

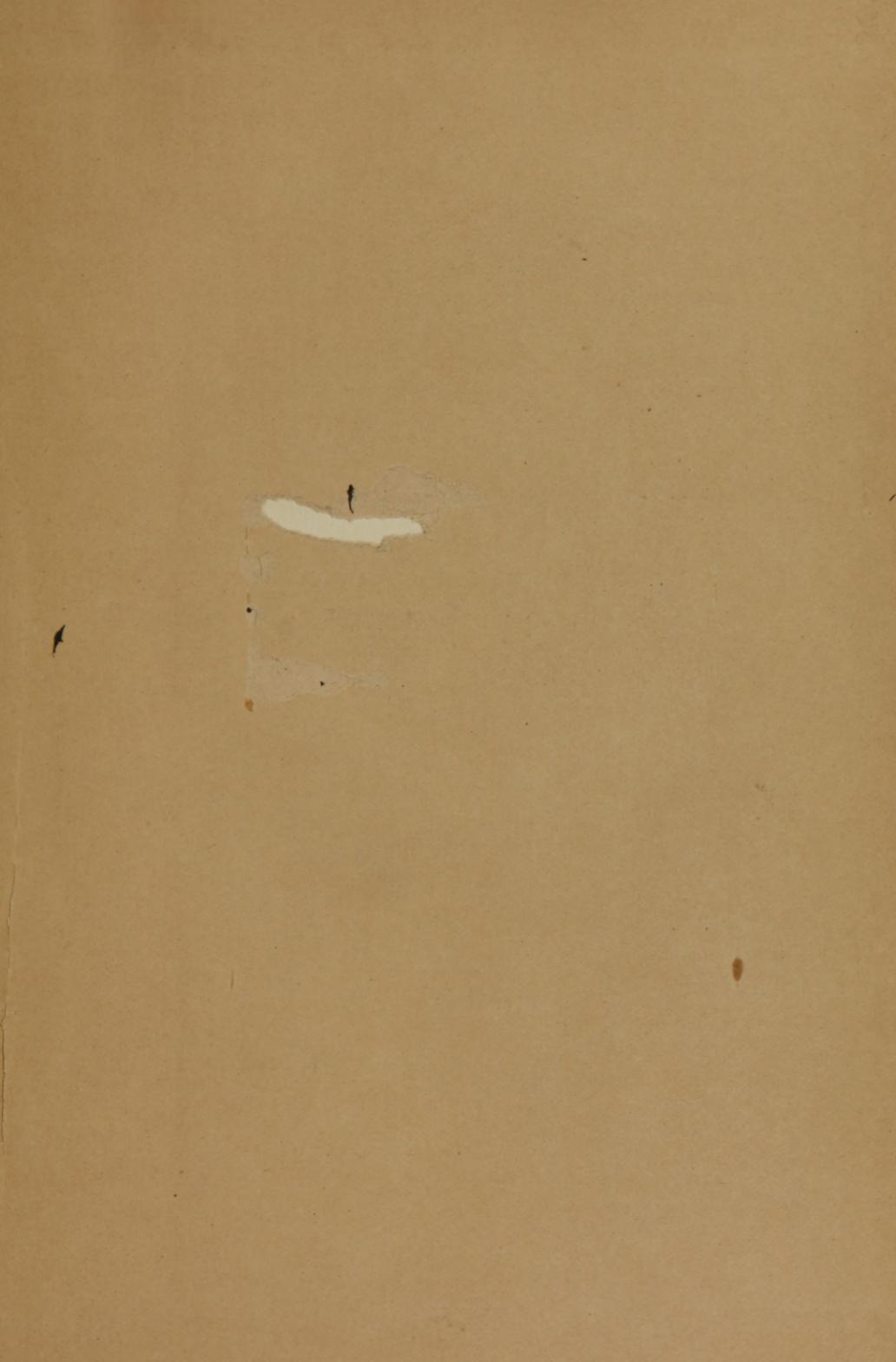
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NASO-PHARYNGEAL

CATARRH.

BY

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TO

PROFESSOR DUDLEY S. REYNOLDS, M. D.,

As a token of my appreciation of his high professional
attainments, and his love of truth and justice;

AND TO

COLONEL BENNETT H. YOUNG,

In recognition of his benevolence and generosity in assist-
ing to maintain the Louisville Eye and Ear
Infirmery, and many other institutions
devoted to charity,

THIS LITTLE VOLUME IS MOST AFFECTIONATELY
INSCRIBED BY

THE AUTHOR.

PREFACE.

AT the request of numerous friends I reluctantly undertook to write a practical treatise on Naso-Pharyngeal Catarrh, for the use of general practitioners of medicine. The task is at once difficult and of uncertain value. I may have satisfied the demand of a few friends who urged me to the work, and fallen far short of the requirements of that large class of general practitioners who, being remote from metropolitan cities and from specialism, do not care to undertake the management of a class of diseases so commonly regarded as necessary evils supposed to be irremediable.

For the illustrative cuts I am indebted to Messrs. G. TIEMAN & Co., and SHEPARD & DUDLEY, of New York; SIMON N. JONES and ADOLPH FISHER, of Louisville.

For much assistance and some good advice, I am indebted to my publishers, Messrs. BRADLEY & GILBERT.

To avoid perplexing difficulties in making foot-note references, and the misuse of quotation marks, I take this method of informing the reader that free use has been made of the text of Gray's Anatomy, Frey's Histology and Histo-Chemistry of Man, Spencer Watson's Treatise on the Nose, Holden's Manual of Anatomy, beside those duly accredited in my text.

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MAY 30, 1880.

NASO-PHARYNGEAL CATARRH.

ANATOMY.

The nose is the more anterior and prominent part of the organ of the sense of smell. It is of triangular form, directed vertically downward, and projects from the center of the face, immediately above the upper lip. Its summit or root is connected directly with the forehead. Its inferior part, the base, presents two elliptical orifices, the nostrils, separated from each other by an antero-posterior septum, the columna. The margins of these orifices are provided with a number of stiff hairs or vibrissæ, which arrest the passage of foreign substances carried with the current of air intended for respiration. The lateral surfaces of the nose form, by their union, the dorsum, the direction of which varies considerably in different individuals. The dorsum terminates below in a rounded eminence, the lobe of the nose. The nose is composed of a frame-work of bones and cartilages, the latter being slightly acted upon by certain muscles. It is covered externally by integument, internally by mucous membrane. The nasal fossæ are two irregular cavities, situated in the middle of the face, and extending from before backward.

