritable condition. The symptoms are a stiffness of the back and neck, with an uneasy sensation at the root of the tongue, difficulty in swallowing, a fixed state of the jaws; the spasms recur every ten or fifteen minutes, increasing in frequency and severity, until the patient is carried off, unless relieved. If the patient be of full habit, robust, bleed freely from the arm; then give large doses of Opium; if it cannot be given by the mouth, inject Laudanum and Starch water; don't give it by the dose, but by the effect it produces. A person in this disease frequently requires three or four times as much as in ordinary cases. If you inject it, use two or three teaspoonfuls of Laudanum every two hours, until the spasms are released. The Warm-bath is recommended, and also Douches with Cold water. If it arises from a nerve partly divided, the nerve must

be cut off entirely; the original wound must be opened again with Caustic.

FRACTURES.

The Fracture of a limb is simply the breaking of the bone of the limb; it may also be attended with a wound of the fleshy parts around the bone, and the tearing off of large blood vessels; the ends of the bone may be pushed through the flesh. Where there is a simple fracture without other wounds, you can detect it by rubbing the ends of the bones together, by which, a grating is produced. The Treatment is, to put the ends of the bones together, place the limb in its natural position, noticing that it is as long as the other limb; then winding the limb with a bandage; then putting thin cotton batting along where you want to apply the splints of shingle or pasteboard, and when these are applied, winding the whole again with a bandage; the limb must then be kept perfectly quiet for several weeks, held in such a position that all the muscles will be in a relaxed condition. If there is a flesh wound with the fractures, the large vessels that are ruptured must be tied; foreign substances must be removed; the broken bones put in as natural a position as possible; the external wound must then be dressed as a simple wound, and the whole done up in bandages and splints.

When the thigh-bone is broken, some kind of an apparatus is necessary to keep the limb extended, so that when it unites together, it will be as long as the other limb.

The best way of treating fractures of the thigh, is, to let the patient lie on a straw bed, with the leg extended; then take two pieces of board, about three or four feet long, and eight or ten inches wide; one

is to be placed on each side of the leg; the upper end of the inner one is to be cushioned, which is to be pressed up against the groin; there is to be a cross-piece at the bottom, to which the foot must be tied, keeping it down, so as to be of the same length as the other leg; it must be kept in this position until healed.

When the joint of a limb is affected, and a stiff joint—Anchylosis—is threatened, the limb must be placed in that position, it would be most convenient, if stiff, to perform the ordinary duties of life. If the fracture is in the knee, the leg must be kept straight by being bandaged in a box filled in with cotton batting, so as to keep the leg in the same position.

If the fracture is in the elbow, it must be bent to a right angle, because if the joint becomes stiff, the fore-arm would be more useful if at a right angle with the arm. In fractures, as dislocations of all other bones, bandage and splint them in the right place, and keep them so, till healed.

DISLOCATIONS.

In a Dislocation, or when a limb is put out of joint, it should be returned to its place as soon as possible; and if a surgeon cannot be soon had, it is better for others to attempt it, than to wait until swelling and inflammation take place, when it will be much more difficult to put it in place. You can tell when a bone is out of place, by the limb being of unequal length with the corresponding one; by the end of the bone being out of its accustomed place; by pain, and by an inability to move the limb. When the large limbs are out of joint, as the thigh, leg or arm, put a roll of muslin between the legs or under the arm, as the case may be, which is to be held by assistants behind

the patient, or which may be tied to a post, in order to hold the patient when the limb is pulled; then wind another wide strip of muslin around the limb, with which other assistants are to draw the limb lengthwise—yourself pull the end of the dislocated bone a little out from the end of the other, and it will generally slip in its place readily. The shoulder can generally be put in its place in this manner. Let the patient lie down, and put your foot in his armpit; grasp with both hands his wrist and fore-arm; get him to tell you all about the accident, and while he is off his guard, draw the arm suddenly, and the end of the bone will slip in; the arm should afterward be bandaged to the breast for some time; in fact, after all dislocations, the limbs should be kept quiet for some time afterward, until the ligaments which held the ends of bones in their joints contract and recover from the great tension to which they have been subjected.

In dislocations of the smaller joints, as the wrist, fingers, or collar-bone, the same principles of extension and counter-extension will apply, drawing the ends of the bones slightly from one another, until they come in place, and then keeping them in place by splints and bandages for sometime afterward. The jaw is sometimes dislocated in gaping; here put on a pair of thick gloves, put your thumbs on the teeth, and your fingers below the jaw; press down with your thumbs; draw up and forward with your fingers, slipping your thumbs between the jaws and lips when it goes in joint, or else they will be bitten. In fracture of the lower jaw, the jaw should be tightly bound to the upper one; a little pasteboard splint should be bandaged over the broken part, the bandage going over the head; nourishment should be sucked through

the teeth or injected. If the limbs cannot be returned to their places in this manner, bleed, use the Warm-bath, and nauseating doses of Tartar-emetic until the muscles relax, or use Chloroform.

AMPUTATION.

In case of a limb being torn to pieces, where it is necessary that it should immediately be taken off, and a surgeon cannot be obtained, the limb can be taken off very easily and safely by very simple instruments, and by any person who has a little courage. Provide yourself with a straight Carving-knife, very sharp, a very sharp Penknife, a few waxed linen or silk Strings, a Needle, a pair of small Pinchers, a piece of Muslin two feet long, torn in the middle, a long Bandage rolled up, a piece of old Muslin spread with Lard, or Ointment made of Lard, Tallow, and Beeswax, and a carpenter's Back-saw, or Saw with a piece of iron on the back to keep it stiff; give the patient sixty drops of Laudanum; then above the part to be cut off, tie a handkerchief, and twist it round with a stick, so as to compress the arteries of the limb, and prevent excessive bleeding; now make an incision around the limb through the skin, so as to form one large flap of skin that will cover the end of the amputated limb, or two flaps, which, meeting in the middle of the end of the limb, will cover it that way; dissect the flaps up, and let them be held by an assistant; then with the large knife cut the fleshy part of the limb around down to the bone; put the piece of slit Muslin so that one slit shall be on each side of the bone, and let an assistant hold the cut parts of the limb up with the muslin, while you saw off the bone, smoothing off the edges of the bone afterward; then tie the bloodvessels,

letting the strings hang out of the wound; draw the flape together; put a few separate stitches through them; then draw them together with strips of adhesive plaster, over which, put the ointed Muslin; then roll the whole up snugly with the bandage.

CHOLERA.

The Cholera is one of the greatest scourges that ever afflicted mankind. The Hindoos have a tradition of its having existed many hundred years ago. The first authentic accounts however, that we have of it was in India, in 1787.

It continued to prevail more or less in India, exciting no great fear in other nations, for it was supposed to be peculiar only to that country, as we suppose the Yellow fever to be peculiar to the southern seaboard, until 1817, when the epidemic became alarming, spreading over a large portion of India. It attacked the English army, then engaged in subduing India, five thousand men of which were cut down in five days. In 1818 it became nearly extinct. The next year, however, it revived, and in 1820 and 1821 it spread over a great part of Asia, Java, and the East India islands, and westward through Persia and Asiatic Turkey. In 1823 it first appeared in Europe, in Russia. It seemed to slumber again during the six following years. In 1829 it broke out with fresh violence in Persia. In 1830 it became extinct again. The following summer it re-appeared on the frontiers of Persia and Georgia; it extended northward to the Arctic Ocean, and westward through the western divisions of Russia and Poland, committing most fearful ravages, increasing in power as it progressed. In 1831 it extended over the most of Europe.

Its ravages were not so dreadful in Europe as in Asia. In 1832 it first broke out in Montreal; thence it rapidly spread over the United States. It did not seem to be influenced by locality; the high, the low, the dry, the wet, the cold, the warm places seemed to be attacked indiscriminately. It was not contagious, for physicians and nurses, who were among it constantly, seemed to be more exempt than any others. Some physicians, for an experiment, wore the clothes in which patients had died; they inoculated themselves with the matter of their bodies; they eat some of the excretions of the Cholera patient without any bad effect.

The reason why it prevailed worse in cities than in the country was, that the air, water, and food in cities are not so healthful as in the country. The constitutions of city people, from excesses of various kinds, are much weaker and not so capable of withstanding disease as those of country people; this is the reason why epidemics of all kinds, as well as the Cholera, are more fatal in cities than in the country.

The cause of the disease seemed to be in the atmosphere. It seemed to prevail more when the east wind blew. Many places to which no human being, or animal, or article of any kind had arrived from an affected district were suddenly desolated by this scourge. Its singularity, in spreading itself, seemed to justify the theory of many celebrated physicians, that the disease was carried by insects through the atmosphere. In many places the disease was preceded by an unusual number of insects in the air, and by great changes in the atmosphere.

But what is the Cholera? We know what the symptoms are, but we do not know the cause. Nearly

every one has seen a case of cholera-morbus, that is, a violent fit of vomiting and purging attended with a clammy, cold sweat and great prostration. Epidemic, or as it is more generally called Asiatic Cholera, resembles cholera-morbus very closely, the Asiatic Cholera being much more violent.

Symptoms of Cholera. — In a great majority of cases, the patient is taken a few hours before the attack, with a diarrhea; at first the discharges are small, they are bilious, attended with some griping; they afterward become thin and watery with but little odor, and attended with but little pain. These are the only unpleasant symptoms the patient feels in the first stage; he does not notice them; and here is the fatal error. If these first symptoms were properly attended to, in nine cases out of ten, the disease would be checked. If, however, these premonitory symptoms are unheeded, the second, or sinking stage supervenes.

Now commence the horrid symptoms of Cholera; violent vomiting and purging of a thin substance resembling rice-water; cramps of the limbs and stomach; in a few hours great prostration ensues; a cold, clammy sweat covers the surface; the pulse can hardly be felt; the skin and fingers turn blue; the features sink; the eye is dull; the voice and hearing are lost; the stomach is so insensible that the most violent stimulants have no more effect than they would have on a leather pouch; the suffering stops, except a great oppression in the chest and at the pit of the stomach; the eye is turned up and very much bloodshot; the spark of life seems almost to have fled, and indeed in many cases it does depart in this stage.

This stage of sinking or collapse lasts from twelve to forty-eight hours—the patient being all the while of an icy coldness; if he revives at all, he first complains of a pain in the head, a sense of giddiness, and a low fever, resembling typhoid fever, sets in, almost as dangerous as the collapse itself. The teeth become covered with a brown sordes; the tongue is covered with a black coat; the eyes more bloodshot; the intellect more torpid; the discharges from the bowels more dark. This stage lasts from a week to ten days; its termination, in a majority of cases, is fatal. Even when the patient gets over this stage and is recovering, he is very liable to a return of the disease from the slightest improprieties. The more violent the sinking stage or stage of collapse, the more violent will be this stage of reaction. In fact, the danger of the disease is in proportion to the violence of the collapse.

The appearances on dissection are principally a great congestion of blood in the internal organs, the brain, the lungs, the liver, and the contents of the abdomen generally.

How to prevent the Cholera.—The means I should adopt to prevent the Cholera in my own case, would be these:—and from the practical testimony of hundreds, I should place great confidence in them. I should be temperate and regular in all things—in eating, in drinking, in clothing, in labor of body and mind, and in sleeping. I should endeavor by simple diet, by cleanliness, exercise in the open air, and freedom from care, to get my body in as healthy a condition as possible. As soon as I heard of the Cholera being in my own neighborhood, I should dispense with fear as much as possible. I should not go to

taking medicine and living too lightly, nor confining myself to the house; but I would live just as if nothing was a-going to happen, and as though I expected to live to a green old age. The intemperate, the uncleanly and the fearful, are the first and most hopeless victims of Cholera; recollect this, and act accordingly. When the Cholera approached near me, I should purify my house and clothing twice a day with Chlorine gas. I should do this regularly until the pestilence passed away, which is generally within a month.

The virtue of Chlorine gas as a preventative, has been proved by hundreds of experiments. The use of it in this case was suggested by its purifying power in other cases. Chlorine gas is produced by mixing three parts of common table salt in a glass vessel with one part of the black Oxide of Manganese; then pouring two parts of Sulphuric Acid (oil of vitriol) mixed with an equal part of water; a green gas will escape, which is Chlorine. Hang your clothes over the gas that it may go through them; and let the gas go through every room of the house. The common bleaching powder (chloride of lime), or the liquid solution of chloride of soda will answer as a substitute, if the materials for forming chlorine gas cannot be obtained.

We come now to the treatment of Cholera, which should be known to every individual; because the disease is so sudden that, in many cases, a physician cannot be obtained in time to do any good. The treatment varies in the first, second, and third stages. In times of its prevalence, when each individual is liable to an attack, if he is taken with a diarrhea, or looseness of the bowels, he had better go to bed at once; keep the surface warm; take a Warm or Steam-

bath into the water of which some stimulating thing may be infused, such as Mustard, Cayenne pepper or salt; the skin should afterward be rubbed thoroughly with a coarse tow towel, and the person should go to bed: (the patient to keep quiet and take nothing in the stomach, except a little water or weak chicken-broth). In the second stage, Mustard plasters should be applied over the abdomen, frictions with mustard should be used on the limbs, with hot applications, bottles of hot water or hot bricks. The person should be in a bed of warm flannels, while you are applying them; bags of hot Bran or Ashes, should be put to the extremities; the object being to prevent the congestion of blood in the internal organs by drawing it outward with external irritations: for it is a principle in medicine that, wherever the greatest irritation is, there will be the greater flow of blood. Give one quarter of a grain of Morphia, two or three grains of Cayenne pepper, and two grains of Calomel, every hour, or more frequently, if necessary, until the spasms cease; then decrease the quantity of morphia; should the weakness be excessive, Brandy toddy should be used; if the discharges from the bowels should grow more healthy, the Calomel should be stopped, or given in smaller doses. When the system re-acts again from the sinking stage and the febrile stage comes on, if there is much oppression of the brain, Cupping and Blistering on the back of the neck will be useful; give two or three grains of Calomel, every two or three hours, until bilious stools are produced. If there is a loose, watery diarrhea, combine your Calomel with Opium in grain doses; try and keep the heat of the body equable; if one part becomes cold, put warm applications to it, and rub it.

The patient must be very careful when recovering from the cholera, that he lives very temperately in every respect; in fact, through the whole of the disease, nothing but the most simple articles of diet should be taken; at first, nothing but mucilaginous drinks of Slippery-elm or Flax-seed; afterward, of Chicken-broth or Beef-tea.

LECTURE VIII.

ORGANS AND DISEASES PECULIAR TO THE MALE

For the increase of the species, and for a due harmony between the sexes, they are created, each with its peculiarities; which peculiarities would be useless or injurious to the individual, if they were not neutralized by the peculiarities of the individual of the opposite sex, with which the individual is connected. Thus man is created larger, stronger, with an inherent desire of governing in his heart; his nature is such as to be equally powerful at all times; whereas woman is created smaller, weaker, more timid, and with a yielding principle in her breast. In a physical and mental point of view, she herself is conscious of being inferior to her male partner; hence she willingly subjects herself to him, and looks to him for protection; beside, she has periods in her life when she is much weaker than at others, less capable of being independent of the assistance of others. The peculiarities of man, as distinguished from those of woman or she-man (as the word literally means), are the largeness of his size, a greater muscularity of his flesh, having less of fat, and more of muscle, the narrowness of his hips, his beard, his voice, and his organs of generation.

The male organs of generation consist of the Penis, Testicles, the parts connecting the two and muscles for the movement of those parts. The penis is composed

of a head called the Glans penis, and the body, composed of three bodies lying parallel to each other, of a loose, spongy texture, full of cells. When the Penis is not under excitement, it is small and flabby; but when the venereal passion is excited, the nerves going to a set of muscles connected with the penis are excited; these muscles contract, by which blood is injected into the spongy structure of the penis, and enlarges it, rendering it capable of being introduced into the female organs of generation, by which the semen or seed of the male is thrown into the vagina and womb of the female: this semen is a white fluid, formed by the testicles. There are two little bags called Vesiculæ Seminales, between the testicles and the penis in which the semen is collected as fast as it is secreted by the testicles. Around these little bags are small muscles, which when they become sufficiently irritated by the friction of the penis against the sides of the female organs of generation, contract with such force as to throw the semen some distance out of the penis. It is the presence of the semen in these little bags, in connection with the venereal passion, that excites the penis to become erect: for when these little bags are emptied of their contents, the penis will not become erect until more semen has been poured into them from the testicles.

The diseases to which the male organs are subjected, are, Inflammation of the Testicles from injuries and from measles; Hydrocele or an accumulation of water in the testicles; a hardening of the testicles, and the two Venereal diseases vulgarly call the *Clap* and the *Pox;* the former, called by physicians Gonorrhea, is a running of matter from the Penis, producing Strictures or difficulty of voiding urine, ulcerations, impo-

tence, and other bad consequences; the latter, called Syphilis, is distinguished by sores, resembling small-pox sores, coming on the Penis, rapidly enlarging, and if not cured, the glands in the groin ulcerating, and afterward the glands of the throat, and the nose becoming eaten away. Both these diseases are caused by having connection with a female who has them. The matter of the specific disease only can communicate the same disease. Whichever disease the female has, the male will take; if she has both, the male may take both. In the same manner, the male can communicate the disease to the female. It seems to be a punishment instituted by Nature, to prevent the indiscriminate mixture of the sexes of the human species, for these loathsome diseases are seldom, if ever known, where the bonds of matrimony are duly observed. And here, do we find a law of God most fearfully verified; for literally are the sins of the parents visited on their children, to the third and fourth generation.

When a person is taken with Gonorrhea or Clap, a running of matter from the Penis, he should immediately go to bed and keep still; take an active dose of Salts; live on the lightest diet; take no drink but Cold water. He should keep on the Penis a wet Rag, so as to keep it cool. In a couple of days, if it has not passed away, inject into the Penis, pressing one finger on the root of the Penis, so that the injection will not go into the bladder, a solution of Nitrate of Silver, two grains to an ounce of Rain water; give internally a tablespoonful of the powder of Cubebs, and twenty-five drops of the Balsam of Copaiva three times a-day. If Strictures occur after Gonorrhea, attended with a difficulty of passing water, they must

be enlarged, by passing gradually in the Penis, Bougies or straight sticks of slippery Elm bark, made very smooth, (moistened first in water), of the size to pass through the stricture; let it remain in the Urethra half an hour every day; make the Bougie a little larger, until it is the size of the opening in the unstrictured part of the Penis. No violence must be used in introducing it.

Manner of introducing the Bougie.—Take hold of the Penis with the thumb and finger of the left hand, draw it out, and let the Bougie gently pass in, until it meets with a resistance, then hold the Penis down, and the Bougie will pass into the bladder. This is the way—a small, elastic, hollow tube, called a Catheter, is introduced into the bladder, when the mouth of the bladder is contracted, so that the water cannot pass out, or where the mouth is obstructed by a stone in the bladder, in order to draw the urine off.

Syphilis or Pox is characterized by contagious sores, first occurring on the Penis, resembing very much the sores of the small-pox, coming like Gonorrhea, a few days after having had connection with a person having the disease.

When the sores first appear on the Penis, generally on the head of the Penis, they should be cauterized with a stick of Lunar Caustic, washing the pits thoroughly with Warm water; then take a little Lint dipped in Wine, and put on the head of the Penis; draw the foreskin over it; change the Lint and wash the part four or five times a-day. This Treatment, if taken in time, will almost invariably cure the disease at once, as I have seen tested in a number of instances.

When hard lumps, called Buboes, occur in the groins, cold applications and compression by bandages

passed around the body with a hard cushion over the swelling, should be used, together with repeated inunction with Mercurial ointment. If it is not benefited by this, Blisters should be used over the swellings. These swellings in the groins, indicate that the venereal poison has been absorbed, and taken to the glands situated in the groins. But when the disease gets into the general system, which is indicated by little swellings in the back of the neck, soreness of the throat, or an eruption of the skin, Mercury should be used immediately; give one grain of the Protochloride of Mercury three times a-day, until the gums become a little sore; use Sarsaparilla freely, at the same time; anoint the swollen parts with blue Mercurial ointment; if hard lumps come on the bones, the shin bones for instance, use Mercurial ointment, and bandage the leg from the toe upward. When the disease has been in the system for a long time, and ugly sores appear in various parts of the body, let the diet be light; dress the sores with blue Mercurial ointment, and take twice daily three tablespoonfuls of the following Syrup: Make a strong tea of Sarsaparilla, mix it with molasses, to make it palatable, put in a pint of this, a drachm of the Hydriodate of Potassa, or two grains of Corrosive Sublimate; use the Sulphur-bath, and afterward, the Salt-bath once a-week.

IMPOTENCE OR WEAKNESS OF THE ORGANS OF GENERATION.

Get the general system into as healthy and rugged a condition as possible, by simple diet, exercise in the open air, and a proper régime in every respect. Then use stimulating frictions about the lower part of the abdomen frequently; perhaps small blisters of Flies;

take from ten to twenty drops of the Tincture of Spanish Flies internally, three times a-day. Relax from the sterner studies and duties of life, and attend more to the softer ones. The propriety of reading loose novels, attending balls and theatres for this weakness, is very questionable. A man is seldom afflicted with impotence, if he lives temperately in all things, from his youth upward. Too great excess in Venery, and particularly that bad habit of self-pollution, called Onanism or Masturbation, brings on impotence of the generative and mental powers oftener than any other cause.

Hydrocele is a collection of water in the testicle; if it cannot be removed by compressing the testicle, by drawing strips of adhesive plaster tightly around it; it should be punctured with an instrument called a Trochar, and some stimulating substance injected with a Syringe, as diluted wine; in children, simply pressing up the fluid into the abdomen, and using a compress, or, at most, letting the fluid out, will cure it. The testicle is sometimes the seat of cancer, in which case, extirpation is necessary.

FEMALE ORGANS OF GENERATION.

The Female Organs of Generation are divided into the external and internal organs. The external are found in and around the external opening, called the Vulva. They are the Mons Veneris, the greater and lesser lips of the Vulva, the Clitoris, and the Hymen. The Mons Veneris is a cushion-like protuberance at the upper part, covering the Os Pubis. The greater lips form the outer sides of the Vulva. The Mons Veneris and greater lips are covered with hair after puberty, to prevent chafing of the parts. The lesser

or inner lips are concealed by the outer lips in the Virgin. The Clitoris is a small teat suspended from the upper part of the Vulva, less than an inch in length. The Hymen exists sometimes in the Virgin, but not always; its absence is not positive evidence of a loss of virginity. It consists of a delicate membrane drawn across the lower part of the external opening of the Vagina.

The internal Organs of Generation in the female, consist of the Vagina, Uterus, Fallopian tubes, and the Ovaria. The Vagina is the passage from the Vulva to the Uterus; it is about an inch in diameter, and from three to five inches in length in the virgin.

The Uterus or womb is a muscular pouch in the shape of a flattened pear, the small end opening downward into the Vagina, and its large end suspended in the cavity of the pelvis, by two ligaments on each side. From the inner and upper part of the Uterus go two little tubes, one from each side, the Fallopian tubes; they are from four to five inches in length, and about the size of a goose-quill; they are open and fringe-like at the outer extremity. One of these fringes is fastened to an oval-shaped body, about the size and shape of an almond, called the Ovarium; and the two, one on each side of the Uterus, are called the Ovaria or receptacles of eggs. Each Ovarium contains from fifteen to twenty minute vesicles, the germs of future human beings. When impregnation takes place, the Semen goes up the Uterus, up the Fallopian tube, and excites one of these little vesicles to germinate or to commence being developed into a human being. When a vesicle is excited in this way, it enlarges, and leaves the Ovarium or body to which it is attached, and goes down the little tube, called the

Fallopian tube, into the womb, becoming enveloped as it goes down, with membranes which become attached to the inside of the womb, forming the connection between the mother and child.

The child increases in size, also the womb and the membranes that connect the child with the womb. The Menses or monthly discharges from the womb resembling blood, cease. When the woman is pregnant she has many curious symptoms, such as Morning Sickness, Toothache, singular tastes and diseases.

The child continues in the sack of the membrane, surrounded with water, and connected with the thicker parts of the membrane (which is glued fast as it were to the inside of the womb,) by the umbilical or Navel Cord. The membranes on the inside of the womb become changed into a thick, spongy matter, called the Placenta or Afterbirth. This is full of blood which comes from the mother, and which goes through a vessel in the navel cord to nourish the child.

Recollect, that the blood goes from this Placenta or afterbirth, fastened to the inside of the womb to the child, through a vessel in the umbilical or navel cord. The blood goes through to the heart of the child, which contracts and sends it through the whole body to nourish it, and then it is returned again to the Placenta by two vessels, also in the umbilical cord, to be purified. For you must know that the blood of the child cannot be purified in its lungs, as after birth, because it does not breathe in the womb. At the end of nine months the bag of waters is broken, and the child is expelled, when it breathes for the first time, and the circulation of blood between the child and the placenta, and through this to the mother, ceases. A

few minutes after the child is expelled, this spongy substance, the Placenta, is expelled also; the child and the placenta are expelled by the contractions of the womb itself, which continues contracting until it becomes a small, round ball, felt by pressing on the abdomen.

When the Womb does not properly contract after delivery, there is danger of fatal bleeding; in which case the woman may die in a few hours. Under such circumstances cold applications should be placed on the abdomen and injected up the vagina, to produce a proper contraction of the womb. In a majority of cases, if a woman is left entirely to nature, she will get through as well as with the assistance of a midwife or physician. I believe that more harm is done by the officiousness of physicians, and particularly by inexperienced midwives, than good.

It is well for the physician to see that the bowels and bladder are emptied at the commencement of labor; and when the Cutting-pains, as they are called, come on, it is well for him, by passing his finger gently up the vagina, to see that the right part of the child is coming down first—that is, the head—and in the right position, and that the parts of the mother are of the proper size, and the soft parts sufficiently dilated. In most cases nothing else is necessary to be done but to support the parts just behind the external opening of the vagina with a towel, when the head of the child comes into the world, to prevent them from being torn. By all means do not hurry the matter; let nature take its course.

If by stimulants and the unnecessary exertions of the mother the child is hurried into the world, and

the Afterbirth is forcibly taken away, the parts, not having had time to dilate, will be much more likely to be bruised and torn.

After delivery, if the Uterus does not contract so as to feel like a hard ball under the hand, violent hemorrhage or flooding is apt to ensue. An effort must be made to stimulate it to contract by grasping it with the hand over the lower part of the abdomen, and by putting cold cloths suddenly over the region of the uterus; if this fail, and the bleeding continue, the vagina must be plugged with soft cotton rags.

Childbed Fever is to be dreaded after delivery; treat it as an Inflammatory fever; keep flannels wrung out of hot water over the bowels. If the woman be plethoric, frequent Cupping over the lower part of the abdomen and small of the back may be necessary.

After birth, when you can feel the pulsations of the Cord no longer, tie it in two places, about three inches from the child, and cut the cord off between the knots; dress the child without much washing, and put it to the breast within five hours. The woman seldom requires stimulating drinks, unless she is very weakly and has been in labor more than eighteen or twenty hours. Women are subject to more diseases pertaining to the organs of generation, than men. They are subject to the venereal diseases, Syphilis, and Gonorrhea, and diseases of the Urinary organs, the Bladder and Kidneys, all of which are to receive the same general treatment as in men.

DERANGEMENTS OF THE UTERINE SYSTEM OR OF THE FUNCTIONS OF THE WOMB.

At the age of from fourteen to eighteen the Monthly discharges from the Womb generally commence in this

country. The age at which these Monthly flows commence, differs in different climates. In cold climates it does not commence till near the twentieth year; in warm climates it not unfrequently commences at twelve and thirteen. If these Monthly discharges do not commence at the ordinary period of life, the mother is apt to be alarmed for the welfare of her daughter, and resorts to stimulating medicines to force on the flow: this is wrong. If the girl is otherwise healthy, let her alone; nature will attend to it in due time. If, however, the girl is sickly, and her sickness is probably produced by the non-appearance of the Menses, she should change her manner of living: for this state is most always produced by improprieties in living, too stimulating food, and too little exercise.

The girl should live in the country; exercise a great deal in the open air, especially on horseback; live temperately; if her bowels are deranged, she might take three or four pills a day of Aloes, Slackened Copperas, and Gum Myrrh. Where the girl has had her Monthly flows, and they stop suddenly—for instance, from exposing herself to wet and cold at the monthly period—she should, in the morning, take an active purge of Aloes, and Compound Extract of Colocynth, living very light through the day; at night she should steam the lower part of her body and hips over a pan of hot water, in which might be put some stimulating herbs, as Mustard, Snake-root, or Smartweed; at the same time, drinking a tea of Senega Snake-root, then go to bed, and it will probably have the desired effect.

If her Menses have been stopped for a long time, and she has become much weakened; in short, if she

has what is called Green sickness (too great confinement in warm rooms is most frequently the cause), the best remedies are a mild but nutritious diet, exercise on horseback, and Pills composed of equal parts of Aloes, Slacked Copperas (or Sulphate of Iron, as physicians call it), and Gum Myrrh; take from two to four pills of these three times a day. The Salt-bath should be used once a week, and frictions with coarse flannels, every morning, about the region of the womb.

Instead of a stoppage of the monthly flow, there is sometimes too great a flow. At the first stage of the flow, as it is generally owing to too great an excitement of the system, Cup freely over the abdomen and give Salts; then apply cold applications, cloths dipped in cold water over the womb. If the flow still continues to be much more than natural, inject a weak cold solution of Sugar of Lead—a teaspoonful of Lead to a pint of Rain water—or a weak solution of Alum; give two or three grains of Sugar of Lead, with one-fourth of a grain of Opium, every two hours, till the discharge is lessened.

LEUCORRHEA.

Leucorrhea, vulgarly called Whites, is a discharge of thin mucous matter from the vagina. If the patient be robust and healthy it will be necessary to reduce her system; but if she be debilitated, give her tonics of Iron; from ten to fifteen grains of the Carbonate of Iron, three times a day, or from twenty to thirty drops of the Muriated Tincture of Iron, using at the same time Injections of Cold Water or Sugar of Lead water, and perhaps a small Blister over the lower part of the abdomen.

Some women have much pain at the time of their

monthly flow; the best preventative of this is, in the intervals of the periods, to take mild purges and plenty of exercise in the open air. Guaiacum, Dover Powder, and the Hip-bath will allay the pain at the time.

Sometimes the womb falls down into the vagina, and even passes out of it between the thighs; this is often produced by the cruel officiousness of the ignorant midwife or physician, who draws away the afterbirth too forcibly and with it the womb. When it falls down in this manner, it must be carefully returned; the woman must lie still on her back for several days, and live very light. When a woman has been subject to it for sometime, she must live light, be careful to keep her bowels regularly open, and perhaps it will be necessary to pass up a piece of sponge and let it remain in the womb at its mouth; inject, once a day, into the womb, at the same time, a cold, weak solution of Sugar of Lead, Alum, or ooze of Oak-bark.

Morbid growths, such as Tumors or Polypi, are not unfrequently found in the Uterus. If cold astringent Injections will not remove them, an operation may be necessary.

The Uterus may be the seat of cancer; it has been extirpated successfully for this disease.

MATERIA MEDICA.

LECTURE IX.

I SHALL include under this head all that pertains to eating, drinking, clothing, exercise, cleanliness, and other minutiæ for preserving the body in a healthy condition.

The food, in a healthy condition of the body, should be of a simple, nutritive character; varying, as to quantity, in proportion to the size and exertion of the individual. But one kind of meat, one kind of bread, and one kind of the common vegetables of the table should be used at a meal. Preserves, stimulating condiments, pickles, and desserts are not only useless, but highly injurious to the stomach of a healthy person; and they cannot be indulged in long without serious injury to the system.

The food should not be eaten hot. It should be well chewed and moistened with the saliva or juice of the mouth, and not washed down with copious draughts of hot tea and coffee, as it generally is. The best drink, the only drink that man should use, is cool water or milk. A marked freshness and healthfulness shows itself in the countenances of those using no other beverage.

Hot stimulating food, as hot stimulating drinks, only borrow strength from the latent resources of the body to be repaid with interest, five or six hours after date; leaving the body finally weaker than if unstimulating food had been used. The natural appetite is destroyed by substituting these stimulants for it, and disease is more likely to be generated. I have not room to dwell on these points, so essential to good health, I have only to say, try the simple course of diet here recommended, for a term of three or four weeks, and you will become convinced of its utility.

A natural and pleasant degree of warmth should be maintained by sufficient clothing, and more particularly by active exercise, which is a better generator of warmth than too much clothing or fire. Nothing is more fruitful of rheumatic diseases than standing round idly on a cold, damp day; it is much better to stir about and keep the system in a glow. Sudden changes from a cold to a hot temperature, or from a hot to a cold one should be avoided. A free circulation of fresh air is also absolutely necessary to our physical and mental well-being. Exercise of the body and mind should be temperate and regular, alternated with a due proportion of rest and sleep.

Cleanliness of the surface of the body, as well as of the clothing, is not only necessary for good looks and comfort, but also for good health. The entire surface of the body should be washed regularly once a week, at least.

The bowels should be regularly evacuated. Times for their evacuation should be attended to as regularly as meal-times. Equanimity or evenness of the mind has a great power in producing a corresponding regularity in the body. All the bad and unnatural habits

of the day should be carefully avoided, such as the use of ardent spirits, gambling, smoking, chewing, snuffing, masturbation, adultery, the use of tea and coffee, tight clothing and the thousand other follies of modern times, that interfere in various ways with the natural and healthy action of the body.

When a person is sick, a proper diet and regimen are the most potent means for bringing about a recovery. In fact, I believe that these alone, if used in time, would prevent and cure one-half of our ailments. When you have a fever use no food or that of the most simple kind, such as toast-water, rice-water, or thin gruel made of Indian meal and water, until the fever subsides. In fever, where there is irritation or inflammation of the stomach, your accustomed food would prove a great source of harm. In inflammatory affections of the bowels, lungs, or urinary organs, mucilaginous drinks alone should be taken at first, such as Slippery-elm water or Flax-seed water. In violent inflammation of any part, a light diet should be used. Cool drinks may be given in every case where there is a fever, with the tepid bath. When a person is recovering from sickness, broths made of chicken or beef, with light bread, may be used.

Persons afflicted with a chronic or long standing disease, must live as light as their strength will allow. Dyspeptics, in particular, should use simple and coarse food, plenty of exercise in the open air and frictions of the skin either with the salt-bath, flesh-brush, or coarse towel. Consumptive patients should use a more nutritious diet. They should clothe themselves with flannel next the skin, and ride much on horseback when the disease is in its first stage. Removal to a warm climate, when the symptoms of consumption

first appear, will frequently ward off this dread disease.

MEANS FOR QUICKLY REDUCING THE SYSTEM.

BLOOD-LETTING.

Where there is a violent fever in a strong, robust person, or where congestion of blood in some internal organ, as the brain, lungs, or bowels, is likely to take place, Blood-letting is necessary, and more particularly if the locality in which the person lives, is a healthy one; such locality always indicating the abstraction of blood more than a locality where fever and ague and bilious fevers prevail. Blood-letting, under such circumstances, shortens fever, terminates inflammation most favorably, and prevents congestion.

When the disease first sets in, bleeding should be performed from a vein at the bend of the elbow; the vein being rendered full and turgid by a narrow bandage being drawn tightly around the arm above the elbow. A common thumb-lancet is the best instrument for this purpose. The person being bled should be in a sitting or standing posture, and should be bled until a faintness is produced; then untie the bandage quickly, bind a compress over the orifice, and let the person lie down with the head full as low as the body. The compress is made by folding a piece of muslin six or eight double. From half a pint to a quart is generally sufficient to be taken from a grown person. If the person should faint after being laid down, sprinkle cold water in his face and apply Camphor or Hartshorn to the nose. It is frequently necessary, where one bleeding does not subdue the fever or inflammation, to repeat it in the course of twenty-four or forty-eight hours.