The following are the osseous boundaries of the cavities: externally, each is bounded by the nasal, su-

perior maxillary, ethmoid, lachrymal, inferior spongy, palate bones, and pterygoid plates of the sphenoid; above by the cribriform plate of the ethmoid in the center, by the frontal and nasal bones in front; posteriorly by the body of the sphenoid and part of the palate bone; inferiorly by the palate. The vomer and perpendicular plates of the ethmoid form the partition wall between the two fossa. The lower portion of the lateral and anterior walls are composed principally of a cartilaginous frame-work which is moved by muscles, thus permitting of a certain amount of contraction and expansion of the cavities in this region. The mucous membrane covering the middle turbinated bone is prolonged into an elevation anteriorly, described by Meyer as the *agger nasi*.

Its direction is nearly parallel with the dorsal ridge of the nose, moving forward and downward, until it reaches very nearly the anterior aperture of the nostril.

This *agger nasi* approaches very near to a thickened portion of the septum, and a very slight lateral compression, as by the action of the compressor naris muscle, brings them into actual contact, thus forming two distinct and separate channels—an upper one, passing toward and along the olfactory region, the olfactory channel, and a lower, the respiratory channel.

The nasal fossæ communicate with the pharynx by means of two oval openings about seven-eighths of an inch in length and one-half an inch in diameter. These openings are known as the posterior nares.

The furrows or depressions on the outer wall of

each sinus formed by the projecting turbinated bones are termed the meatuses. They are three in number, the superior, middle, and inferior.

Each fossa communicates with four sinuses—the frontal, above, opening with the anterior ethmoidal cells into the middle meatus through the infundibulum; the sphenoidal, behind, opening into the superior meatus; the maxillary or antrum Highmorianum, opening indirectly into the middle meatus, at the lower part of the infundibulum; and the posterior ethmoidal, opening into the superior meatus.

Each fossa also communicates with the conjunctival sac by a continuation of the mucous membrane of the inferior meatus through the nasal duct, lachrymal sac, and the canaliculi and puncta lacrymalia.

The mucous membrane lining the nasal fossæ is intimately adherent to the periosteum, or perichondrium, over which it lies. It is continuous externally with the skin through the anterior nares, and with the mucous membrane of the pharynx through the posterior nares.

From the nasal fossæ its continuity may be traced with the conjunctiva through the nasal duct and lachrymal canals; with the lining membrane of the tympanum and mastoid cells, through the Eustachian tubes, and with the frontal, ethmoidal, and sphenoidal sinuses, and the antrum maxillare, through the several openings of the meatuses.

The mucous membrane is thickest and most vascular over the turbinated bones. It is also thick over the septum; but in the intervals between the spongy bones and on the floor of the nasal fossa it is very thin.

Where it lines the various sinuses and the antrum maxillare it is thin and pale.

The surface of the membrane is covered with a layer of tessellated epithelium at the upper part of the nasal fossæ corresponding with the distribution of the olfactory nerve, but is ciliated throughout the rest of its extent, excepting near the aperture of the nares. This membrane is also provided with a nearly continuous layer of branched mucous glands, the ducts of which open upon its surface. They are most numerous at the middle and back parts of the nasal fossæ, and largest at the lower and back part of the septum.

Owing to the great thickness of this membrane, the nasal fossæ are much narrower, and the turbinated bones, especially the lower ones, appear larger and more prominent than in the skeleton. From the same circumstance, also, the various apertures communicating with the meatuses are either narrowed or completely closed.

In the superior meatus the aperture of communication with the posterior ethmoidal cells is considerably diminished in size, and the sphenopalatine foramen completely covered in. In the middle meatus, the opening of the infundibulum is partially hidden by a projecting fold of mucous membrane, and the orifice of the antrum is contracted to a small circular aperture much narrower than in the skeleton.

In the inferior meatus, the orifice of the nasal duct is partially hidden by either a single or double valvular mucous fold, and the anterior palatine canal either completely closed in, or a tubular cul-de-sac of mucous membrane is continued a short distance into it.

In the roof, the opening leading to the sphenoidal sinus is narrowed, and the apertures in the cribriform plate of the ethmoid completely closed in.

The arteries of the nasal fossæ are the anterior and the posterior ethmoidal, from the ophthalmic, which supply the ethmoidal cells, frontal sinuses, and roof of the nose; the sphenopalatine, from the internal maxillary, which supplies the mucous membrane covering the spongy bones, the meatuses and septum; and the alveolar branch of the internal maxillary, which supplies the lining membrane of the antrum.

The ramifications of these vessels form a close plexiform net-work beneath and in the substance of the mucous membrane. The veins of the nasal fossæ form a close net-work beneath the mucous membrane. They pass, some with the veins accompanying the sphenopalatine artery, through the sphenopalatine foramen, and others, through the alveolar branch, join the facial vein; some accompany the ethmoidal arteries and terminate in the ophthalmic vein; and, lastly, a few communicate with the veins in the interior of the skull, through the foramina in the cribriform plate of the ethmoid bone and the foramen cæcum.

The nerves are the olfactory, the nasal branch of the ophthalmic, filaments from the anterior dental branch of the superior maxillary, the Vidian, naso-palatine, descending, anterior palatine, and sphenopalatine branches of Meckel's ganglion. The olfactory, the special nerve, is distributed over the upper third of the septum, and over the surface of the superior and middle spongy bones. The nasal branch of the ophthalmic

distributes filaments to the upper and the anterior part of the septum and outer wall of the nasal fossæ. Filaments from the anterior dental branch of the superior maxillary supply the inferior meatus and inferior turbinated bone. The Vidian nerve supplies the upper and back part of the septum and superior spongy bone; and the upper anterior nasal branches from the sphenopalatine ganglion have a similar distribution. The naso-palatine nerve supplies the middle of the septum. The larger or anterior palatine nerve supplies the middle and lower spongy bones.