Where the symptoms of the patient are not so violent, where the patient is weakly, where the disease has existed for some time, or where the system has been reduced by a previous bleeding, and more particularly where there is pain or oppression in some internal organ, Cups or Leeches are the better means of abstracting blood. You can cup very well with common tumblers and a sharp razor. Hold the tumbler in your left hand, set fire to a piece of newspaper with your right; when the newspaper is in a blaze, throw it in the tumbler and immediately clap the tumbler on the part to be cupped, so that no air will get under the edge of the tumbler. When the tumbler has drawn ten or fifteen minutes, take it off, cut three or four gashes with the razor, and put the cup on again until it has drawn all it will. An instrument, called the Scarificator, is better for making the gashes with than the razor. Leeches are the best means for drawing blood from young children.

The following diseases generally require large abstractions of blood from the arm: Apoplexy, Violent fever, Child-bed fever, Inflammation of the brain, Pleurisy, Inflammation of the Peritoneum or membrane covering the bowels, Active Inflammation of the lungs, liver, and kidneys. The following diseases require a less abstraction of blood, and in most cases can be cured without any bleeding at all. The commencement of mild Intermittent and Remittent fevers, or fevers attended with an eruption, as Measles, Scarlet fever, Small-pox, and Chicken-pox.

It is sometimes necessary to bleed in Rheumatism, Bronchitis, Inflammation of the stomach and bowels. In many of these affections, especially if some internal organ is affected, cupping will answer the purpose

best. Cupping on the nape of the neck, and between the shoulders will frequently relieve disorders of the head and breast, when other means fail.

When a large limb, as the arm or leg, has been out of joint for some time, and the muscles have become contracted so as to render it difficult to set the limb, by bleeding the person, while sitting in a Warm-bath, till he faints, the muscles will become so relaxed as to admit of the limb being reduced.

In Spasmodic colic, where the muscles of the bowels are so contracted as to prevent an evacuation, bleeding will sometimes open the bowels after the most drastic purgatives have been used to no purpose.

I well recollect the case of Mr. B., of Cincinnati, who was attacked most violently with this species of colic; the most powerful physic had no effect; mortification threatened. No sooner was he bled to fainting, than he had a passage from the bowels, and was immediately relieved.

When the Febrile or inflammatory symptoms are not very violent, Blood-letting should give way to other reducing remedies, such as Emetics, Cathartics, the Warm-bath, and in some instances, where there is a good deal of nervous irritability, Opium. During a practice of eight years in a bilious district, where the system becomes debilitated by the poisonous miasms, I have seldom found it necessary to use the Lancet. But I have used Cups more frequently.

EMETICS.

Emetics are those medicines that excite vomiting. They are useful, where there is some indigestible substance lying in the stomach, producing an uneasy sensation there, or sick headache, or other unpleasant

feelings in the general system. Emetics would do good in the beginning of most febrile diseases.

The best emetic in this case, is two grains of Tartar-emetic, mixed with twenty grains of Ipecac. Put this powder in six tablespoonfuls of Warm water, and give one tablespoonful every five or ten minutes, until vomiting is produced; then give copious draughts of Warm water, so as to thoroughly cleanse out the stomach. Emetics are useful where poisons have been taken into the stomach. Here, you want a speedy emetic, and none answers the purpose better than the Sulphate of Zinc, commonly called White Vitriol; a dose, is twenty grains, dissolved in a teacupful of Warm water. In affections of the chest, particularly in Asthma, an emetic of Lobelia or Squills is best. A dose of powdered Lobelia, is fifteen grains, of the Tincture, one teaspoonful. The dose for Squills, is about the same.

The best emetic for children, is Ipecac., given in doses of from two to ten grains. In Croup, emetics are the sheet anchor of hope; keep the child nauseated constantly until the croup goes away. A plaster of snuff kept around the neck, will assist the nauseants in this disease.

In consumption, where there is a difficulty in throwing up the matter, an emetic of three grains of the Sulphate of Copper or Blue Stone, dissolved in a teacupful of water, is highly recommended.

In the beginning of fever, particularly where the liver is inactive, which is known by a yellowness of the skin and tongue, with a bitter taste in the mouth, and a high-colored urine, an emetic of six grains of Tartar-emetic dissolved in six tablespoonfuls of Warm water should be given, using a tablespoonful every ten

minutes till it operates. Tobacco, Mustard, Blood-root, and common Salt are sometimes used as emetics. Mustard in the dose of a tablespoonful, ground, in a cup of Warm water, is very good, just before a chill of the fever and ague is expected. A drachm of Tabacco, dissolved in a pint of water, may be injected into the bowels, where great prostration is required, as in obstinate colic, and in the reduction of limbs long out of joint. A plaster of Tobacco laid over the stomach will assist the operation of an emetic very much.

The doses of medicines here given, are intended for grown persons, unless children are specified. Children about ten years old, should have half the dose of a grown person. Children five years old, a quarter. Children two years old and under, an eighth of a dose for an adult. Some strong, robust persons may require more than the quantities here mentioned; and some older persons of weak constitution may require less. This general rule should be borne in mind, in the administration of all other medicines, as well as emetics.

Emetics are very potent remedies, used in doses not large enough to vomit, but just large enough to keep the patient sick at the stomach; most every case of mild fever can be subdued by this course alone. For this purpose, dissolve six grains of Tartar-emetic in half a pint of Warm water; give a tablespoonful, or more, or less, as the case may require, every hour, so as to keep the patient slightly sick at the stomach, until there is a moisture on the skin, and the fever is broke. Nauseants supersede the necessity of blood-letting in nearly all mild cases of fever. What are called Nitrous Powders, are almost a certain cure for the mild bilious fever; they are composed of ten grains of

Nitre (Saltpetre), two grains of Calomel and an eighth of a grain of Tartar-emetic; one to be given in a little honey or thick cream every two hours, till the fever goes off. For nauseating children, Ipecac. is the best; it is very useful in whooping-cough, croup, bad colds, and where there is fever from almost any cause.

CATHARTICS.

Cathartics are those medicines that produce increased discharges from the bowels. The action of the different medicines used as cathartics, is very different, both as to the severity of their action, and as to the nature of the discharges they produce.

Cathartics are indicated where there is a costive state of the bowels, where the discharges are unhealthy, where we want to reduce the system, and where there is an inflammation in some other part, and we want to draw the irritation from the inflamed part to the bowels.

Cathartics are indicated in a greater number of diseases than any other class of medicines. A too long use of them, however, will do injury, producing inflammation and ulceration of the bowels. Cathartics should be used with the greatest caution, where there is inflammation of the stomach or bowels; which can be detected by a burning pain in the belly, increased by pressing on it with the hand. Injectious are the best means for opening the bowels, where there is inflammation of the stomach or upper bowels. If there is inflammation of the lower bowel, producing the disease called Dysentery, the bowels should be once thoroughly opened by some mild cathartic, and then no other purge should be given for some time, but rather inject, in small quantities, some soothing

substance up the anus, half a teacupful of Starch water, mixed with forty drops of Laudanum.

MILD CATHARTICS.

Where a simple operation of the bowels is required, give two tablespoonsful of Castor oil with a teaspoonful of Turpentine; or two tablespoonsful of Epsom Salts with about the same quantity of Senna leaves, steeped in half a pint of boiling water. Pills made of equal parts of Aloes, Rhubarb, and Castile Soap, mixed up with an extract made by boiling the inner bark of White Walnut (Butternut) down to a jelly, make a good cathartic. Mayapple-root, Sulphur and Sugar-house Molasses and Mustard, are mild laxatives. Rhubarb root, chewed constantly, is good to counteract habitual costiveness.

MORE ACTIVE CATHARTICS.

Aloes, Colocynth, and Gamboge, of each, three parts, Cayenne pepper one part, make it into pills with Molasses, first having pulverized and mixed them thoroughly. Take of these four every four hours until they operate. The following is used as a common cathartic pill at the Commercial Hospital, Cincinnati: Aloes, Colocynth, and Scammony, of each, three parts, Red pepper one part, made into pills and taken as the above.

In Dropsy, where a watery discharge is required, Cream of Tartar one hundred grains, with Jalap twenty grains, given two or three times a day. The following is the composition of "Brandreth's Pills:" Colocynth four ounces, Aloes two pounds, Castile Soap half a pound, Oil of Peppermint two drachms,

Oil of Anise one drachm, the whole to be ground up very fine and made into pills with syrup or paste.

The following is the composition of "Morrison's Pills," No. 2: Aloes three parts, Colocynth one part, Gamboge one and a half parts, Cream of Tartar half a part, Ginger half a part, made into pills.

Morrison's No. 1 Pills: Gamboge half a part, Aloes three quarters of a part, Cream of Tartar three quarters of a part, made up as the above.

Where the Liver is inactive, cathartics with some peparation of mercury are best, to excite again the secretion of Bile, which is the natural purgative of the system. A mild purgative of this kind is composed of equal parts of Aloes, Rhubarb, and Blue Mass, made into pills; five or six of which may be taken every four hours until they operate. If the patient is hard to be operated on, substitute Calomel for the Blue Mass. In Colic, the Oil of Peppermint, or Cinnamon, or Turpentine, should be combined with the cathartic. Where there are Spasms or violent Griping, combined with Assafœtida, Soap, Extract of Hyoscyamus or a few drops of Laudanum. Where there is acidity of the stomach, with Carbonate of Soda.

The following is a tonic or strengthening cathartic, good for costive persons, who are weakly: Aloes two drachms, Gum Myrrh one drachm, Cayenne Pepper one scruple, Quinine one scruple, made into pills and taken two or three times a day so as to keep the bowels regular.

The following pills are very useful to girls and women who are weakly and irregular in their monthly courses: Aloes and Myrrh two parts of each, one part

of the Sulphate of Iron (copperas) made into pills: take five or six a day.

DRASTIC OR POWERFUL CATHARTICS.

Croton oil, given in obstinate costiveness, on sugar. In Apoplexy, by dropping on the tongue. Dose from two to eight drops. Eleterium or wild Cucumber, given in Dropsy. Dose from half a grain to two grains of the powder. Scammony, Colocynth, and Gamboge are Drastic purgatives. This class of cathartics are useful in the obstinate costiveness that sometime occurs in Delirium Tremens, Insanity, and Obstinate Torpor of the Bowels.

CATHARTIC INJECTIONS.

In order to assist the operation of cathartics given by the mouth, or where it is inadvisable to give them by the mouth on account of there being irritation or inflammation of the stomach or upper bowels, or where it is impossible to get the medicines down the throat from spasm or swelling of the parts, Injections are invaluable remedies. The injection of a pint or more of warm water, mixed with a little common salt, will generally be sufficient, or it may be mixed with some Soft soap. A Stimulating injection can be made by beating up a tablespoonful of Turpentine with the yelk of an egg, and then mixing this with a pint of warm water. Simply putting a piece of hard soap up the anus will produce an operation.

CATHARTICS FOR INFANTS.

Molasses or Brown sugar, Rhubarb and Magnesia, from two to five grains of each mixed together and

given in a tablespoonful of molasses. Castor oil a teaspoonful, Sweet oil two teaspoonsful. If there is Wind collected in the Bowels, a little Peppermint Essence should be added. Injections can be given also with care. Where a syringe is not at hand, an injection can be given with a bladder, to the mouth of which is fastened a small tube or goose quill.

DIAPHORETICS.

Diaphoretics are such means as produce an increased action of the Skin, in other words, sweating. Now the pores of the skin can be closed up by filth, fever, cold, and a congestion of blood within.

The system must be got into a certain healthy condition before the secretions of the Skin (the sweat) or of the glands of the body, will be properly poured forth. Hence the best diaphoretic, when there is fever and a dryness of the skin, is something to reduce the excessive action of the heart, when the sweat will break out of itself. Blood-letting can be used to accomplish this, if the case be urgent; nauseants of Tartar-emetic and Ipecac. dissolved in water, and given in sufficient quantity to keep the patient sick at the stomach. Putting the patient in a Warm-bath or Steaming him, or wrapping him up in a wet Sheet, will greatly assist the other means for starting the perspiration. Where all these means have been used without effect, and the patient is restless, nervous, and sleepless, a large dose of Opium will frequently have the most desirable effect. The best form of giving it in this case is to give it in the form of Dover's Powders, from ten to twenty grains.

DOVER'S POWDERS

Are composed of Opium one part, Ipecac. one part, Sulphate of Potassa eight parts, ground finely together. The Sassafras root, used as a tea, makes a good diaphoretic; also, the sweet Spirits of Nitre, in doses of from twenty to thirty drops, repeated every two hours.

Where the perspiration is suppressed by a sudden cold, producing an oppression of the lungs, a Steam-bath is indicated. You can give a person a steaming, by simply setting him on a chair, and wrapping a blanket around him, and then put a dish of hot water under the chair, and raise a steam by putting hot irons or bricks in the water. When the febrile symptoms have subsided, and a gentle moisture is desired to be kept up on the skin, give a teaspoonful of the Spirits of Mendereri every hour.

The Spirits of Mendereri is made by putting the Carbonate of Ammonia in Vinegar, and letting it dissolve, until foaming has ceased. When a person is in a high fever, Cold, Acidulated water as a drink, with cool sponging of the face, neck, hands, and arms are not only very agreeable, but useful. One thickness of thin muslin can be kept wet constantly on the forehead. The old rule of abstaining from the use of cold water while taking Calomel, is perfectly absurd. The hot teas usually given to produce sweating, are of doubtful utility, frequently increasing, rather than decreasing the fever; the Warm-bath and the free use of Cold water is much better.

EXPECTORANTS.

Expectorants increase, and aid in discharging the secretions of the lungs. In diseases of the lungs, where

there is fever or inflammation, the same reducing remedies should be used, spoken of under the head of Diaphoretics, such as Blood-letting, Tartar-emetic, Ipecac., and the Warm-bath. The local application of wet cloths over the breast is a very valuable means. In more chronic or long standing cases, where there is a tough mucus secreted, and thrown up with difficulty, the Honey of Squills with Vinegar is very beneficial; likewise, the Balsam of Tolu, Fir, and Copaiva, Bloodroot, and Licorice-root. Warren's Cough Mixture, containing Lobelia, Bloodroot, and Morphia, is a good preparation; also, the following: Gum Arabic one ounce, Licorice half an ounce, Saltpetre one drachm, Tartar-emetic two grains, Water one pint, of which use a tablespoonful every two hours. Inhaling the vapor of Warm water, is good to loosen the mucus in the air tubes; by mixing tar or other indicated medicines with the water, it is said to have a still better effect.

Where a person has the consumption, with a great difficulty of throwing up the matter, an occasional vomit will assist the expectoration much. Many medicines may be applied directly to the lungs, by boiling them, and inhaling the steam, such as Vinegar, Gum Ammoniac, Chlorine, Iodine, Comfrey, Elecampane, Stramonium (Jamestown Weed), Tar, Tobacco, Senega Snake-root, etc.

The following, are good preparations for coughs in children: tincture of Opium and Camphor one ounce; Wine of Antimony, half an ounce; Extract of Licorice, three drachms; Gum Arabic, two drachms; Boiling water, six ounces; give of this, a teaspoonful every two or three hours, until the child gets better.

The following, is a good preparation in Whooping-

cough: Ipecac., three grains; Pulverized Gum Arabic, half a drachm; Carbonate of Magnesia, half a drachm; White Sugar, one drachm. Make it into twelve powders, and give one every two hours.

The following, is the composition of Coxe's Hive Syrup: Senega Snake-root, one ounce; Squills, one ounce; Tartar-emetic, twelve grains; Water, one quart; boil down to a pint; strain, and add half a pint of Honey; dose, from twenty drops to a teaspoonful.

DIURETICS.

Diuretics increase the flow of Urine. They are indicated, where there is a suppression of this flow, and in nearly all diseases of the bladder and kidneys. The following, are the principal diuretics: Juniper-berries, dose from a drachm to two drachms; Buchu-leaves, dose, from half a drachm to a drachm, made into a tea; Digitalis, dose, from ten to twenty drops of the Tincture; Meadow Saffron or Colchicum, dose, from two to ten grains, or from twenty to thirty drops of the Vinous Tincture; Oil of Turpentine, dose, from five to thirty drops; Cream Tartar, give an ounce in twenty-four hours; Squill, dose, from one to four grains.

The following, is an active preparation for Dropsy: the Deuto-chloride of Mercury (or Corrosive Sublimate), one grain; Sweet Spirits of Nitre, two ounces; Tinct. Camphor, half an ounce; Syrup of Squills, one ounce; Tinct. Digitalis, one drachm; dose, a teaspoonful every three hours.

LECTURE X.

EMMENAGOGUES.

Emmenagogues assist the womb to secrete the Monthly courses, and are useful where the monthly courses are irregular. Depletive remedies and the Warm-bath are indicated where the patient is strong and robust, and where there are febrile symptoms. Pennyroyal is a mild emmenagogue. Black Hellebore, dose, from ten to twenty grains; Oil of Rosemary, dose, from three to six drops; Madder, dose from twenty to thirty grains; Savine, dose, from fifteen to twenty grains; Spurred Rye, dose from ten to twenty grains; Senega Snake-root, dose from ten to thirty grains; Tansy, dose, from thirty grains to a drachm.

ANTHELMINTICS.

Anthelmintics are those medicines used to remove worms from the intestinal canal. Turpentine, from half a teaspoonful to two teaspoonfuls; Wormseed oil, from four to eight drops; Cowhage, from one to two teaspoonfuls; Dipple's Animal oil, from five to twenty drops; Common Salt, from half an ounce to an ounce; Pinkroot and Senna, twenty grains of each, given two or three times a-day, is a very good combination.

TONICS.

Tonics are strengthening medicines. They are indicated where a patient is recovering from an attack of sickness. Where an exhausting disease exists, as where there is a running abscess, or where the system has become debilitated from any cause whatever; good, plain, substantial food, gentle exercise in the open air, with cleanliness and friction over the surface, are simple but powerful tonics.

The preparations of Iron stand first among tonic medicines; they are oftener indicated than any other class of tonic medicines because, in debilitated cases, the blood is oftener deficient in iorn that in any other constituent. The coloring-matter of the blood is iron, and every one has noticed the light color of the blood, and consequently, of the complexion of debilitated persons. By giving some preparation of iron, it gives the blood a richer color, and the complexion a ruddier hue. The Precipitated Carbonate of Iron, given in doses of from ten to twelve grains three times a day, is as good a preparation of iron as is used. If the bowels are irregular, combine each dose of iron with four or five grains of Rhubarb.

The Sulphate of Iron (Copperas) four grains, mixed with Myrrh four grains, and Aloes two grains, given three times a day, is good in debilitated females; also the Muriated Tincture of Iron is good in the same cases. A home-made preparation of iron can be made by putting a quantity of rusty nails in some sour cider, and letting it stand for a few days.

The Bitter tonics stand next in importance. They are invaluable in the cure and prevention of intermittent fevers. Under this head come Columbo-root, Gentian, Quassia, Peruvian-bark, Wild Cherry-tree

bark, Dogwood bark, Wa-a-hoo, Poplar bark. The dose of these is from ten to thirty grains, three times a day. Quinine is the most powerful bitter tonic we have, given in doses of from one to four grains, three times a day. The following is an excellent combination in Dyspepsia, where there is a want of action in the stomach: Infusion of Quassia a wineglassful, Tincture of Columbo one fluidrachm, Tincture of the Muriate of Iron ten drops; to be taken one hour before a meal.

The Acids are also tonics. Nitric, particularly in diseases of the liver. Mix one ounce of Nitric acid with nine ounces of Distilled water: Give of this from ten to twenty drops at a dose, three times a day. Bathing the body with water acidulated with equal parts of Nitric and Muriatic acids is used for liver complaints. The best method of using Sulphuric acid (Oil of Vitriol) is, in the form of Elixir of Vitriol; dose, from ten to twenty drops. Common Vinegar is sometimes useful as a tonic, used both internally and externally. Pure Wines are indicated sometimes where they do not produce too much excitement; what is still better is good Ale. The Cold-bath, taken every morning, followed by a thorough rubbing with a coarse towel, is a means that every invalid, unless he be too weak, should attend to regularly.

TONICS FOR DEBILITATED INFANTS.

The Tartrate of Iron; dose, from five to ten grains. Where medicines will not be retained in the stomach and it is necessary to give a tonic, use half an ounce of Peruvian-bark, mixed in half a pint of water, in the form of an injection. The following is a good tonic preparation for children, and especially for those

that are subject to the fever and ague. Quinine two grains, Elixir Vitriol sixteen drops, Syrup of Cloves half an ounce, Water an ounce and a half. Give a teaspoonful three times a day. Where a slight stimulus is required, put an ounce and a half of White wine with a pint and a half of boiled Milk. Bathing children regularly is another tonic means that should never be forgotten.

ASTRINGENTS.

Astringents contract or pucker up the animal structures. They are used in long-continued Diarrheas, in Hemorrhages (bleedings), in excessive secretions of Mucus and Serum, in Sore Eyes, Piles, and long-standing Sores of most every kind. The following are the principal Astringents: Alum ten to thirty grains. Dried Alum, five to ten grains. Elixir Vitriol from ten to thirty drops. Catechu ten grains to half a drachm. Kino ten to thirty grains. Rhatany twenty to thirty grains. Sugar of Lead one grain to ten. White and Black Oak bark. Blackberry-root. Creosote. Chalk—Alum and Sulphate of Zinc (White Vitriol), each half an ounce, mixed with boiling water, a quart, makes an excellent astringent wash for sores of most any kind. A good prescription for ordinary Summer Complaint is two grains of Dover Powder, one grain of Calomel, ten grains of Prepared Chalk, given every two hours until the patient is better; using no nourishment but Slippery-elm water or Flax-seed water. If the disease continues after using several doses of this, then use some of the more powerful astringents, such as Kino, Rhatany, Tannin, or the Sugar of Lead.

I would here say that I have of late used scarcely any other astringent internally but Tannin. It is the

active principle of all vegetable astringents, and it accomplishes the object with more certainty, with less irritation, and in less quantity than any other astringent I ever used. I use it a good deal in the preparation of Ointments for sores of different kinds. The dose is from two to five grains. For a wash it should be used in the proportion of from four to eight grains to the ounce of water.

The following preparations are recommended in obstinate diarrhea: Extract of Rhatany and Sugar of Lead, each, five grains, Opium half a grain, given two or three hours until the symptoms abate. Or the following: Kino three drachms, Gum Arabic one drachm, Cinnamon Water two ounces. Take a teaspoonful every three hours.

The following is a good combination in the Diarrhea of infants: Prepared Chalk half an ounce, Almond Soap and pulverized Rhubarb, each, a drachm, Hydrargyrum cum Creta twenty grains, Oil of Fennel eight drops, White Sugar two drachms. Give from six grains to twenty, three times a day. A Syrup of Blackberry-root is valuable.

Where the child is low use the following: Blackberry syrup two quarts, Nutmeg half an ounce, Cinnamon and Allspice half an ounce of each, best Brandy one pint; sweeten with Loaf sugar, and give two teaspoonsful three or four times a day. In Dysentery (which is an inflammation of the lower gut) an injection of Starch water, about four tablespoonsful, mixed with about a teaspoonful of Laudanum and five grains of Tannin after the bowels have been once thoroughly evacuated, is the best remedy that I ever saw used for that complaint. The injection may be repeated every two or three hours until relief is obtained.

A WASH FOR SORE MOUTH.

Fill a four ounce vial two-thirds full of Water, put in as much Alum as will dissolve, and then fill the bottle up with Laudanum; rinse the mouth with this five or six times a day.

A WASH FOR SORE EYES.

Put four or five grains of the Sulphate of Copper (Bluestone), or the same quantity of the Nitrate of Silver, in an ounce of Rain water, and wash the eyes with it once or twice a day. Or, put ten or fifteen grains of Sulphate of Zinc (White Vitriol) in an ounce of Rain water.

In violent bleeding from the Womb, put a small teaspoonful of the Sugar of Lead in a pint of Cold Rain water and inject into the womb, at the same time giving internally five grains of Sugar of Lead and a quarter of a grain of Opium, every two or three hours until the bleeding stops.

In bleeding from the Lungs, Stomach, or Bowels, the internal use of Sugar of Lead or Opium is indicated; not, however, till the patient is somewhat reduced.

In all these internal affections, where astringents have been recommended, the external use of some stimulating applications, as Cloths wrung out of Hot water, Mustard plasters, Liniments, or where there is much internal inflammation, Blisters will assist their action very much.

SEDATIVES.

Medicines producing Sleep, quieting Spasm, lowering the action of the Heart, easing Pain, and allaying general Nervous Irritability. Useful in all Nervous diseases, and often in Inflammatory and Febrile dis-

eases where the nervous system is much excited. They are useful in Spasmodic diseases, as in Colic, and where there is too great an action of the involuntary muscles, as in Diarrhea and palpitation of the Heart.

Opium and its preparations are the safest and surest of Sedatives. In small doses, say from a fourth to half a grain, it stimulates; but in larger doses, from two to five grains, it acts as a direct sedative.

Laudanum is the Tincture of Opium. The dose is from fifteen to sixty drops.

Morph'a is the active principle of Opium, and the form in which I generally prefer exhibiting opium. The dose is from an eighth to half a grain.

Paregoric is a weak Tincture of Opium; generally given to children. Dose for children, from five to twenty drops; for adults, from twenty drops to a teaspoonful.

Hyoscyamus (Henbane) is a Sedative. Dose from four to ten grains of the Extract.

Digitalis (Foxglove). Dose from one to three grains.

Conium (Hemlock). Dose from three to five grains.

Belladonna (Deadly Nightshade). Dose from one to two grains of the Extract.

Aconite (Wolf's-bane). Dose from four to eight grains.

Ether. Dose from one to two drachms.

Tobacco. This should be used in the form of an injection. Dissolve a drachm in a pint of water, half of which should be used at a time. Tobacco will produce its Sedative effect if used in the form of a plaster laid over the bowels. Tobacco is never used internally except where great relaxation of the muscular

system is required immediately, as in violent Spasmodic Colic; here it will frequently afford relief when all other means fail. When boiled with Lard it makes a good ointment for irritable ulcers.

Stramonium (Jamestown weed) is another most valuable sedative as an external application. An ointment made by boiling Stramonium leaves in Lard, is one of the best for painful sores and piles. The leaves of Stramonium smoked, afford much relief in Asthma.

Blood-letting is a powerful sedative, where the circulation of the blood is too active. The application of Cold water, especially to the head, has a very sedative influence: for this purpose a bladder of ice should be kept on the head, or a single thickness of thin muslin should be kept wet on the forehead.

Chloroform, used as an inhalation, is a quick, powerful, and certain sedative. Chloroform should be used where an insensibility to pain is desired, as in surgical operations; or, it may be used in a high nervous excitement from any cause, as in Convulsions, or in a Fever kept up by nervous irritation. It is a powerful remedy and should be used with great caution. I have used it and seen it used in many cases, always with perfect satisfaction. I would as soon be deprived of any other remedy in my practice as Chloroform. It is a boon to suffering humanity whose place cannot be supplied by any other agent. Its administration is simple. Pour about a drachm at a time on a handkerchief, held in the hand, and breathe through the handkerchief until the desired effect is produced; quietness is to be observed in the room; the Stomach should be empty, else vomiting will be excited. In

difficult parturition (child bearing) no physician should withhold this from his patient.

SEDATIVES FOR CHILDREN.

Lemonade, one ounce; Black drop or Laudanum, two drops; shake well and the dose will be a teaspoonful for every year of its age. A child three months old may take half a drop of Laudanum; six months old, one drop; one year old, two drops.

PRESCRIPTION.—Rain water, one ounce; Mucilage of Gum Arabic, half an ounce; Simple Syrup, half an ounce; Laudanum, one drop. Dose, a teaspoonful every half hour until rest is produced. If the child be over a month old, double this quantity may be given.

ANTISPASMODICS.

Sometimes there is an irritability of the nervous system that can be overcome without the use of the more powerful sedatives; as in Hysteria, the peculiar nervousness of persons recovering from a Fever, Delirium Tremens, Windy Colic, and the like. Here Antispasmodics are indicated. Ether, from one to two drachms; Assafœtida, five to thirty grains; Skunk-cabbage, ten to twenty grains; Valerian (Lady slipper or nervine) half a drachm to a drachm and a half.

FOR CHILDREN IN SPASMS.

Assafœtida six grains, infusion of Chamomile one ounce, with a little Gum Arabic, to be injected. Another: warm milk, one ounce; Peppermint Essence, half an ounce; Tincture of Assafœtida, one drachm, to be injected in convulsions. Chloroform inhaled, is the most powerful of Antispasmodics.

Douches of cold water are good in Spasms.

EXCITANTS OR STIMULANTS.

This class of medicines is used where an increased circulation of blood is required, either in a part or the whole system; as where there is great prostration of the system; or where the bowels are so torpid, as not to be acted on properly by other medicines, excitants being given here to assist the action of other medicines.

Excitants are used in every case where the spark of life has nearly expired, as in the restoration of drowned persons; those having received a violent blow or shock; those struck by lightning; those in the last stages of fever or disease of any kind. They are used locally, to drive away congestions of bloodvessels in the part, as in the first stage of inflammatory swellings. They are used in indolent sores, where there is not enough life to heal. Spirits, such as Brandy, Wine, Whisky, Rum, etc., are powerful stimulants, when taken internally, and externally, if the wet surface is kept covered to prevent its evaporating.

Carbonate of Ammonia is a very powerful stimulant; this is the Smelling Salts that ladies fill their smelling-bottles with; if taken internally, the dose is from five to ten grains; Ether, one to two drachms; Camphor, five to fifteen grains; Cayenne Pepper, five to ten grains; Cinnamon, ten to twenty grains. The essential oils, such as Cinnamon, Peppermint, Cloves, in doses of from five to fifteen drops; Nux Vomica, four to six grains; Strychnine (the active principle of Nux Vomica), from one-sixteenth to one sixth of a grain.

Heat, as hot drinks or heat applied externally. Friction is an excitant; all external applications are rendered more potent by being used with a gentle

friction. Electricity is perhaps the most powerful excitant we have; it seems to be similar to the life-exciting principle itself, and it will sometimes restore life to the paralyzed limb or system when all other means fail.

ALTERATIVES AND SORBEFACIENTS.

Those medicines that act imperceptibly on the whole system, producing a general change in it without any violent action. They act slowly but powerfully, eradicating diseased conditions of the body that have been of long standing; removing morbid growths, and restoring the whole system to a healthy condition.

Mercury stands at the head of this class of medicines. Blue Pill (which is a preparation of Mercury), is almost a certain cure for mild attacks of sickness depending on a want of action of the liver, as costiveness, temporary Dyspepsia, Jaundice, and the numerous catalogue of real Liver complaints.

Take about six grains for four or five nights in succession, seeing that there is an operation from the bowels every morning; then discontinue a week and repeat again in the same manner, until the difficulty is removed. If the gums look redder than natural, or become tender, discontinue for a while, or salivation will be induced. It will be necessary also, to attend strictly to diet, exercise, bathing and the like, so as to assist the medicine.

A more active form of Mercury is Calomel. This acts as an alterative most effectually, when given in small doses, from two to three grains every three hours, until yellow discharges are produced. Yellowness of the discharges from the bowels, and less yellowness in the urine and skin is an indication of

mercury taking effect, and it should not be used longer. Where the liver is inactive, and the bowels loose, as in Cholera Morbus and watery Diarrhea, the Calomel should be given combined with Opium; two grains of Calomel with a fourth of a grain of Opium, or an eighth of a grain of Morphia every two hours, until the symptoms subside.

The Proto-iodide of Mercury is a still more powerful alterative, and should be used where some dangerous disease threatens to get into the general system, and you want to get this introduced first, as in the second stage of Venereal disease (Pox), or where some ulceration is extending rapidly, as ulceration of the liver, or where false membranes are being formed, as in inflammation in the windpipe, called Croup, or in Pleurisy.

Corrosive Sublimate is another very powerful alterative and sorbefacient, stimulating to increased action every gland and absorbent vessel in the system. It is very useful for the removal of enlargements of the bones and flesh, occurring from Venereal disease. Two grains mixed with a pint of the Syrup of Sarsaparilla, is a good mode for its administration. Give of this two or three tablespoonfuls three times a-day.

I am aware that there is a popular prejudice against the use of these rank poisons, as they are called. But this very power that they possess, is what makes them useful, and there is no possible danger in using them in the manner here recommended. By mixing Corrosive Sublimate twenty grains, with Lime-water a pint, you form an excellent wash for old sores, known under the name of Yellow-wash.

Blue Mercurial Ointment (Unguentum) is an excellent ointment for sores, and especially if combined with

some astringent, as Alum, Sugar of Lead or Tannin. It is sure death to lice of all descriptions.

Hydriodate of Potassa is another medicine of this class, valuable in most all chronic diseases; mix a drachm with a pint of the Syrup of Sarsaparilla, and give two or three tablespoonfuls three times a-day. Sarsaparilla alone, is said to have an alterative effect.

EXTERNAL APPLICATIONS.

1st. Stimulating: to draw the irritation from some internal and vital part to the skin; the inflammation of which, is not so serious as that of the part from which you wish to draw it. Stimulating applications are used to drive away congestions of blood in a part, producing swelling which would otherwise terminate in inflammation and suppuration (formation of matter). This is commonly called "Scattering the swelling."

Stimulating applications are also used to excite action in parts too indolent or lifeless, as in Paralysis and Old sores without much feeling. Blister plaster stands first in this class of external applications. This is made by pounding up a pound of Spanish flies or of Common potato flies, and mixing them with White wax, Resin, and Olive oil, half a pound of each, melted. Mustard plasters, made of Ground Mustard, mixed up with Vinegar and Flour, having the proportion of mustard in proportion to the age of the person and to the urgency of the case; it is an excellent application in painful affections of the Stomach and Bowels, and in violent Chest complaints.

The following liniment is one that will accomplish all that the patent liniment's, such as "Opodeldoc," "Nerve and Bone Liniment," "Chinese Liniment," or all the "Pain Killers," can do. Take equal parts of

Laudanum, Sweet oil, Aqua Ammonia, and Spirits of Camphor. Shake the mixture up and rub it on the part where you wish to produce the irritation. The irritation will be much greater if the part be covered up with a flannel cloth after it is rubbed. The following is the composition of "Granville's Lotion:"

1st. The *Milder:* Liquor Ammonia one ounce, Spirit of Rosemary six drachms, Tinct. of Camphor two drachms.

2d. The *Stronger:* Liquor Ammonia ten drachms, Spirit of Rosemary half an ounce, Tincture of Camphor two drachms. By wetting the surface with the stronger lotion and covering it up, you can draw a Blister.

For indolent sores the following are good ointments: The Citrine, the Basilicon ointment (made by melting one ounce of Beeswax, one ounce of Resin, and one and a half ounces of Lard together). The Yellow-wash, made by mixing one drachm of Corrosive Sublimate with a pint of Lime-water.

COOLING AND SEDATIVE APPLICATIONS.

Useful where there is much heat or pain. Cold water, applied with a Sponge, or keeping a cloth constantly Wet over the part. In inflammation of the Brain a bladder of Ice should be kept alternately on different parts of the head.

For painful inflammations and swellings, Poultices of Tobacco, or Stramonium, or Poppy leaves, are admirable.