Soft Palate.—This movable prolongation of the roof of the mouth is attached to the posterior border of the hard palate. It constitutes an imperfect partition between the mouth and the posterior nares. Its upper or nasal surface is convex, and continuous with the floor of the nose; its lower surface is concave, in adaptation to the back of the tongue, and is marked in the middle by a white line, indicating its original formation by two lateral halves.

When the soft palate is at rest it hangs obliquely downwards and backwards; but, in swallowing, it is raised to the horizontal position by the levatores palati, comes into apposition with the back of the pharynx, and thus prevents the food from returning through the nose.

A perpendicular section through the soft palate shows that the great bulk of it is made up of mucous glands, which lie thick on its under surface. Above these glands we come upon the aponeurosis of the palate; still higher, upon the fibres of the levator palati; and

lastly, upon the nasal mucous membrane. The soft palate is supplied with blood by the descending palatine branch of the internal maxillary, and the ascending palatine branch of the external maxillary. Its nerves are derived from the second division of the fifth pair.

Uvula.—The uvula projects from the middle of the soft palate, and gives the free edge of it the appearance of a double arch. It contains a number of mucous glands and a little muscle, “the azygos uvulæ.” Its length varies in different individuals, and in the same person at different times, according to the state of its muscles. It occasionally becomes permanently elongated and causes considerable irritation, a sense of tickling in the throat, and harassing cough.

Arches of the Palate.—The soft palate is continued into the tongue and pharynx by two folds of mucous membrane on each side, enclosing muscular fibres. These are the anterior and posterior half arches or pillars of the palate. The interior arch describes a curve from the base of the uvula to the side of the tongue. It is well seen when the tongue is extruded. The posterior arch, commencing at the side of the uvula, curves along the free margin of the palate, and terminates on the side of the pharynx. The posterior arches, when the tongue is depressed, can be seen through the span of the anterior.

Pharynx.—The term “pharynx” is applied to that part of the alimentary canal which receives the food after it has been masticated, and propels it downward into the œsophagus. It is a funnel-shaped, muscular bag. Its upper part is attached to the basilar process

of the occipital bone; from thence it extends perpendicularly as low as the cricoid cartilage. The pharynx is connected behind to the bodies of the cervical vertebræ by loose cellular tissue which never contains fat. *Parallel with and close to its sides are the internal carotid arteries.* Its dimensions are not equal throughout. Its breadth at the upper part is just equal to that of the posterior openings of the nose; for here it is only required to transmit the air inspired through the nose; but it becomes much wider in the situation where it transmits the food—that is, at the back of the mouth; thence it gradually contracts to the œsophagus. The pharynx may be compared to a funnel communicating in front, by wide apertures, with the nose, the mouth, and the larynx; while the œsophagus represents the tube leading from its lower end. On each side, and parallel with the floor of the inferior meatus, and one-fourth to one-half an inch in front of the posterior wall will be found the faucial orifices of the Eustachian tubes. Small glands surround the orifice of each tube. They are similar in nature and function to the glands beneath the mucous membrane of the mouth, the palate, and the pharynx; and serve the purpose of supplying an aqueous saline fluid, which, by mixing freely with the mucous, keeps the surface washed clean.

Constrictor Muscles of the Pharynx.—They are three in number, and arranged so that they overlap each other, *i. e.*, the inferior overlaps the middle, and the middle the superior. They have the same attachments on both sides of the body, and the fibres from the right and left meet, and are inserted together into

the mesial line, the insertion being marked by a white longitudinal line called the raphe. The inferior constrictor arises from the side of the cricoid and thyroid cartilages. Its fibres expand over the lower part of the pharynx. The superior fibres ascend; the middle run transversely; the inferior descend, and are identified with the œsophagus. Beneath its lower border the recurrent laryngeal nerve enters the larynx. The middle constrictor arises from the upper edge of the greater cornu of the os-hyoides, from its lesser cornu, and a part of the stylo-hyoid ligament. Its fibres take different directions, so that with those of the opposite muscle they form a lozenge. The lower end of the lozenge is covered by the inferior constrictor; the upper angle ascends nearly to the basilar process of the occiput, and terminates upon the pharyngeal aponeurosis.

The external surface of the muscle is covered at its origin by the hyo-glossus. The superior constrictor arises from the hamular process of the sphenoid bone; from the pterygo-maxillary ligament (which connects it with the buccinator); from the mylo-hyoid ridge of the lower jaw, and from the side of the tongue. The fibres pass inward to the mesial line; some of them are inserted through the medium of the pharyngeal aponeurosis into the basilar process. The upper border of the superior constrictor presents on either side a free semi-lunar edge with its concavity upward, so that between it and the base of the skull a space is left in which the muscle is deficient. Here the pharynx is strengthened and walled in by its own aponeurosis. The space is called the "sinus of Morgagni," and in

it, with a little dissection, we get at the muscles which raise and tighten the soft palate, *i. e.*, the levator palati, the tensor palati. The fibres of the stylo-pharyngeus pass in between the superior and middle constrictors, and expand on the side of the pharynx; some of them mingle with those of the constrictors, but most of them are inserted into the posterior margin of the thyroid cartilage.

Pharyngeal Aponeurosis.—The pharyngeal aponeurosis intervenes between the mucous membrane and the muscles of the pharynx. It is attached to the basilar process of the occiput, and to the points of the petrous portions of the temporal bones. It maintains the strength and integrity of the pharynx at its upper part, where the muscular fibres are deficient; but it gradually diminishes in thickness as it descends, and is finally lost in the walls of the œsophagus.