For painful sores, Ointments made from the above-named plants, boiled down to an extract and mixed with Mutton tallow.

For the Itch, Sulphur ointment is a sure cure. Ointment of Red Precipitate and Yellow Dock is also used for this purpose.

The following is an excellent ointment for the cure of Venereal and Scrofulous sores: Deuto-Iodide of Mercury four grains, Morphia four grains, Ointment (made of lard, wax, and resin) one ounce, mixed.

A good ointment for simple sores is made by mixing six ounces of Lard and one drachm of the Sugar of Lead.

Tartar-emetic ointment, is used to raise a crop of little sores on the skin, in order to relieve some internal difficulty. It is made by mixing a drachm of Tartar-emetic with six drachms of Lard.

Where there is inflammation, and matter is likely to be formed, the sooner it is brought to a head the better; for this purpose keep a Bread and Milk poultice on it constantly; if there be much pain, mix the poultice with Poppy leaves, Jamestown weed, or Tobacco.

Where there is Proud flesh in a sore, and it be very sensitive to the touch, cauterize it with Bluestone, Lunar Caustic, Burnt Alum or Caustic potash.

Sores resembling Cancers, have been cured by ointments containing Arsenic. The following preparation is recommended in such cases: Six grains of the Chloruret of Gold, dissolved in an ounce of Nitro-muriatic acid.

The following is a good preparation to kill the nerve of a tooth: Arsenic one-fourth of a grain, Morphia a fourth of a grain and one drop of Creosote; make into a pill and confine it in the cavity of the tooth by Wax. Let it be in about a day, or touch the exposed nerve with Lunar Caustic. Where Mortification is about to take place in a part, or where it smells

very bad, a Carrot poultice, or a poultice made of finely pulverized Charcoal and Peruvian-bark should be used.

A TOOTH-POWDER TO CLEAN THE TEETH.

Peruvian-bark two ounces, Gum Myrrh two ounces, Chalk one ounce, Armenian bole one ounce, Orris root one ounce; all to be pulverized together very finely.

TO COLOR THE HAIR BLACK.

Take equal parts of Vinegar and Lemon-juice, say two ounces of each, two ounces of Litharge; boil for half an hour over a slow fire: wet the hair with this decoction and in a short time it will turn black. Or, take of bruised Gall-nuts one pound; boil them in Olive oil until they become soft; then dry them and reduce them to a fine powder, which is to be incorporated with equal parts of the Charcoal of willow and Common salt pulverized; add a small quantity of Lemon and Orange peel, dried and reduced to powder; boil the whole in twelve pounds of water till the sediment at the bottom of the vessel is of the consistence of salve. The Hair is to be anointed with these preparations, covering it with a cap till dry. It should be applied at least once a week.

POISONS AND THEIR ANTIDOTES.

When Poisons have been swallowed, the first thing to be done, is to remove them from the stomach, either by a Stomach pump, by Emetics, or by both. The best emetic for this purpose is White vitriol, twenty grains dissolved in a teacupful of Warm water; assist its operation by tickling the throat with a feather dipped in oil, and by a Tobacco poultice over the stomach.

The next thing to be done, which, indeed, can be done at the same time you are producing vomiting, is to give something to change, chemically, the nature of the poison, converting it into an innoxious or harmless substance. If the poison be a corrosive or burning poison, you must give some Mucilaginous or oily substance to protect the coats of the stomach, such as the Whites of eggs, Slippery-elm or Flax-seed water, Sweet oil or Linseed oil, or Butter, or Lard.

ANTIDOTES FOR ALKALIES AND THEIR SALTS.

Liquor of Ammonia and Sal Ammonia, are neutralized by Lemon-juice, Olive oil, and Flax-seed oil.

For Potash, and Pearlash, and Lye, the antidotes are the same as the above, some oily or greasy substance, which forms Soap with the Alkalies. The antidote for Saltpetre is Mucilaginous drinks. For Liver of Sulphur, Common salt.

The antidote for Arsenic is the Hydrated Peroxide of Iron; in the absence of this, iron rust; afterward Mucilaginous drinks.

For Tartar-emetic, the infusion of Oak bark, of Gall-nuts, or of Peruvian-bark. A strong decoction of Common tea is good also in poisoning from Tartar-emetic.

For Carbonate of Barytes, Epsom or Glauber salts. For poisoning from Blue Vitriol, Verdigris, "Scheele's Green," food cooked in dirty copper vessels, or pickles made green by Copper, give the Whites of eggs in large quantity. For Spanish-flies, Linseed oil; for Muriate of Gold, give Sulphate of Iron (Copperas). For the preparations of Opium, such as the Gum, Laudanum, Morphia, Paregoric, use an emetic and stomach-pump, as in every other case of poisoning,

then use strong hot coffee, keeping the person moving all the time and dashing him with cold water. For Lead and its various preparations, such as White Lead, Red Lead, and Sugar of Lead, use Epsom Salts and water acidulated with Sulphuric acid.

Mercury and its different combinations, such as Corrosive Sublimate and the Iodide of Mercury: the antidotes are Milk, the Whites of eggs beaten up with water, Wheat flour, similarly prepared. The antidote for Oxalic acid is Chalk and water.

Prussic acid: for this, give a few drops of the Spirits of Ammonia, frequently repeated, and the cold dash should be used. For Nitrate of Silver, use common Salt. For the Muriate of Tin, Dyer's Solution, Putty, Gunpowder, give Whites of eggs. For Sulphate of Zinc (White Vitriol), Oxide of Zinc, and Acetate of Zinc, give Milk and the Carbonate of Soda.

The antidote for Muriatic acid is common Pearlash, or Carbonate of Magnesia, Carbonate of Soda, Chalk, or Soap in solution, to be accompanied with copious draughts of warm Flax-seed tea, Milk, or some mucilaginous or oily fluid.

The antidote for Nitric acid is the Carbonate of Magnesia, Chalk, with warm Flax-seed tea. For Sulphuric acid (Oil of Vitriol), give the same as for Nitric acid.

TREATMENT OF THE BITES OF MAD DOGS, VENOMOUS SNAKES AND INSECTS.

Where the teeth have made a wound in a fleshy part, sharpen a stick so as to fit the hole, and then, with a sharp blade, cut the part out around the stick so as to take out an entire cap of flesh on the point of the stick. First of all, however, tie a band around

the limb, above the wound, tightly, to prevent the poison being absorbed into the system. After you have cut out the wounded parts, or even before, if you cannot get them cut out immediately, suck the wound with all your might, draw out all the blood you possibly can, or put on a Cupping-glass and draw it. When this is done, wash the wound with a solution of Potash or Ammonia; then give the patient two grains of Opium and ten grains of Calomel, and let him go to bed; after a few hours, give him a Cathartic to open his bowels. If symptoms of the disease occur, keep the patient insensible with large potations of ardent Spirits and Opium or inhalations of Chloroform.

A MOST VALUABLE PRESCRIPTION FOR RHEUMATISM.

Put half an ounce of the Hydriodate of Potassa in a pint of rain water, and take of this a tablespoonful twice a day. Rub the part affected thoroughly, twice a day with a liniment made by dissolving half an ounce of Iodine in half a pint of Alcohol. Continue this course till relief is obtained.

THE CHEAPEST AND SUREST PRESCRIPTION FOR THE FEVER AND AGUE.

Take purified Chinoidine, an ounce, and make into pills. A grown person should take two of these pills three times a day, till the ague stops; then take one of them every morning, for two or three weeks. It would be better to drink some lemonade or vinegar and water after each dose. The pills may be dissolved in water for children.

APOTHECARIES' WEIGHTS AND MEASURES.

FLUID MEASURES AND THEIR SIGNS.

60	Minims	(sign ♏)	make	one	fluid	drachm.
8	Fluid drachms	(ʒ)	"	"	"	ounce.
16	" ounces	(ʒ)	"	"	"	pint.
8	" pints	(O)	"	"	"	gallon.

APOTHECARIES' MEASURES AND THEIR SIGNS.

20	Grains	(sign gr.)	make	one	scruple.
3	Scruples	(℈)	"	"	drachm.
8	Drachms	(ʒ)	"	"	ounce.
12	Ounces	(ʒ)	"	"	pound (℔).

The ordinary measures by which medicines are administered:

A teaspoonful	is supposed to	contain about	one fluidrachm.
A coffee or dessert-spoonful	"	"	three "
A tablespoonful	"	"	four "
A wineglassful	"	"	two ounces.
A cup or glassful	"	"	four "

APPENDIX.

EXTRACTS FROM CELEBRATED MEDICAL AUTHORS ON FOOD, DRESS, AND EXERCISE.

OF THE KINDS OF FOOD.

What is the proper food of man?—Food to be adapted to constitution and circumstances.—Diet must vary with time of life.—Diet in infancy.—The mother's milk the best.—Substitutes for it.—Over-feeding a prevalent error.—Causes which vitiate the quality of milk—Regimen of nurses.—Weaning.—Diet after weaning.—Too early use of animal food hurtful.—Diet of children in the higher classes too exciting—and produces scrofula.—Mild food best for children.—Incessant eating very injurious.—Proper diet from childhood to puberty.—It ought to be full and nourishing, but not stimulating.—Often insufficient in boarding-schools.—Diet best adapted for different constitutions in mature age.—Regimen powerful in modifying the constitution, mental as well as physical.—Farther investigation required.

"WHAT is the proper food of man? In answering this question, we must begin by making distinctions, otherwise we shall, in the very outset, fall into error.

On examining the structure of the human body at different ages and in different individuals, remarkable differences are observable in the relative proportions of the elements or tissues of which it is composed. In one, the muscular system predominates, and the body is remarkable for a compactness of fibre indicative at once of strength and activity. In another, the lymphatic system is the most conspicuously developed, and its features are easily recognized by the full, soft,

and rounded form, and languid action, which generally accompany it. In a third, the thin and sharp outline, irregular and vivacious activity, and great susceptibility of impressions, betoken the predominance of the nervous over all the other functions; while, in a fourth, the florid complexion, expanded chest, and general vivacity of disposition, as clearly point out the superior development and energy of the vascular system. Such are the four principal constitutions, long familiarly known under the names of the *bilious*, the *lymphatic*, the *nervous*, and the *sanguine* temperaments. Very frequently the habit of body indicates a mixture of two or more of these temperaments; in which case the results of course are modified according to the proportions in which they are combined.

The elementary textures being thus differently proportioned in different individuals, it follows that the aliment best suited for the support and repair of one is not always so for the others; in other words, a distinct modification of diet ought to be adopted for every marked variety of constitution, because *a direct relation ought always to subsist between the qualities of the food and the nature of the system which it is intended to nourish.* Thus, the highly concentrated and stimulating food which is found necessary for the proper sustenance of the trained pugilist or sportsman, whose muscular frame is in high development and constant exercise, would prove far too exciting to the slender and irritable constitution of a person whose characteristic feature is the predominant activity of the brain and nervous system. And, in like manner, the generous and stimulating diet which suffices merely to rouse a phlegmatic organization to ordinary

energy, would prove by far too nutritive for a person of a florid and sanguine temperament, whose predisposition is already toward inordinate activity.

The necessity of adapting the diet and regimen to the individual constitution and mode of life, becomes so obvious to reason, when thus plainly stated, as to excite surprise that it should ever have been neglected. But, strange to say, although the ancient writers attached much importance to the subject, the relation between diet and constitution, as a practical consideration, has of late been so entirely overlooked, and sound physiological principle has been so little consulted in the proper adaptation of the one to the other, that we are at this moment in possession of very little information of any value regarding it, and a long time must elapse before more can be supplied. My own observations have not been extensive or accurate enough to enable me to lay before the reader any new or definite results; and I notice the deficiency here only because I am deeply impressed with its importance, and hope that others may be induced to observe for themselves, and make known any information which they may obtain.

There is no kind of alimentary substance of which it can be said absolutely that it is always proper for the sustenance of man. To be serviceable, *the food must be adapted to the age, constitution, state of health, and mode of life of the individual, and to the climate and season of the year.* The same diet which, administered to an adult, is healthful and nutritious, may prove irritating and injurious to a child; and, in like manner, the stimulating animal diet, which, in winter, is highly grateful to the system of a hard-

working unexcitable laborer, may prove utterly destructive of health when indulged in during summer by an inactive and excitable female. It becomes, therefore, an object of deep interest to determine the principal causes and states of the system which render modifications of diet necessary.

Among these modifying causes, *the varying state of the body at different periods of life*, ought certainly to be considered as one of the most influential. The differences observed in the constitution of the same person at different ages, are at least as great as those subsisting between different individuals at the same age. In infancy, the lymphatic and nutritive functions greatly predominate over the muscular; and if the highly animalized food which suits the latter, were then freely administered, it would infallibly induce disease, and fail to afford the requisite nourishment. In manhood, again, when muscular activity and nutrition are at their height, the lymphatic system, in abeyance, and the person subjected to laborious exertion, the mild food of infancy would be equally misplaced. In advanced age, another change of constitution occurs. The soft tissues of early life have disappeared, and the whole frame is dry and wasted—a condition which, in its turn, requires food of a different kind from that fitted for either of the preceding stages.

Even the state of the digestive organs at different periods of life is sufficient to indicate a corresponding modification of diet to be proper for each. In early infancy, when no teeth exist, and the muscles which move the jaws are still comparatively small and powerless, and mastication is consequently impossible, milk from the mother's breast is manifestly the only food intended by nature for its use; and so long as it can be obtained

of healthy quality and in sufficient quantity, no other ought to be substituted in its place. After the milk-teeth have made their appearance, but not till then, a little admixture may be permitted, and gradually and cautiously increased in proportion as dentition advances, and the stomach becomes fitted to digest other food. If, however, the appearance of the teeth be retarded by inability in the mother to furnish an adequate supply of sustenance (which sometimes happens) the deficiency must be made up either by providing a nurse of a healthy constitution, or by other means to be presently mentioned. The former is the preferable remedy; but where a nurse cannot be procured, and the mother's milk is scanty, the child may, after the third or fourth month, receive at proper intervals a small allowance of cow's milk, diluted with one-third of water, and slightly sweetened. This makes the nearest approach to the nature of the mother's milk, and is, therefore, more suitable than any preparation of milk and flour or arrow-root that can be given. Ass or goat milk answers still better.

The appearance of the first teeth is an indication that the digestive organs have become sufficiently developed to admit of small portions of barley-water, panada, a thin arrow-root, or milk and water, being given two or three times daily in addition to the nourishment drawn from the mother's breast, if the latter be at all deficient. Great care must be taken, however, neither to exceed in quantity, nor to give the food too rapidly; for otherwise the stomach will become too full, and be weakened by the efforts it is obliged to make. I have already pointed out the importance of attending to this rule; and, in accordance with it, nature, by arranging that the milk shall flow

only by slow degrees, has taken care that, in suckling, the child shall receive its food very gradually. The very appearance of the teeth indicates a preparation of the digestive functions for more substantial aliment; and by beginning cautiously the use of small quantities of such simple articles as those above named, and gradually increasing them according to the wants of the system, an excellent preparation is made for the process of weaning, which would otherwise, by its suddenness, be attended with serious risk to both parent and child.

The milk *of the parent* ought, in every instance, to constitute the food of the infant, unless some very urgent reason prevents the mother from suckling, or renders her milk improper for the child. There is always a relation between the condition and constitution of the mother, and the age and constitution of the infant, which renders this proper, and which cannot exist between the child and any other nurse, but which exercises an important influence on its nutrition. It is well known, for example, that during the first few weeks, the milk is thinner and more watery than it afterward becomes. If, consequently, a newly-born infant be provided with a nurse in the third or fourth month, the natural relation between its stomach and the quality of the milk is destroyed, and the infant suffers from the oppression of food being too heavy for its powers. If, again, an infant of five or six months old be transferred to a nurse recently delivered, the aliment which it receives is too watery for its support, and its health in consequence gives way.

In like manner, if the parent be of mature age, her own milk, or that of a healthy nurse of a nearly similar age, will be more suitable to the infant than the

milk of a much younger woman; because the constitution of the offspring always bears a relation to that of the mother, and is adapted to the quality of the fluid which nature has provided for it. I speak, of course, only of the healthy state; for in cases of disease, the mother may be, and often is, the most unfit nurse that can be found for her own child. But as, in such instances, the parents are always guided in their conduct by medical advice, and this is not the place to discuss the treatment of disease, I need not now enlarge upon it.

The leading error in the rearing of the young, I must again repeat, is *over-feeding* — an error serious in itself, but which may easily be avoided by the parent yielding only to the indications of appetite, and administering food slowly and in small quantities at a time. By no other means can the colics and bowel-complaints, and irritability of the nervous system, so common in infancy, be effectually prevented, and strength and healthy nutrition be secured. Nature never meant the infant stomach to be converted into a receptacle for laxatives, carminatives, antacids, spicy stimulants, and astringents; and when these become necessary, we may rest assured that there is something faulty in our management, however perfect it may seem to ourselves. The only exception is where the child is defectively constituted, and then, of course, may fail to thrive under the best measures which can be devised for its relief.

Another cause of infantile indigestion, and which is too much overlooked through ignorance of its importance, is *vitiation of the quality of the milk*, caused by imprudence, neglect, or anxiety on the part of the mother. The extent to which this cause operates in

inducing irritation and suffering in the child, is not generally understood; and accordingly, it is not unusual for mothers to display as much indifference to health, regimen, and tranquillity of mind during nursing, as if the milky secretion, and all other bodily functions, were independent of every external and corporeal influence. Healthy, nourishing, and digestible milk can proceed only from a healthy and well-constituted parent; and it is against nature to expect that, if the mother impairs her health and digestion by improper diet, neglect of exercise, impure air, or unruly passions, she can nevertheless provide a wholesome and uncontaminated fluid, as if she were exemplary in her observance of all the laws of health.

It is no new or uncertain doctrine that the quality of the mother's milk is affected by her own health and conduct, and that, in its turn, it directly affects the health of the nurseling. Even medicines given to the parent act upon the child through the medium of the milk; and a sudden fit of anger, or other violent mental emotion, has not unfrequently been observed to change the quality of the fluid, so much as to produce purging and gripes in the child. Care and anxiety, in like manner, exert a most pernicious influence, and not only diminish the quantity, but vitiate the quality of the milk.

As soon, then, may we expect to see a bad tree bringing forth good fruit, as bad management good results; and low must that parent be ranked in the scale of moral beings, who, knowing the relation we have pointed out, can still deliberately sacrifice the welfare of her offspring by the improper indulgence of her appetites and passions, and by culpably neglecting the duties and restrictions demanded by her own health.

It is a common mistake to suppose that, because a woman is nursing, she ought, therefore, to live very fully, and to add an allowance of wine, porter, or other fermented liquor, to her usual diet. The only result of this plan is to cause an unnatural degree of fullness in the system, which places the nurse on the brink of disease, and which of itself frequently puts a stop to, instead of increasing, the secretion of the milk. The health and usefulness of country nurses are often utterly ruined by their transplantation into the families of rich and luxurious employers. Accustomed at home to constant bodily exertion, exposure to the air, and a moderate supply of the plainest food, they live in the enjoyment of the best health, and constitute excellent nurses. But the moment they are translated from their proper sphere, their habits and mode of life undergo an unfavorable change. Having no longer any laborious duties to perform, or any daily exposure to encounter, they become plethoric and indolent; and as they are at the same time too well fed, the digestive functions become impaired, the system speedily participates in the disorder, and the milk, which was at first bland, nourishing, and plentiful, now becomes heating and insufficient, and sometimes even stops altogether. The motive which induces the mother to take the nurse out of her proper element is extremely amiable—she is desirous to see that her infant is properly attended to; but the method which she takes to gratify this desire is not on that account the less short-sighted and erroneous. If the nurse cannot be trusted with the child at her own home, care ought to be taken at least that her diet and mode of life be changed as little as possible from those which experience has proved to be most conducive to her health: and the

system of feeding, confinement, and indolence usually resorted to ought to be strictly prohibited, as fraught with evil to both nurse and child.

Nature, indeed, has saved mothers the necessity of oppressing their stomachs by way of providing for the wants of their young, and has enabled them to give suck without either suffering from exhaustion or having recourse to inordinate eating. This is accomplished simply by the suppression of that periodical evacuation to which all healthy women are subject during the greater portion of life, except when pregnant or nursing; and as, in every situation, it is certainly more advantageous for all parties to follow out the intentions of nature, than to substitute any contrivance of their own to effect a given end, so, in the present instance, more will be gained by the observance of the ordinary laws of health on the part of the nurse, than by any foolish deviation founded on ignorance and caprice.

The length of time during which an infant ought to be fed at the breast is subject to some variation. In this country, the end of the ninth month is usually considered a proper time for weaning; but much depends on the condition of the mother, and also on that of the child. If both are in vigorous health, if the infant has cut several of its teeth, and been already accustomed to be fed, and if the season be favorable, weaning ought to be then gradually accomplished. But if the nursling is feeble in constitution, the teeth late in appearing, and the nurse has a sufficient supply of good milk, especially if it be the winter season, it will be far better to prolong the nursing for a few months. In such a case, the single fact of the non-appearance of the teeth would suffice to indicate an unfitness of the

system for any other than the natural food from the maternal breast. In general, weaning takes place too early.

Where a healthy and well-constituted nurse has been provided, on account of the existence of an hereditary taint, such as active scrofula or cancer, in the parent, it is generally advantageous to defer the weaning beyond the usual time. But we must, in this case, be watchful not to delay it, if either the nurse or the child begins to suffer from its continuance.

It would carry me too far from the main object of this work to discuss all the contingencies against which it is occasionally necessary to provide in the management of the young. This, however, is scarcely required, seeing that medical advice is generally resorted to at the time of their occurrence; and the exposition of principles already given will enable most reflecting readers to decide for themselves how far they may safely trust to their own lights, without delaying to seek advice from others till the evil is done.

After the child has been weaned, panada, gruel, thin arrowroot, tapioca, sago, rusk, or crust of bread, may be allowed along with the fresh milk and water and sugar, which ought still to constitute the principal part of the food; and one or other ought to be preferred according to its effects. When these are given in moderate quantity, and not too frequently, they generally agree well; but in some delicate children they cause acidity, flatulence, and griping. In this case, a proportion of weak chicken-broth or beef-tea, freed from fat, and thickened with soft-boiled rice or arrowroot, may be added.

The same kind of food ought to be continued till after the appearance of the canine or dog-teeth. When

these have fairly protruded, a portion of soft-boiled egg may be given as an introduction to the use of a more completely animal diet. In general, solid animal food ought not to be allowed in any quantity till all the teeth have appeared, and the digestive powers be fully adequate to its assimilation.

In this respect, there are two errors which ought equally to be avoided. If animal food be given too early, or in too great quantity, the system becomes excited, and diseases of irritation are apt to be produced, which impede nutrition, and lead ultimately to the production of scrofula and other organic changes in the glands and bowels, and not unfrequently also in the brain and lungs. In these instances, the child generally eats heartily, but nevertheless continues thin, and is subject to frequent flushing and irregularity of the bowels, headache, and restlessness. His mind partakes of the general irritability of the system, and peevish impatience takes the place of the placid good-humor natural to healthy childhood. In this state, the ordinary diseases of infancy—measles, scarlet fever, and hooping-cough—are often attended with an unusual and dangerous degree of constitutional disturbance; and whenever inflammation takes place, the necessary depletion is borne with difficulty, and the system does not easily rally.

The consequences now enumerated, and the error from which they spring, are most frequently met with in the middle and higher classes of society. Aware that animal substances contain the largest proportion of nutriment in a given bulk, but ignorant of the relation subsisting between particular kinds of food and particular states of the system, and which in practice can never be safely overlooked, the fond parent natu-

rally imagines that the more nutritious the food, and the larger the quantity administered, the stronger and healthier will the child become. No suspicion is entertained that strong diet may overpower weak organs, and thus induce the very evils which it is sought to avoid; whereas, by adapting the quality and quantity of the food to the condition of the system, the assimilating powers may be gradually invigorated, and healthy nutrition be completely insured.

Among the wealthier classes, imperfect nutrition most generally arises from excess in quantity, or a too stimulating quality of food; but among the lower classes, from deficiency in quantity or quality, added to scantiness of clothing, want of cleanliness, and imperfect ventilation. And hence Dr. Clark, in treating of the prevention of scrofula and consumption in early life, lays great stress on the proper regulation of diet, and shows that, even in families free from all hereditary taint, a morbid condition of the system extremely favorable to the production of both diseases is speedily brought about by continued mismanagement of diet; and both the public and the profession are deeply indebted to him for drawing attention to the extensive influence of dyspeptic ailments in paving the way for the future inroads of a deadlier disease. It is true that it has long been the fashion to ascribe all bodily and mental disorders to bile, indigestion, or the state of the bowels; but the rationale of the result has seldom been perceived, or turned to any good account in improving preventive or remedial treatment. Dr. Clark's treatise, however, presents a remarkable exception, and may be referred to as a most instructive specimen of cautious and discriminating medical inquiry.

When we reflect that the object of digestion is to

furnish materials for the growth of the body, and to supply the waste which the system is constantly undergoing, it must appear self-evident, that if the digestive powers be impaired by disease, by improper quantity or quality of food, or by any other cause, the result must necessarily be the formation of an imperfect chyle, and consequently of imperfect blood. The elements of the blood are derived from the chyle, and if *it* be vitiated, the blood also must suffer: if the blood be impoverished, so must necessarily be all the organs which it supplies; and if the body be thus debilitated, can any wonder be felt that it should no longer be able to resist the action of offending causes which full health alone can withstand? No matter whether the imperfect chyle springs from deficiency or excess, from too weak or too strong food, from constitutional debility or the inroad of disease—imperfect nutrition is its invariable consequence, and that cannot happen without exposing the system to morbid influences in a greater or less degree, according to the nature of the constitution and other concomitant circumstances.

Wisely, therefore, does Dr. Clark recommend early and earnest attention to a proper dietetic regimen, and insist that "the food of the child be regulated chiefly by the state of the digestive organs. In proportion to the delicacy of the child, the diet will in general require to be mild; when he thrives upon milk, farinaceous food, and light broths, no stronger or more substantial food need be used during the first two years of life: when he looks healthy and grows, and his bowels are regular (for this is one of the surest indications that the food is suited to the digestive organs), we have the best proofs that the diet agrees with him.

When, on the other hand, the child appears heated or flushed toward evening, when he drinks greedily and more than is usual in children of the same age, and when his bowels do not act regularly, we may be assured that there is something wrong in the regimen employed.

"There is no greater error in the management of children than that of giving them animal diet too early in life. To feed an infant with animal food before it has teeth for masticating it, shows a total disregard to the plain indications of nature in withholding such teeth till the system requires their assistance in masticating solid food. Before that period, milk, farinaceous food, and broth afford that kind of sustenance which is best suited to the digestive organs, and to the nourishment of the system. The method of grating and pounding meat as a substitute for chewing, may well be suited to the toothless octogenarian whose stomach is capable of digesting it; but the stomach of the young child is not adapted to the digestion of such food, and will be disordered by it. When the child has the means of masticating, a little animal food may be allowed, but it should be of the lightest quality, and given on alternate days only; and even then its effects should be watched, for all changes in the regimen of children should be gradual.

"The frequent origin of scrofulous disease in defective nourishment has led to the opposite extreme, and children who are disposed to tuberculous disease are too often subjected to a system of over-feeding, which induces the disease it is intended to prevent. By persevering in the use of an over-stimulating diet, the digestive organs become irritated, and the various secretions immediately connected with digestion are

diminished, especially the biliary secretion; at least the sensible qualities of the bile enable us to observe it best. Constipation of the bowels soon follows; congestion of the hepatic and abdominal veins succeeds, and is followed by the train of consequences which have already been detailed. It would be well if the advocates of the system of high feeding would bear in mind the salutary adage, *corpora impura quo plus nutries, eo magis lædis.*"

In proportion as the organization becomes developed, and strength, activity, and aptitude for abundant exercise increase, a larger allowance of plain animal food becomes essential to health. The instruments of mastication are now fully adequate to their office, and the stomach is no longer oppressed by the effort of digesting it. To make it safe, however, even at that age, ample exercise and exposure to the open air are indispensable. By undue confinement to the house or to school, and deficient exposure to the air, a degree of general delicacy is kept up which is incompatible with the daily use of a stimulant animal diet. The waste occasioned by the bodily action is too limited to require the copious supply of any very nutritious substances, and if these be freely allowed, they serve only to oppress the digestive functions and impair the health.

The prevalent and pernicious custom of tasking the minds and confining the bodies of children for hours in succession at home and in schools, at a time of life when the growth of the body and the welfare of the system require constant and playful exercise in the open air, and perfect freedom from care and excitement of mind, is the fruitful source of much future bad health, and is eminently calculated to defeat the

object aimed at by parents, namely, the mental excellence of the child. The premature exertion of intellect to which it is stimulated by the constant excitement of emulation and vanity, far from strengthening, tends to impair the health and tone of the brain, and of all the organs depending on it; and hence we rarely perceive the genius of the school manifesting in future years any of the superiority which attracted attention in early life; but we find him, on the contrary, either sunk below mediocrity, or dragging out a painful existence, the victim of indigestion and melancholy. On the other hand, some of the most distinguished men who ever lived were in childhood remarkable only for health, idleness, and apparent stupidity. The illustrious Newton was, by his own account, an idle and inattentive boy, and "very low in the school," till he reached twelve years of age; and the young Napoleon himself is described as "having good health, and being in other respects like other boys." Adam Clarke was considered "a grievous dunce" when a boy, and was seldom praised by his father except for his ability *in rolling large stones*, which his robust frame and good health enabled him to do. Shakspeare, Gibbon, Byron, Scott, and Davy were in like manner undistinguished for precocious genius, and were fortunately allowed to indulge freely in those wholesome bodily exercises, and that freedom of mind, which contributed so much to their future excellence. The mother of Sheridan, too, long regarded him as "the dullest and most hopeless of her sons."

Among the many who give great promise in early life, and whose talents are then forced by ill-judged cultivation into precocious maturity, how few live to manhood to reap the reward of their exertions, and

how few of those who survive preserve their superiority unimpaired! Tasso was early distinguished, and wrote his immortal epic at twenty-two years of age; but his life was miserable, and his reason disordered, and he died at thirty-two. Pascal is another example of the same result, and Kirke White and many others might be named were it necessary.

Experience, indeed, amply demonstrates, that precocious and excessive activity of intellect and vivacity of feeling are most powerful impediments to healthy and vigorous digestion, and consequently to a sufficient nutrition. In early life, therefore, when not only health, but future usefulness, depends mainly on the completeness and vigor with which the system shall proceed toward its full development, the preservation of the digestive organs by suitable diet, exercise, and regimen, ought to be a primary object of attention with every sensible parent. Even as regards superiority of mind, the healthy development of the body is of essential importance, as the only sure foundation on which mental excellence can be built; because, so long as mind and body are intimately connected with each other, the former must continue to be affected by every change in the condition of the organization on which it depends. We enjoy acuteness of vision by preserving the eye in high health, and exercising it regularly and moderately; and, in like manner, we can obtain and preserve intellectual power only by preserving the health of the brain, and exercising it in conformity with its natural constitution.

Instead, then, of feeding the closely-confined and excitable children of the middle and higher classes from early infancy on quantities of stimulating animal food, and even giving them wine and fermented

liquors, we shall act more in accordance with the laws of nature by restricting them, during the three or four earliest years of childhood, chiefly to a mild farinaceous diet, with a small allowance of meat on alternate days; and by seeking to increase their digestive power and bodily vigor by constant exercise in the open air, before giving them a more solid diet. By these means the development of the organization, the keenness of appetite, the tone of digestion, and the desire of, and fitness of the system for, animal food, will increase in regular proportion, and a free supply of that species of aliment will even become necessary to carry on the growth. In short, it must ever be remembered, that strength is to be obtained not from the kind of food which contains most nourishment in itself, but from that which is best adapted to the condition of the digestive organs at the time when it is taken.

Children who are prone to bodily exertion, and live almost entirely in the open air, as many of those of the lower orders do, and who display no unusual sensibility or activity of mind, or, in other words, no unusual irritability of the nervous system, not only bear, but require a larger proportion of animal food than their more delicate and sensitive companions. Not only is their digestion more vigorous, but the waste going on in the system is much greater, and the nutritive functions are more active; the need, consequently, for nourishing food, and the desire to procure it, are proportionally increased. Hence it happens that, in the wealthier classes of society, young children suffer most from over-feeding, while in the poorer classes they suffer chiefly from the opposite cause. In both, defective nutrition is the result; but the modes in which it is brought about are very different.

One of the most pernicious habits in which children can be indulged is that of almost incessant eating. Many mothers encourage it from the facility with which, for a time, the offer of "something nice" procures peace. Even from infancy, the child ought to be gradually accustomed to eat only when hungry, and when food is really required. After two years of age, an interval of four hours between meals will rarely be more than enough; and to give biscuit, fruit, or bread in the meantime, is just subtracting from the digestive power of the stomach. Like almost every organ of the body, the stomach requires a period of repose after the labor of digestion, and accordingly, in the healthy state, the sensation of appetite never returns till it has been for some time empty. To give food sooner, therefore, is analogous to making a weary traveler walk on without the refreshment of a halt.

It is a great mistake to suppose that children would not be quiet or contented without such indulgence. On the contrary, they would be healthier and happier were the *opposite* system steadily pursued. The greatest obstacle to be encountered is the ignorance of the nurse or mother, and her want of resources for the entertainment and exercise of the child's bodily and mental faculties. If these be duly attended to, the child will not think of eating till the return of appetite enforces the demand; whereas, if it be left idle and neglected, everything will be carried to its mouth, as its only remaining resource against absolute inanity. So true is this, that I should regard that nurse as unfit for her employment who should complain that her charge, otherwise in good health, is incessantly craving for something to eat. In this respect children are like adults. Give them something to do and to think

about, and they will seek meat only when hungry. But leave them idle and listless, and eating will become their chief subject of contemplation.

In a matter so important as the rearing of children, one would imagine that every mother and nurse would be anxious for instruction on the nature, functions, and wants of the being committed to their fostering care. And yet it is notorious how rarely either one or other of them possesses any but the crudest notions of the animal economy, or can give reasons for the practices they recommend, or modify them in any degree to suit modifications of circumstances and constitution. In reality the wonder comes to be, not that so many children die, but that so many survive their early mismanagement.

From the age of six or seven years up to that of puberty, when the animal activity is at its height, growth in full progress, and the nutritive functions in their greatest vigor, a larger proportion of animal food, and a more generous diet, become necessary to the enjoyment of good health and vigor; but they must still be accompanied by ample exercise and free exposure, otherwise they will tend only to clog and impede the functions of life. At that age the teeth and other organs concerned in digestion have become developed and fit for the assimilation of a richer aliment, and the rapid growth which takes place renders an abundant provision of the latter in a manner indispensable. It is then that the healthy youthful appetite demands quantity as well as quality, and that digestion goes on with an ease and vigor which the dyspeptic parent contemplates with a covetous and regretful eye.

At that age, indeed, the nutritive functions are so

predominantly active for the purpose of carrying on growth, and supplying the rapid waste caused by youthful activity, that if the natural craving for exercise in the open air be freely indulged, and due attention be given to the development of the bodily frame, the young may be very safely left to choose for themselves both the quality and quantity of their food. In such circumstances, the natural taste inclines so essentially to the preference of plain substantial nourishment, that there is very little risk of excess being committed. But where the parents are intent only on the intellectual advancement of their children, and accustomed to subject them daily to many successive hours of confinement and study, with only an hour or so of relaxation in the open air, as is too commonly the case both with those educated at home and with those in boarding-schools, an artificial state of being is induced, which makes the rule no longer applicable, and renders necessary a more careful attention to dietetic regimen.