There are seven openings into the pharynx, *viz.*: 1. The posterior openings of the nares. 2. On each side, near the inferior turbinated bones, are the openings of the Eustachian tubes; below the nares is the soft palate, with the uvula. 3. Below the soft palate is the communication with the mouth, called the “isthmus faucium.” On each side of this are two folds of mucous membrane, constituting the anterior and posterior half arches of the palate; between them are the tonsils. Below the isthmus faucium is the epiglottis, which is connected to the base of the tongue by three folds of mucous membrane. 4. Below the epiglottis is the aperture of the larynx. 5. Lastly, is the opening into the œsophagus. All these parts are lined by mu-

cous membrane, common to the entire tract of the respiratory passages and the alimentary canal. But this membrane presents characteristic differences in the different parts of these channels, according as they are intended as passages for air or food. The mucous membrane of the pharynx above the velum palati, being intended to transmit air only, is very delicate in its texture, and lined by ciliated epithelium like the rest of the air passages. But opposite the fauces the mucous membrane in every respect resembles that of the mouth, and is provided with squamous epithelium. At the back of the larynx the membrane is corrugated, to allow the expansion of the pharynx during the passage of the food.

Arches of the Palate Continued.—The tonsils are situated on each side, between the arches. Now, what are the uses of these arches? They are chiefly concerned in the mechanism of deglutition. The anterior (enclosing the “palato-glossi” muscles) contract so as to prevent the food from coming back into the mouth; the posterior side curtains co-operate in preventing the food from passing into the nose. True, in vomiting, food does sometimes escape through the nostrils, but one can not wonder at this, considering the violence with which it is driven into the pharynx.

Muscles of the Soft Palate.—The muscles of the soft palate lie immediately under the mucous membrane. There are four pairs, viz.: the levatores palati, the circumflex or tensores palati, the palato-glossi, and palato-pharyngei; the azygos uvulæ is single.

Levator Palati.—This muscle arises from the petrous

portion of the temporal bone, and from the cartilage of the Eustachian tube. Its fibres spread out, and are inserted along the upper surface of the soft palate. Its action is to raise the palate so as to make it horizontal in deglutition.

Circumflexus or Tensor Palati.—This muscle is situated between the internal pterygoid muscle and the internal pterygoid plate of the sphenoid bone. It arises from the scaphoid fossa, and from the Eustachian tube. Thence it descends perpendicularly, ends in a tendon which turns round the hamular process, and expands into a broad aponeurosis, which is connected to its fellow of the opposite side, and is also attached to the horizontal plate of the palate bone. It gives strength to the soft palate. A synovial membrane facilitates the play of the tendon round the hamular process. Its action is to draw down and tighten the soft palate.

Azygos or Levator Uvulæ.—This consists of one or sometimes two thin bundles of muscular fibre, which arise from the aponeurosis of the palate, and descend along the uvula, nearly down to its extremity.

Palato-glossus and Palato-pharyngeus.—These muscles are contained within the arches of the soft palate. The palato-glossus, within the interior arch, proceeds from the anterior surface of the soft palate to the side of the tongue, and is lost in the stylo-glossus muscle. The palato-pharyngeus, within the posterior arch, proceeds from the posterior border of the palate to the side of the pharynx and mixes with the fibres of the constrictor and the stylo-pharyngeus.

These muscles, and the relations they bear to sur-

rounding parts, should be particularly noticed, as the surgeon may have to divide them in the operation of staphylorrhaphy. Sir William Ferguson has shown that in cleft-palate the fissure is separated by the levatores-palati and palato-pharyngei muscles; which offer an impediment to the parts healing after they are brought together. He recommends the division of these muscles as a necessary proceeding. The flaps are thus relaxed, and readily retained in position. The pillars should be divided just below the tonsils with a pair of blunt-pointed scissors.

To divide the levator palati, Mr. Pollock places the flap upon the stretch, and passes a double-edged knife through the soft palate, on the inner side of the hamular process, and above the line of the levator-palati. The handle is now raised and depressed, a sweeping cut being made along the posterior surface of the soft palate.

Tonsils.—The tonsils consist of an aggregation of muciparous glands. They are situated at the entrance of the fauces, between the arches of the palate. Their use is to lubricate the fauces during the passage of the food. The orifices of their ducts, visible on the surface, give the tonsil an appearance like the shell of an almond; hence, as well as from their oval figure, they are called “amygdalæ.” These openings lead into small cells in the substance of the tonsil, lined by mucous membrane; and into these numerous smaller ducts pour their secretion. The fluid, viscid and transparent in the healthy state, is apt to become white and opaque in inflammatory affections of the tonsils, and

occasionally accumulates in the superficial cell, giving rise to the deceptive appearance of a small ulcer, or even a slough.

Concerning the relations of the tonsil, remember that it lies close to the inner side of the internal carotid artery. It is only separated from the great vessel by the superior constrictor and the aponeurisis of the pharynx; therefore, in it the point of the instrument should never be directed outward, but inward toward the mesial line. The tonsils are supplied with blood by the tonsillar branch of the external maxillary artery.

MINUTE ANATOMY.

The organ endowed with the sense of smell consists, as is well known, of the two nasal fossæ and accessory cavities, in the lining membrane of which the branches of the olfactory nerves are distributed. Besides being a sensory apparatus, this also serves as a passage for an important part of the great highway to the respiratory system. The whole nasal membrane does not participate in the perception of odors.

It is only the upper portions of the two greater cavities which preside over the reception of this particular kind of impressions; the other parts are either accessories in the process, or merely endowed with ordinary sensation through twigs of the trigemini. That portion of the organ designed for the perception

of odors corresponds to the distribution of the olfactory nerves. It consists generally of the membrane covering the upper part of the septum, the superior and a portion of the middle turbinated bones. It is remarkable for its yellowish or brownish tint, better seen in the mature than in the newly-born animal, and but slightly pronounced in man. It is further liable to vary in extent in different individuals, especially of the human species. To this tract the appropriate name of *regio olfactoria* has been given (*Todd and Bowman*). The older name of Schneiderian membrane may be retained for the remainder of the mucous surface not endowed with perceptive power.

In the anterior nares strong hairs are to be found, known as vibrissæ, designed to prevent the entrance of foreign bodies. Internally, the coating of flattened epithelial cells extends for a certain distance from the entrance, and then gradually gives way to a slightly laminated, ciliated species, already alluded to, which extends from thence throughout all the cavities of the organ. Here also we find beaker-cells, except in the *regio olfactoria*. (*Schultze*.)