Among the higher classes of society the unrestricted use of the most exciting kinds and preparations of animal food, and the daily use of wine, are the means generally resorted to for the removal of the delicacy thus engendered; but when we consider the real state of the case, no remedy can seem more preposterous. The evil to be corrected is imperfect nutrition and the want of strength. The imperfect nutrition, however, is caused, not by deficient food, but by impaired powers of digestion and assimilation, and these suffer only because the lungs are denied the free air, the muscles their necessary exertion, the brain its cheerful recreation, and the circulation the healthy stimulus which these united conditions infallibly produce. Instead,

therefore, of oppressing a weakened stomach by administering stronger food than it has the power of digesting, the natural way of proceeding would be to prescribe at first a milder and less stimulating diet—to improve the tone of digestion by fulfilling the conditions above referred to—and then, in proportion as the stomach was strengthened, to adopt a more nourishing diet, suited to the increased efficiency of all the animal functions.

By running counter to this method, and using highly stimulating food improperly, many young people of the wealthier classes incur as much suffering from imperfect nutrition, and the diseases to which it predisposes, as if they were really the victims of an impoverished diet. Dr. Clark, after making some very judicious remarks on the influence of bad digestion in inducing the consumptive constitution of body, expresses himself strongly on the evils to which I have just alluded. "Food in excess," he says, "or of a kind too exciting for the digestive organs, may also induce tubercular cachexia—a circumstance which is not sufficiently attended to — I may say, not generally understood, even by medical men ; nevertheless, I hold it to be a frequent cause of scrofula, and believe that it produces the same effect on the system as a deficient supply." — "The imperfect digestion and assimilation in the one case, and the inadequate nourishment in the other, being equally injurious ; the form and general characters which the disease assumes may differ, but the ultimate result will be the same in both cases. The adaptation of the food, both in quality and quantity, to the age of the individual, as well as to the powers of the digestive organs, is too little considered ; and the evil consequences of this neglect are

often evident in the children of the wealthy classes of society, who are allowed an unrestricted use of the most exciting kinds of animal food."

The opposite error, of not providing a sufficiently nourishing diet for the young, is, from mistaken views, much more prevalent than it ought to be, particularly in female boarding-schools, where, as already mentioned, the system of diet is often insufficient for due sustenance and growth; and where, consequently, the natural expression of impaired health, if not actual disease, is a marked feature in the aspect of most of the pupils. So defective, indeed, is the common school management in this and other respects, that we have the best authority for considering it as a rare exception for a girl to return home in full health after spending two or three years at an ordinary boarding-school.

It is true, that much of this result is owing to excessive confinement, neglect of cheerful exercise, ill-ventilated sleeping apartments, and other depressing influences; but to these, that of an insufficient diet may often be added; and when it does exist, it acts with double force from the impaired digestion, which seldom fails to ensue where the laws of health are so widely outraged.

I have seen some striking instances of incurable scrofulous disease induced by the depressing influence of misfortune, added to the want of a sufficient supply of nutritious food. After the mercantile disasters of 1825–6, many cases of this kind occurred, especially in families whose sensitive feelings induced them to shrink from public observation, and to suffer the severest privations rather than allow their situation to become known. In these cases, the tone of the gene-

ral health first became reduced, and then local disease was easily excited by any trivial cause. In one, the structure of the bones and joints became disorganized, and amputation of the limb preserved life, but could not prevent other parts of the osseous system from being attacked. In another, caries of the bones of the foot ensued, but the constitution itself was so thoroughly tainted that no operation could be performed with even momentary success, and after much suffering, the patient died. The same causes undermined the health of another member of the same family, and led to his death, from consumption, at an early age.

In regard to the diet best adapted to different constitutions in mature age, I have already confessed that I have little information to offer. In determining the question, several other circumstances beside the mere temperament require to be considered. A more or less laborious mode of life, for example, will require a more or less nutritious diet, whatever the original habit of body may be. In like manner, if any temperament be in excess, and we wish to repress its predominance, the same kind of food which is suitable for it in a lower degree will no longer be applicable. Thus, when the lymphatic constitution is predominant, and our object is to diminish its ascendency, and stimulate the system to greater vigor, a larger proportion of solid nourishing food, combined with increased exercise, will be more proper than if there is no such excess. Where, on the other hand, the nervous or sanguine temperament preponderates, a plainer and less exciting regimen will be necessary than where the constitutional tendencies are more equally balanced.

The power we possess of modifying the constitution

by well-directed regimen is very great, and only requires to be investigated and made known, to have due importance assigned to it in conducting physical education. This is well exemplified in the art of training, where diet and exercise are reduced to a practical science for the attainment of certain results, and with remarkable success. In the hands of a trainer, the breathless and oppressed frame of a person overburdened with lymph and fat, speedily becomes converted into an active, firm, and well-conditioned organization, exhibiting a promptitude of action of both mind and body the very opposite of its former manifestations; and if such a change can be effected by rigid adherence to rules, in the course of two or three months, we may easily conceive the degree of improvement which would follow the uniform observance of proper regimen and dietetic precepts in ordinary society. In improving the moral and intellectual, as well as physical condition of the working classes, the influence of food, air, and exercise will soon be discovered to possess a degree of importance of which at present scarcely a suspicion is entertained. They constitute, in fact, the very foundation of a systematic education; and mere intellectual cultivation will fail to produce its full beneficial results, till the organization by which the mind operates be itself improved by a treatment in harmony with its own constitution.

If it be impossible for me to communicate sufficient information to enable each of my readers at once to determine the kind of diet which is likely to suit him best, it will give him at least some satisfaction to know, that, by observing personally what kind of food agrees best with his stomach and constitution, he may soon obtain the necessary information for himself. When

we refrain from eating too much, and at unseasonable hours, and are not conscious of any undue oppression or discomfort after our meals, but, on the contrary, feel light and refreshed, and, after a time, ready for renewed exertion, we may rest assured that the food which we have taken is wholesome and suitable for us, whatever be its nature and general effects. Whereas, if, without committing any excess or other dietetic error, we experience the opposite sensations of oppression, languor, and uneasiness, we may be just as certain that our food, whatever its general character for lightness and digestibility, is not wholesome or suitable for us under our present circumstances. So that, with a little care and trouble, we shall rarely be at any loss to find out what we ought to eat and what to avoid ; and, accordingly, it is notorious that indigestion from a wrong choice of food is induced at least nine times by willful indulgence, for once that it occurs from errors originating in ignorance alone. If the proper *quantity* of food be not exceeded, and the other conditions of digestion be carefully fulfilled, the risk of mischief from an erroneous choice of aliment will be greatly diminished.

After the full exposition of the laws of digestion given in the first part of this work, I need hardly add, that although there are very few articles of diet which a person in health, and leading a sufficiently active life, may not eat with impunity, there are nevertheless some which ought to be preferred, and others which ought to be avoided, by those *whose digestion is impaired.* Thus, vegetables are, generally speaking, slower of digestion than animal and farinaceous aliments, and consequently, when digestion is feeble, are

liable to remain in the stomach till acetous fermentation takes place, and give rise to acidity and flatulence. Fat and oily meats are nearly in the same predicament, and hence both form unsuitable articles of diet for dyspeptics. Soups and liquid food are also objectionable, both because they are ill adapted for being properly acted upon by the gastric juice and by the muscular fibres of the stomach, and because they afford insufficient nourishment. From the former cause they frequently impair the digestive functions; and from the latter, they induce diseases of debility which it is difficult to subdue. Daily experience furnishes examples of stomachic disorder from eating soups, especially as preliminary to an otherwise substantial dinner; and the fatal epidemic which prevailed a few years ago in the Milbank Penitentiary, was distinctly ascertained to have been partly caused by an insufficient and too liquid diet. It is common, indeed, to see heartburn and indigestion of recent origin cured simply by giving up soups and vegetables, and diminishing the quantity of liquid taken at breakfast and tea.

When, from the state of health or other causes, chicken-tea, beef-tea, veal-broth, or other kinds of soup require to be given, their digestibility will generally be promoted by the addition of bread or rice to give them consistency, and by taking little or no other food along with them. Even vegetables, when taken alone, are sometimes digested without difficulty, where, if mixed with other substances, they disorder the stomach. Dr. Abercrombie mentions a very remarkable instance of this kind in a gentleman who "had been for many years a martyr to stomach complaints, seldom a day passing in which he did not suffer greatly

from pain in his stomach, with flatulence, acidity, and the usual train of dyspeptic symptoms; and, in particular, he could not taste a bit of vegetable without suffering from it severely. He had gone on in this manner for years, when he was seized with complaints in his head, threatening apoplexy, which after being relieved by the usual means, showed such a constant tendency to recur that it has been necessary ever since to restrict him to a diet almost entirely of vegetables, and in very moderate quantity. Under this regimen, so different from his former mode of living, he has continued free from any recurrence of the complaints in his head, and has never been known to complain of his stomach." In this case, however, the *very moderate quantity* of vegetable food to which the patient restricted himself had perhaps no small share in the subsequent improvement of his digestion.

Dr. Beaumont mentions, as a general result from his experiments on St. Martin, that vegetable food is slow of digestion; but it is much to be regretted that he gives the particulars of only one or two trials, which lead to no very important results. In one of these, St. Martin ate "nine ounces of *raw*, *ripe*, *sour* apples, at 2 o'clock 35 minutes. At 3 o'clock 30 minutes the stomach was full of fluid and pulp of apples, quite acrid, and *irritating the edges of the aperture, as is always the case when he eats acescent fruits or vegetables.*" In another instance ten ounces of *raw cabbage* were given, and in two hours not a particle of it was to be found in the stomach; while on a third occasion, half a pound of *raw cabbage*, cut fine, and macerated in vinegar, disappeared in little more than one hour and a half! If in the latter experiments the cabbage was really digested, and not merely

propelled out of the stomach into the intestine, we shall be forced to admit that we have still much to learn concerning the digestibility of different kinds of food, for the result is contrary to all generally received opinions. When vegetables are allowed, great stress is commonly laid upon the necessity of their being thoroughly cooked ; and yet, according to these experiments, *raw* cabbage is very nearly as digestible as soft boiled rice or sago ! It is strange that Dr. Beaumont should not have remarked this anomaly, which he seems not to have done, since he neither attempts to explain it nor alludes to it as anything extraordinary. My own suspicion is, that the cabbage was not entirely digested, but had merely passed through the pylorus into the intestine.

Dr. Beaumont's testimony in favor of farinaceous vegetables is, however, more precise and satisfactory. In some of his experiments, St. Martin digested completely a full meal of *boiled rice*, seasoned with salt, in a single hour. *Soft custard* and *boiled rich sago*, sweetened with sugar, and taken in quantities of a pint each time, were disposed of with nearly equal dispatch " and there was no acrimony of the gastric contents, or smarting of the edges of the aperture during their chymification, as is usual in most vegetable and farinaceous aliments ;" on the contrary, the sago " seemed peculiarly grateful to the surface of the stomach, rendering the membrane soft, uniform, and healthy." In these instances, it ought to be remarked, nothing else was eaten at the same time ; so that the stomach was not oppressed by *quantity*.

In early life, when digestion is vigorous, the system excitable, and the habits peculiarly active, a full proportion of vegetable and farinaceous food is proper and

salutary. Morning and evening meals of this description, prepared with milk, or taken along with it, are very useful—animal food being reserved for dinner alone. But as age advances and excitability diminishes, and perhaps, also, as habits of activity and exposure to the open air are changed, the same proportion of vegetable and farinaceous food can no longer be digested so easily, and therefore ought not to be continued.

Pastry, rich cakes, puddings, and other articles containing much fatty or oily matter in their composition, are perhaps the most generally indigestible of all kinds of food, and consequently ought never to be eaten when the tone of the stomach is impaired. There are states, however, in which oily articles seem to agree better than lean. I have seen very fat fried bacon, for example, digested with ease at breakfast, where even a small potato would have disordered the stomach. It is very difficult to afford any explanation of the fact, which, however, is not uncommon. Perhaps it is dependent on a peculiar state of the biliary secretion, for Dr. Beaumont often remarked that the presence of bile in the stomach facilitates the digestion of fat and oily aliments, and that, even out of the stomach, gastric juice dissolves suet faster when a little bile is added to the mixture than when the juice is pure. He mentions, moreover, that he never found bile in the stomach, at least during health, except when food of an oily kind had been eaten ; and, in accordance with this, I have generally noticed that fried bacon agrees best with what are called " bilious" subjects. Still, however, the quantity must be small, otherwise it will prove injurious.

Plain, well-cooked animal food, not too recently

killed, and eaten in moderate quantity, with bread, rice, or roasted potatoes, forms one of the most easily digested meals which can be devised for a weak stomach. Sometimes, however, potato induces acidity and flatulence, and ought not to be used. Venison and most kinds of game are very suitable in the same circumstances.

In some conditions of the system, where the condition is irritable, and the mode of life not sufficiently active, red, highly animalized meat proves too stimulating, although easy of digestion. The same happens during recovery from illness; and hence fish, chicken, and other white meats, which excite less and are digested more slowly, are often allowable where beef, mutton pork, etc. cannot be taken with impunity. For the same reason, white and young meats are the best adapted for the excitable systems of the young.

It would be easy to fill many pages with disquisitions about the preference due to individual articles of food, were such the purpose which I had in view. But books devoted to this branch of the subject abound, and are already in general circulation; and as I have nothing new to add to what is contained in them, it would be making a needless demand on the patience of the reader merely to repeat what is to be found in so many other works. My object is the exposition of PRACTICAL PRINCIPLES rather than of minute details; and my great aim is to enable every intelligent person to understand, not only what digestion is, but the laws by which it is regulated, so that he may know at once WHY it is for his advantage to adhere to one course of conduct in preference to another in regard to it—WHY, in different situations, diet requires to be modified in

order to adapt it more effectually to the varying wants of the system—and, lastly, the circumstances or rules by which such modifications ought to be determined. If I have succeeded in the attempt to explain any or all of these principles sufficiently to render them susceptible of a practical application by the reader, not only shall I be greatly pleased, but the advantage to him will speedily convince him that I have acted judiciously in forsaking the beaten path, and drawing his attention to truths of still greater importance to his welfare than those which are most commonly treated of under the title of Dietetics."

ON THE DRESS AND EXERCISE OF CHILDREN.

"I am induced to make a few observations upon this subject for the purpose of setting before parents, especially mothers, the grievous folly, to call it by the mildest term, of the general mode of dressing and exercising children, more particularly girls, whose health is ruined and their lives shortened by the unnatural, I had almost said atrocious system, to which in youth, if not even in childhood, they are subjected for the improvement of their figure and gait, as it is called, though in reality it is only for the purpose of making girls into women before the proper time.

DRESS.

Boys in general are soon properly clothed: it is the custom that little master be early slipped into a pair of trowsers, and have his chest completely protected by the little tunic which reaches above his collar-bones. He may wear a belt, indeed, for ornament, but it forms no tight girth about his chest. In fact, his chest and

limbs have as free play as if he wore no clothes at all, and the result is, that he grows up tall, straight, and with a well-formed chest, which allows the free play of his heart and lungs. Rarely during his youth is this happy condition for his health interfered with: he may arrive, indeed, at the dignity of stand-up collar and coat, sooner or later, but school discipline does not permit screwing up his waist with a tight belt, to give greater apparent breadth to his shoulders, a proceeding which some silly fellows adopt after they have reached years of discretion! — fortunately, however, their chest has by this time become so completely formed, that their folly even cannot do it much damage.

Now, let this sensible method of clothing boys be compared with that in general adopted for girls. The mischief often begins from the very cradle. The upper part of the chest and shoulders are rarely covered, except when the child is specially dressed for going out of doors, as the shoulder-straps of the several parts of the dress, instead of completely covering and fairly resting on the tops of the shoulders, as they should, are allowed to slip below them, so that they cannot support the dress, which is only kept at all in place and prevented dropping completely off by the waistband or strings which surround the chest. The consequence of this is, that the shoulders and upper part of the chest are continually exposed to draughts of air, or to sudden changes of temperature, which canno be avoided even in-doors, in passing from one room to another; and thus is laid the foundation of irritable lungs.

When the child begins to run about, the top of her dress though in some degree altered, being still too

wide to allow the proper resting of the straps upon the shoulders, so as to keep it up, the dress slips down first on one side and then on the other, and to relieve herself from this inconvenience, and even to prevent the dress dropping entirely, the child is constantly hitching up first one shoulder and then the other, or even both at once. Usually, however, both sleeves do not drop down equally, and thus one shoulder becomes the habitual hitcher, and the trunk in this action being continually thrown to the opposite side, the spine naturally bends that way, and hence very frequently originates a crooked or curved spine, which is usually first discovered by the medical attendant whose advice is asked, on the mother's attention being drawn to one shoulder being higher than the other, and wishing to have it corrected.

The mode of preventing these fearful consequences is simple enough. The soundness of the child's lungs, and the straightness of her spine, are preserved by one and the same mode of management. *Dress the girl properly* by having the frock at least as high as the collar-bones, and the upper opening of the other parts of her dress only so wide, that the shoulder-straps can have a good bearing, and not slip off the shoulders; the dress will then be supported as it should be, on the shoulders, and cannot slip down, consequently there will be no hitching, nor any curved spine from that most common cause of it, and the chest will, at the same time, be protected from cold.