The Schneiderian membrane, which is very vascular in the greater cavities, differs much in structure in particular localities. In the accessory cavities it is thinner, and so intimately connected with the surface of the bone, that its sub-mucous tissue plays the part of periosteum to the latter. In the nasal fossæ proper, the mucosa attains, on the contrary, a much greater thickness. Here it is richly supplied with racemose glands, which occur very sparsely in the adjacent cav-

ities. It presents, also, in this region, a dense plexiform arrangement of blood vessels, especially of veins, to which is due the great tendency of the nose to bleed. The mode of termination of the sentient nerves of the nose is still unknown.

The regio olfactoria offers for our consideration a very remarkable and extremely delicate tissue, whose constituents are particularly liable to suffer from decomposition. For our present acquaintance with its nature we are indebted to *Schultze*, and before him, for many points, to *Eckard* and *Ecker*. Apart from difference of color, it may be distinguished from the surrounding membrane by its greater thickness and dissimilarity in the species of glands it contains, as well as in not possessing ciliated epithelium. The glands in question have been named by *Kölliker* after their discoverer, *Bowman*. They belong to the tubular species, and remind one of the follicles of *Lieberkuhn*. In the central portion of the regio olfactoria they present themselves in great number, becoming more scattered toward the periphery, and finally disappearing. Their form is that of an elongated tube, somewhat twisted below, and of varying calibre, generally narrowing greatly at the mouth. Internally, they are lined with rather large gland cells, containing usually a considerable quantity of small yellow or brown pigment molecules, which fact explains, to a certain extent, the peculiar tinge of the olfactory region.

These glands of *Bowman*, whose existence was formerly denied, are to be found in all lower mammalia, and are not absent in man, although they take the

form here of a kind of transition to ordinary racemose glands. (*Frey, Schultze.*)

The secretion of *Bowman's* glands, as regards its composition and physiological significance, has not yet been made the subject of investigation.

Thus we find the olfactory region in the lower mammals and the human infant. (*Schultze.*) In the adult, also, spots quite destitute of cilia are to be found, which vary, however, considerably in extent. But under certain circumstances the whole regio olfactoria has been observed to be clothed with ciliated columnar cells. (*Gegenbaur, Leydig, and H. Müller, Weckler, Luschka, Henle, Ecklers.*)

When we take into consideration the varying acuity of the sense of smell in different individuals, and that frequently recurring catarrh may induce changes of structure, this need not surprise us.

At the border of the regio olfactoria the ordinary ciliated epithelium gradually terminates, giving place to a no longer laminated covering of long cylindrical cells. These dwindle down below into thread-like parcels, which descend into the subjacent connective-tissue, where they become widened again, and, undergoing division, unite with one another. In this way a network of fibres, or rather of more or less homogeneous bands, is formed. Between these cylindrical elements there remain naturally interstices, which serve for the reception of another species of cell. The occurrence of particles of yellowish or brown pigment, either in the upper broader portion of the columnar cells, or deeper down below their nuclei, is peculiar; these

granules may not unfrequently be seen also in the widened portions of the process. The former is the case in man and many of the mammalia. Like the contents of the glands of *Bowman*, these caloused particles communicate to the locality in which they are situated a peculiar tint.

Between these decidedly epithelial elements (and, moreover, in all vertebrate animals,) a second species of cell presents itself, different in shape and composition and nervous nature. These cells consist of a fusiform body, situated deeper down, however, than the bodies of the first kind, containing a vesicular nucleus and finely granular contents. From both poles of each of these nervous structures, as they are held to be, these olfactory cells, a process is given in opposite directions. The descending is of extreme delicacy, and liable to undergo early decomposition. At intervals it is studded with minute varicosities, recalling to mind these very fine nerve tubes. The ascending process is, on the other hand, thicker and less knotted, presenting a more or less smooth outline. It has the form of a slender cylinder or rod, 0.0018 or 0.0009 mm. in diameter, reminding us of one of the elements of the retina. These rods mount up between the columnar epithelial cells to the surface of the mucous membrane, terminating here in various ways. In the frog and allied amphibiæ (in which they may be easily seen), they are surmounted at their free extremities by delicate hairs of considerable length, in a certain number of which ciliary motion has been observed, while others, generally the longest, remain quite stiff. These

two kinds of *olfactory filaments* appear to be linked together by intermediate forms.

In other amphibia and in birds, very similar, and, in certain cases, even longer hairs are to be found, either in large numbers or single (*Schultze*); none have been observed among the fishes. In man, and the rest of the mammalia, we may seek in vain for these paradoxical cilia. Here we observe small appendages, from 0.0023 to 0.0045 mm. in length, seated on the extremities of each rod, and projecting beyond the ends of the columnar cells.

In order to better understand the nature of these remarkable olfactory cells, we must now make ourselves acquainted with the arrangement of the branches of the first cerebral nerve. The nerves of scent take their origin from peculiar masses in the lower surface of the olfactory lobes in the form of bundles of pale fibres. A few dark-edge fibres, which have been met with by *Remak* and *Schultze* in the olfactory nerves, are probably derived from anastomosis with the trigeminus.

The true olfactory fibres are pale elements, 0.0045 to 0.0074 mm. in thickness, enclosed within a nucleated sheath. The contents of the latter are not constituted by a single axis cylinder, however, but, as was found by *Schultze*, by a bundle of extremely delicate varicose primitive fibrillæ, 0.0023 to 0.0002 mm. in diameter, presenting a secondary nucleus. Similar fibres are to be found in the grey matter of the *bulbus olfactorius*. (*Walter, Schultze.*)

In the mucous membrane of the *regio olfactoria* sev-

eral other bundles may be recognized. These spring at acute angles from branches of the olfactory twigs, and give origin in their further course to the true (complex) nerve tubes. The latter are for a short distance enclosed within their nucleated sheaths, until, eventually, the delicate varicose fibrillæ of the interior stream out free into the tissues around. (*Schultze.*)

The mode in which these filaments ultimately terminate is not yet fully ascertained; it seems, however, extremely probable that the varicose fibrillæ are continuous with the descending fibres of the olfactory cells; so that these bodies, with their narrow rods, may be looked upon as the terminal structures of the olfactory nerve. The fact, however, can not be concealed that the most recent observations by *Exner* on the structure of these parts have pointed to other conclusions. According to him there is no sharp line of distinction between the two species of elements of the regio olfactoria, the olfactory, and columnar epithelial cells. They are, he says, connected by intermediate forms.

Beneath these cells, there exists a (*sub-epithelial*) band-work of protoplasm, whose interstices are filled with nuclei. Into this (in man) thin net-work the ramifications of both kinds of cells sink from above, and become fused. From below, also, the olfactory fibres ascend into it. Thus we have in it an intermediate nervous plate. The course of development of the olfactory organs in the embryo, although followed up in its broader outlines, has not been minutely investigated.

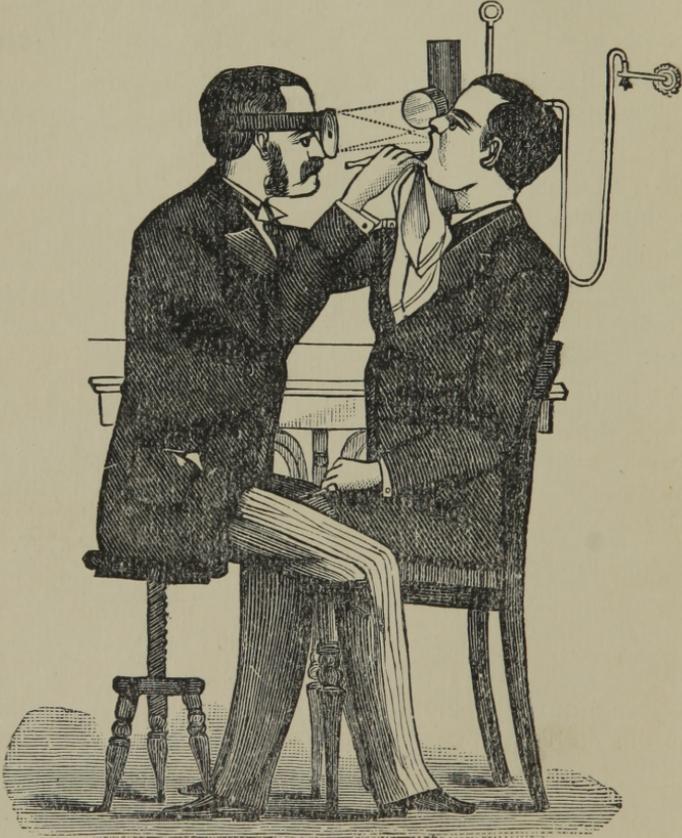
Remarks.—(1.) In many of the mammalia we meet

with peculiar structures, known as the organs of *Jacobson*. These consist of tubes, with cartilaginous walls, and are situated in the substance of the palate; they open into the duct of *Stenson*. In these is contained branches of the olfactory nerves. In their texture they resemble the regio olfactoria. (*C. Balogh*.) (2.) *Bowman's* glands may be made out with comparative ease. (3.) The delicate fibrillæ which spring from the inferior end of the olfactory cells, and those which are derived from the spreading out of the olfactory nerves, resemble each other in every respect. But the difficulties connected with the investigation in this direction have hitherto rendered it impossible to demonstrate a direct transition of one into the other.

EXAMINATION OF THE PHARYNX.

The walls of the pharynx are to be examined by direct inspection, and by reflected light. In order to make a direct inspection it is necessary that the tongue should be depressed. Many persons are able to depress their tongues by voluntary effort. This is done by opening the mouth very wide and taking a full inspiration. When the patient is unable to accomplish this sufficiently, the tongue may be depressed by the index finger. The finger should be well wrapped with a napkin or handkerchief, as a matter of cleanliness and protection. (See Fig. 1.) A neglect of this precaution

might prove disastrous to the observer by rendering him liable to contract syphilis by inoculation, as this disease is frequently met with in connection with



Shepard & Dudley, N.Y.

Fig. 1.

catarrh of the nose and pharynx. In the event of an objection on the part of the patient, or a reluctance on the part of the operator, a tongue depressor may be used,

such as is represented in Figs. Nos. 2 and 3. The handle of an ordinary spoon is an excellent substitute for the depressor. Tongue depressors are objectionable, and I rarely use one, unless it is in a case where the patient objects, or some specific manifestation is present. Children often refuse to permit the instrument to enter the mouth, when the finger is not objected to. Adults refuse upon the grounds that the instrument is common property, and therefore is used in the mouths of individuals that are probably contaminated with some disease that might be transmissible. The objections are well taken, as a failure to thoroughly cleanse these instruments might easily occur on account of the rough surface that is usually placed next to the tongue.

By direct inspection the walls of the pharynx that are below the level of the soft palate may be very thoroughly examined if the tongue is kept well out of the way. In some instances the epiglottis may be seen. In this way

Tobold has been able on one occasion to see the action

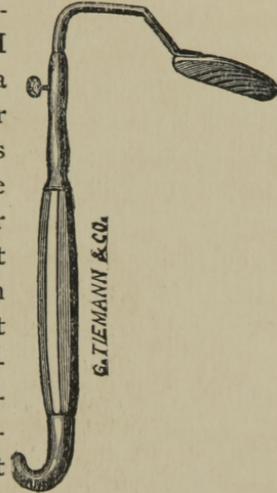


Fig. 2.

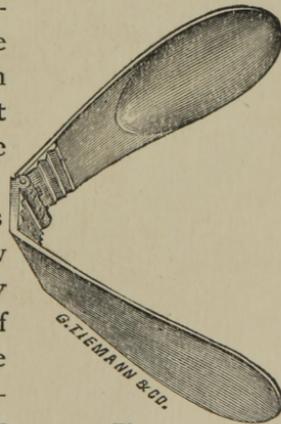


Fig. 3.

of the lips of the glottis, and to recognize a morbid growth upon the left vocal cord. The posterior wall and a portion of the lateral walls are usually very well shown, and likewise the arches and tonsils.

A more extended examination may be made by lifting the soft palate gently up. This may be done with a palate elevator, or in the absence of that instrument a stout flexible probe of sufficient length may be curved at the end and used for the purpose.