The next ill-treatment to which a girl is subjected, is that of inclosing the greater part of her body in bone stays, which, covering about the lower two-thirds of her chest, and reaching as low as the tops of the hip-bones, wide at the top and bottom, but narrow

enough in the middle, with a broad steel or wooden busk in front, curved forward, but with its ends bent backward, and with a pair of stiff whalebones behind at the lacing edges, beside a large array of other smaller bones of the same kind, are so ingeniously contrived as not merely to prevent the expansion of the chest necessary for the proper performance of inspiration, but actually to diminish its capacity at its lower or widest part; so that the poor child has her chest really put into a vice, and can only breathe very imperfectly, for the silly purpose of preventing her waist being thick, which is the real object of wearing stays. Mothers, however, sometimes delude themselves with the notion that they thus incase their girls in steel and whalebone for the purpose of giving them support, while in reality they are destroying their children's health and constitutional powers, by interfering with the action of the great organs of respiration and circulation. Being early impressed with the notion that the elegance of their figure depends on the tightness of their stays, most girls soon become addicted to this pernicious habit and draw their waist so tight that they suffer constant distress from this cause.

The accompanying illustrations, in the front part of the book, will show (A) a naturally formed female chest, and (B) one which has been ruined by tight lacing. This stay-lacing is as needless for the attainment of its object, as it is injurious in its results: for women will have a much better form without the use of stays than with them. I have known as finely formed women as could be met with who never wore stays.

Beside the more serious consequences to which I have alluded, women are liable to various other incon-

veniences from the practice of tight lacing; for the stomach and bowels being squeezed into an unnaturally small space, not only by the contents of the chest being partially forced down upon them, but also by the cavity itself in which they are contained being lessened by the straightness of the lower part of the stays, they are incapable of properly performing their duty, and hence the digestion of the food being imperfectly effected, the consequence is that a long string often of very unaccountable and perplexing symptoms, commonly called hysterical, are set up, and render the girl miserable and incapable of the slightest exertion, till at last she gets into positive ill health.

Another point of great importance in the dress of children, too commonly alike neglected in children of both sexes, is that of taking care, that at all times and seasons of the year, the surface of the body, particularly of the chest, should not be suddenly cooled below its ordinary heat after exertion in their play, during which most commonly children perspire freely, and in consequence their body-linen becomes completely soaked with moisture, and as it quickly cools, the child is wrapped, till it has dried, in a wet cloth. This is a very serious matter, as the surface being chilled the perspiration is checked, and the lungs have more blood sent to them to be freed of its carbon than is their due, and being thus overloaded they are very often excited to inflammation.

Now, this is best guarded against by wearing a flannel waistcoat next to the skin ; for however sodden with perspiration it may be, it cools very slowly, dries less quickly, and therefore after violent exercise the body is never chilled as it is when linen is next to the skin. Many persons have a foolish notion that

the warmth of the surface kept up by wearing flannel next the skin is weakening, and fancy they render their children more hardy by never putting them in a flannel waistcoat. This, however, is nonsense: for as the preservation of an equal temperature on the surface of the body is at all times necessary for regularly sustaining the perspiration, which is almost, if not quite, as important as breathing, in freeing the blood from its impurities, it is quite clear that the preservation of this condition should be most carefully attended to. Though I strongly advise flannel to be worn next the skin of the body at all times, and that delicate persons should in like manner cover their lower as well as their upper limbs, yet I do not mean that they should at all times wear flannel of the same thickness. The winter flannel waistcoat should be much thicker and warmer than that worn in summer, which may be as thin as can be procured, and will then not be found to add to the heat of the clothes.

Another bad practice to which most females of all ages are habituated is that of wearing, at all seasons of the year, alike in the frosts of winter as in the heats of summer, thin cotton, almost gauze-like, stockings, in which there is not the slightest warmth. This folly is for the purpose of setting off the foot and ankle to advantage, but the unwise mother, in thus treating her girls, forgets that she does so at the expense of cold feet, which are the result of the thereby diminished activity in the circulation of the blood through the feet, which, in consequence of their distance from the heart, is naturally languid and ill needs any reduction of power. Care enough is taken that, on the approach of winter, boys be provided with some kind of worsted stockings or other, and most men make the same periodical

change, and it seems utterly incomprehensible why females, who are generally less active than males, and therefore usually having a less active circulation, should be less protected from cold, to which their sedentary habits render them especially susceptible.

It is now the almost common practice for little girls to wear drawers, and a very good practice it is; and if it were always adopted by women it would be very praiseworthy.

If, then, you wish your children, girls especially, to have the best chance of health and a good constitution, let them wear flannel next their skin, and wollen stockings in winter—have your girls' chests covered to the collar-bones, and their shoulders *in*, not *out* of their dress, if you would have them straight; and do not confine their chests and compress their digestive organs by bone stays, or interfere with the free movement of their chest by tight belts or any other like contrivance, if you desire their lungs should do their duty, upon which so mainly depends the preservation of health.

EXERCISE OF CHILDREN.

Exercise in the bringing up of children, is of the utmost importance. It is not only necessary that they should have the free use of their legs, but also of their arms, so that all the muscles of their whole system should be brought into proper action, and, as a natural consequence, attain their proper bulk. And when the child is tired with his efforts, he should rest himself in any position he finds most agreeable: for we may be sure he will put himself into such as will best relieve and rest the muscles he has tired by his exertions.

Now, boys are generally allowed to exercise them-

selves at their own pleasure, in running, leaping, or climbing, in cricketing, or hockeying, or kiting, in lifting, dragging, and throwing weights which they can master, and in various other exercises; and, if very active, will often change from one play to another, which does not call for the use of the muscles they have tired by their former game. Only at last, when, to use a boy's expression, they are 'dead beat,' do they give up their laborious play and throw themselves down on a bench, or on the ground, in one of the many indescribable postures, with which, however, every man is himself perfectly well acquainted, and after a few minutes, change it for another, rolling about in all sorts of ways, till at last they have recovered themselves sufficiently to take to their legs again, and not improbably resume their violent plays. In this way the child has the best chance of growing up to healthy manhood.

Let us compare this with the exercise generally permitted to girls, often even from a very early age.

As soon as a little girl has acquired the free use of her limbs, the first thing she is taught is 'not to be rude and romp about, because such behavior is not like that of a little lady;' and thus at the very onset, the child's natural and necessary activity is restrained, and she is put into an artificial training, by which she shall only move so much, and in such a way as is worse than useless; and when she is tired by this wearisome proceeding, she may not throw herself down on the sofa, but must be seated in her little straight high-backed chair, with its bottom of scarcely sufficient width for her to sit upon, upright as if she were skewered, not with the slightest chance of her getting any rest, because she is obliged to call all the

muscles of her spine into action to prevent falling off her chair.

If, as regards exercise, a girl is to have fair play, and if her parents desire she should be a well-formed and healthy woman, she must be allowed till at least ten or twelve years of age the same freedom from restraint, and to exercise her limbs as freely as boys do."

A SYNOPSIS OF HYDROPATHY OR WATER-CURE.

This system consists in the treatment of disease by hygienic rules, such as Diet, Exercise, and Ventilation, and the use of Water externally and internally. It is a very safe system of practice, and in a majority of cases, if persevered in, will cure the disease, although there are other agents that would, in many cases, greatly assist these simple means. It is a well established fact, that Nature, if she is left alone, will cure most diseases herself. It is on this principle that Hydropathy is founded: by dieting, exercising, ventilating, and washing the patient, it gives Nature a chance to effect the cure. And it must be confessed that a cure brought about in this slow but natural way, is generally more effectual, leaving the system in a better condition than by the use of drugs. The great difficulty is to get people to submit to this tedious kind of practice. When people get sick they want to take some kind of specific that will cure them immediately, and are not willing to regain the road of health by retracing the steps by which they have lost it. Water is applied in this treatment in various ways.

First, of the Wet Sheet. The process is very simple; it is merely to wring a sheet out of water and wrap the patient in it, covering him up thickly with clothes,

if you wish to produce sweating; or letting the covering be light if you wish to reduce quickly the heat of the body, as in violent fevers. The wet sheet is a valuable means of breaking up a fever, as I have frequently tested. If the patient be strong and recently attacked, the fever very violent, and not much oppression of the lungs or brain, wrap him up in a sheet rather cool, and let the covering be light. Let him drink all the water he wants, and if the bowels be costive, evacuate them by frequent and large injections of water.

If the patient be weakly or reduced by fever, the sheet must be wrung out of warmer water and the patient be well covered so as to produce sweating. When he has been in the sheet a sufficient length of time to reduce the fever, the body should be washed off with water, varying in temperature as to the vigor of the patient, and then should be rubbed dry with a coarse sheet.

The Sitz or Hip-bath can be taken by sitting in a tub of water varying in temperature, as all baths should, according to the virulence of the disease and the strength of the patient. This is useful in affections of the abdominal organs, the liver, stomach, bowels, kidneys or bladder, acting as a derivative to draw the blood from the affected organs to the surface. It is most useful in derangements of the uterine system (peculiar to women). I have seen it relieve difficulties in the monthly discharges most happily. In this case the water should be warm. It affords great relief to piles. In a word, it is useful in almost every affection of the lower part of the body. It may be used two or three times a day, or even oftener.

The Shallow-bath is used by placing the patient in a tub partly filled with water and then dashing the

water over him with the hand, rubbing him afterward with a coarse towel. Very useful in nervous affections, in diseases of the skin, and in fevers where the patient is able to sit up. I have used it with a great deal of success in convulsions (fits) of children. Strip the little fellow, put him in a tub of warm water, and keep a thickness of muslin, wet with cold water, on his head until he is relieved. This is a very convenient bath to use habitually with children, bathing them in it every evening during the summer, and at least once a week during the winter.

The Plunge bath is nothing more than the ordinary bath in streams, where the body is plunged in suddenly. Very weakly persons, and especially those predisposed to diseases of the lungs, should be very cautious in using this bath, taking care that they are not exhausted at the time, and that the weather is not too cold, and that they do not stay in it too long. The surface should be thoroughly rubbed, after the bath, with a coarse towel. This is a pleasant way for adults to bathe during the summer. It is useful, in conjunction with diet and exercise, to give tone to a debilitated system. The Shower-bath is highly recommended by some, but there is more danger in its use, perhaps, than any other bath. It is useful in nervous affections, and is most potent in restoring a person from the insensibility of drunkenness.

The Head-bath is used by pouring water on the crown of the head from a height, by keeping one thickness of muslin wet with cold water continually on the head, or by the patient lying down horizontally and resting the back part of the head in a shallow dish of water.

The Foot-bath is a powerful derivative, as every old

lady knows, drawing the blood from the upper part of the body to the feet and legs and thus relieving many disagreeable feelings. It has a most happy effect in common sick headache.

The Vapor-bath has been described in another part of the work (page 43). It is useful where there is a want of action of the skin in debilitated persons, where the system has not sufficient vigor to withstand the other general baths before spoken of. In suppressed perspiration, "bad colds," as they are generally called, the vapor or "steam-bath" is a most capital remedy, restoring the action of the skin and relieving the lungs immediately. After the action of the skin is fully established the surface should be thoroughly rubbed with a coarse towel.

LOCAL BATHS.

The Douche consists in the bathing of a part by a continuous stream of water; it can be given by filling a vessel with water, suspended at the proper height, and boring a hole in the bottom for the exit of the water. Where an upward current is necessary, as in Piles, or Prolapsus Ani (falling of the rectum), or in Prolapsus Uteri (falling of the womb), it can be given by means of a hose, or a large syringe, or bladder. The douche is useful in local congestions or inflammations, most epecially in congestions of blood in the brain, as from drunkenness or apoplexy. The douche is indicated also in permanent enlargements of structure, as having a tendency to excite the absorbents to increased action, and thus to reduce the enlargement. If used in rheumatic swellings the water should be warm. In most other cases it should be cold.

The local application of water in the form of Fomentations frequently affords great relief, as in toothache,

croup, pains in the breast, stomach, side, or bowels. Cloths should be wrung out of warm water and applied to the part, frequently renewing the cloths from the warm water. If the part be very hot and feverish, and you wish to reduce the heat, wring the cloth out of cold water, and put but little covering on it. If, on the contrary, you wish to keep the part warm, so as to draw the blood there from some opposite part, you wring the cloths out of warm water and keep it well covered with other cloths.

Another mode of applying water locally is by Wrappers. Wring a coarse towel out of water and wrap it around the part affected; cover the wrapper well with cloths so that the patient may not take cold. This is recommended in dyspepsia, colic, liver-complaints, enlarged spleen, bowel-complaints, uterine difficulties, affections of the kidneys, pain and oppression in the breast or throat. These wrappers act on the same principle as liniments and embrocations, though in a much milder degree, producing a counter-irritation, drawing the blood from some congested part. In many cases they have this superiority over liniments: they can be applied to a larger surface, and they increase the action of the perspiratory ducts, whereas the oleaginous ingredients of most liniments rather have a tendency to stop up these perspiratory ducts. And here I will allude to a silly practice that I have often witnessed, of mothers greasing the breasts and necks of their children for affections of the lungs and throat, thus effectually checking the perspiration. Where a mild counter-irritating effect is required, therefore, with an increased action of the skin, the wrapper, well applied, is in many instances preferable to all other applications.

A PARTING WORD OF ADVICE TO THE READER HOW TO BE HEALTHY, HAPPY, HANDSOME, AND LONG-LIVED.

First: Live in a healthy climate. However temperate and well-regulated your life may be, you cannot expect to have good health, as long as you are breathing a poisoned air.

Second: Engage in a healthy occupation; one that exercises the whole body much in the open air. Avoid inactive confinement in ill-ventilated rooms. Have an occupation of some kind, no difference what your pecuniary circumstances may be; you cannot enjoy life without occupation.

Third: Observe regularity in everything; in eating, in drinking, in labor, in rest, in recreation, in intellectual and physical exercises, in washing and bathing, in sleep and in the natural evacuations of the body. Let every duty have its regular hour, and every hour its regular duty.

Fourth: Let your food and drink be proper, simple in quality, and not taken in excess.

Fifth: Be cleanly in every part of your person.

Sixth: Be chaste. Have one companion of the opposite sex, and but one, whom you purely and sincerely love.

Seventh: Avoid all bad and unnatural habits, such as the use of artificial stimulants: tea, coffee, tobacco, opium, and spirituous liquors, as also excesses of all kinds; any practice that stimulates or depresses unnaturally the powers of life.

Eighth: Be honest, industrious, and economical, and thereby acquire a competency and an independence.

Ninth: Be religious. Trust implicitly in a Supreme Being. Love his works. Serve and adore him.

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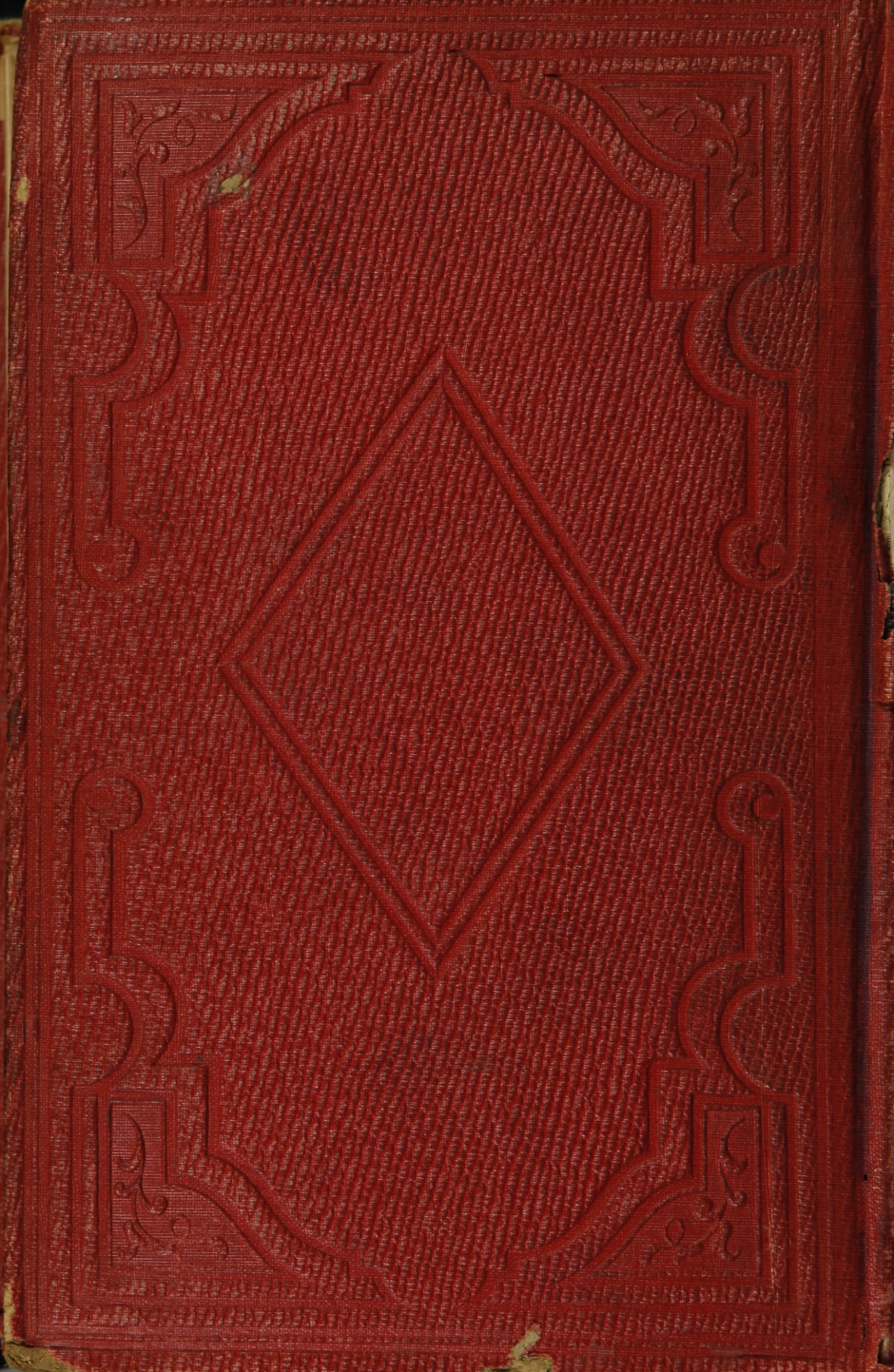
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