To make a thorough examination of the superior portion of the pharynx, and in some instances certain of the inferior portions, it is necessary to use the reflecting mirrors, or, in other words, to practice pharyngoscopy. The steps in superior pharyngoscopy are the same as those of posterior rhinoscopy. The mirrors to be used for this purpose are of two kinds: First, a large one (Fig. 4), from two and a half to three inches in diameter, perforated in the center, and attached to a band which is to fit around the head, so as to give the manipulator the free use of both hands. (See

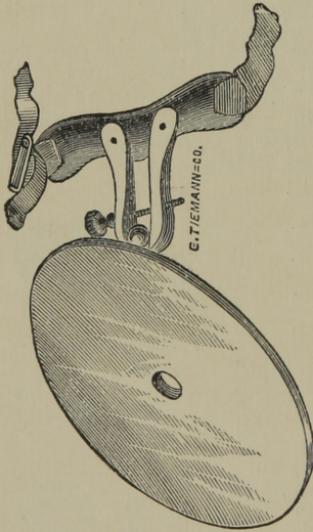


Fig. 4.

Fig 1.) There should be a ball and socket joint, so as to permit the free movement of the mirror, in order that the light may be shifted from one point to another with perfect ease. The focal distance of this glass

should be about eight inches. The small glasses should be attached to long handles with flexible metallic shanks, in order that the angle may be changed at will. The size of these mirrors is a matter that should not be overlooked. They should be small enough not to impinge upon the adjacent structures, as a mere touch is often sufficient to cause severe retching, which materially interferes with the examination. The most convenient size is about one-fourth of an inch in diameter.

Artificial illumination will be necessary as a rule, on account of the uncertainty of the sunlight and the inconvenience of getting in a suitable position at all times to make use of it. An argand burner attached to a gas jet serves an excellent purpose, or the ordinary burner attached to a rack movement is sufficient. The student's lamp is preferable to gas, because the flame is more steady and regular. A condenser may be attached to the lamp or gas jet, but the light is equally as good without, and is much easier managed when coming from the surface of an ordinary chimney than from the surface of a convex lens, which throws the rays of light out in a pencil. In the absence of any of these conveniences, the common lamp that is used about dwellings or a tallow-candle will suffice.

To make a posterior rhinoscopic examination the following steps must be taken, in the order named:

1. The patient must sit erect and face the observer, as in Fig. 1.
2. The light should be placed on a line with the ear, and about twelve inches from the head. It makes no material difference upon which side the light is placed;

this is to be arranged to suit the convenience of the observer.

3. Seated in front of the patient, with the reflector properly adjusted, so that the right or left eye, as the observer may choose to use, looks through the perforation in the center of the mirror.

4. Place the patient's head in such a position as to have him look you directly in the face, then direct him to open his mouth and breathe through the nose. Use the smallest size mirror, which should be held over a flame before introducing until it feels pleasantly warm to the cheek, not hot. The object in warming the mirror is to prevent its becoming misty by the moisture of the throat. Allow the patient's tongue to remain quiet, in its natural position.

5. The small mirror should be placed either in the right or left hand, as suits the convenience of the operator, and then introduced into the patient's mouth with the reflecting surface upward, and passed carefully in behind the soft palate, taking the precaution not to touch the base of the tongue or the posterior wall of the pharynx. The reflecting surface of the mirror should be about in the position represented by Fig. 5, although it will frequently be necessary to vary the position from that represented in the cut, on account of anatomical peculiarities, and many other causes, that will manifest themselves to the observer. When the mirror is in position, direct the patient to breathe through the nostrils quietly, and as a rule a view of the posterior nares may be obtained with but little difficulty.

The structures brought into view by posterior

rhinoscopy are the posterior surfaces of the soft palate and uvula; the membrane covering the posterior and a portion of the lateral surface of the septum, and that covering the posterior portion of the turbinated bones; the roof of the pharynx and the superior part of its

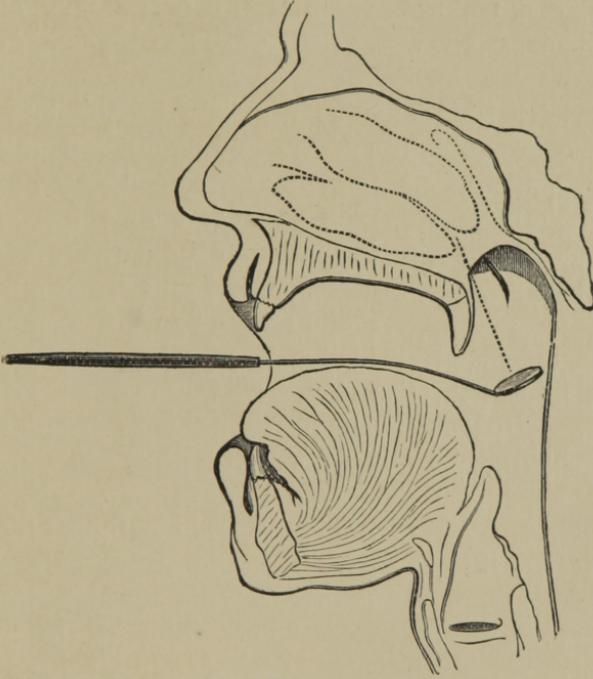


Fig. 5.

posterior and lateral walls; the openings of the Eustachian tubes, and the posterior portion of the nasal meatuses.

It will be necessary to change the position of the mirror in order to get a view of all the structures, as

they can not all be included in one image. By reversing the surface of the mirror inferior pharyngoscopy can be practiced. This is done in the same manner as laryngoscopy. It enables the observer to determine the condition of the walls of the pharynx down to the larynx, and that organ also, if necessary, and the membrane at the base of the pillars of the fauces and tongue.

Anterior Rhinoscopy.—The light for this may be direct or reflected. In using direct light it is necessary to incline the patient's head backward, so as to allow the light to pass directly into the anterior nares. Good sunlight is preferable to any other in making this kind of an examination, although artificial light may be used. It is necessary that the nostrils should be dilated in order to obtain a good view. There are a number of instruments used for this purpose. The author has

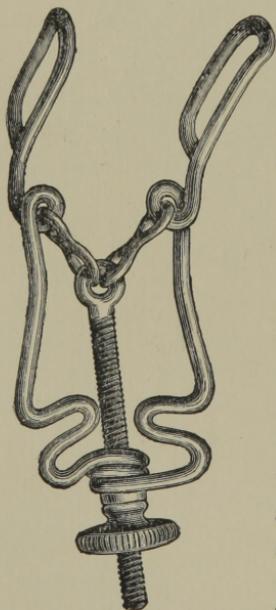


Fig. 6.

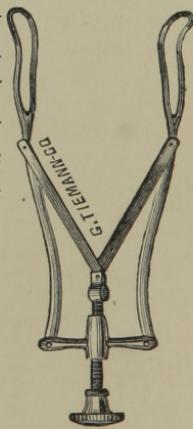


Fig. 7.

devised an instrument (Fig. 6) with a screw arrangement, graduating the amount of pressure, and at the same time rendering the instrument sufficiently small

for its introduction into the nostrils of children as well as adults. Frankel's speculum (Fig. 7) works in a manner similar to the above-mentioned instrument, with the exception that when it is introduced it is adjusted by a screw, which must be loosened before removal or its withdrawal will be painful. Slight pressure on the blades of the author's instrument permits of its easy removal without interfering with the screw.

Dr. Elsburg's trivalve nasal speculum (Fig. 8) is a serviceable instrument, but is not so convenient as either of the former. In the absence of a nasal speculum, an ordinary aural speculum will answer for a simple examination. In the absence of a speculum of any kind, the head may be thrown back, the lobe of the nose elevated, and the nostril pulled open by means of a bent probe, hair pin, or ordinary piece of wire. A good light, with this manipulation, will usually afford a fair view. Any one of these instruments may be used with direct or reflected light. In using reflected light the head mirror is to be used as in posterior rhinoscopy.

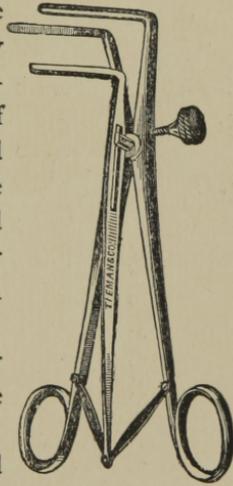


Fig. 8.

The structures to be observed by anterior inspection are the lateral walls of the anterior nares, the membrane covering the septum, anterior portion of the turbinated bones, and floor of the nares and the agger-nasi. The anterior portion of the septum is rarely

found in the center of the nose, and in consequence of that fact the cavities of each side are not of equal dimensions. Any portion of the septum may be displaced, but it occurs most frequently in the anterior region. The turbinated bones are occasionally distorted and bent out of their proper position. When this is the case the cavities are disproportioned. The distortion may be sufficient to prevent a perfect examination. It often interferes with the introduction of the Eustachian catheter, and in many cases with the passage of atomized fluids.

There are various modes and devices for throwing fluids into the nasal and pharyngeal cavities. For injecting the naso-pharyngeal space the catarrhal or post-nasal syringe is the best instrument of the kind in use. It is made of hard rubber, with a bulbous extremity, which is perforated by numerous small openings, so arranged as to allow the fluid to escape in all directions.

The manner in which the syringe should be introduced, emptied, and withdrawn is a matter that should receive special attention. First of all, it is necessary to have light sufficient to get a fair view of the velum palati and fauces. The patient's head should be controlled by one hand and the syringe carefully passed in behind the velum palati. As soon as the instrument is in proper position, it should be emptied and instantly withdrawn. The instrument should never move in the hand, and in order to withdraw it properly it is necessary to invert the hand. If manipulated in this manner, there is no danger of abrading the surfaces or inflicting pain. It should be remembered that the

patient's tongue must not be pulled out of the mouth while washing the nose and pharynx with this instrument. If the tongue is pulled out, the larynx is drawn forward, and the epiglottis prevented from closing that aperture, and at the same time places it in such a position as to receive any fluid that may fall from the region of the uvula or posterior nares.

The cases that are best adapted to its use are those that are confined to the pharynx and lower portion of the nose, and those that are free from crusts of inspissated mucus. Where the secretions are very dry and adherent to the membrane, one application of liquid by the syringe does not always cleanse the surface, and it may be necessary to introduce it a number of times to accomplish the desired result. Frequent introductions of the instrument at a single sitting are often objected to by the patient. Children sometimes shrink from the use of the syringe on account of its having to be used through the mouth, but after a few applications they usually submit without any trouble.

The question may be asked, is there any danger of flooding the drum cavity with the catarrhal syringe? I have heard of but two cases; one of these was undoubtedly due to the ignorance of the physician, who made the patient put his tongue out while he injected the pharynx. The patient strangled, and the result was that both drum cavities were filled with liquid, which set up a violent acute suppurative otitis media, that resulted in perforation of both drum membranes. The other was a case in which the anterior nares were completely closed with inspissated mucus and prevented

escape through the proper channel. The prompt use of the catheter prevented any thing more serious than severe pain for a few minutes. When the nose is in a condition to permit the passage of liquid, the instrument, if properly used, is free from harm in every respect.

Atomizers.—Richardson's and similar anæsthesia apparatuses (Fig. 9) are about the best hand instruments

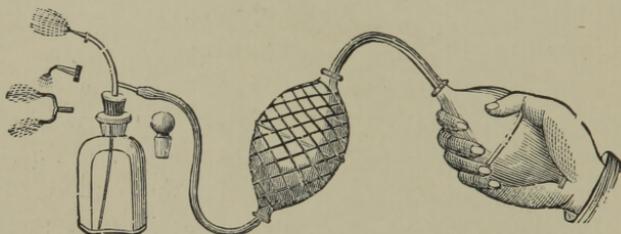


Fig. 9. Shepard & Dudley, N.Y.

in use. Their complicated structure renders them somewhat objectionable. The double bulb attached to them gives a decided advantage, enabling the operator to use either an intermittent or continuous spray.



Fig. 10.

The Holmes Boston Perfumer (Fig. 10) is a very excellent little instrument as long as it remains in perfect working order. Unfortunately, its tubing is made of metal, and the use of any saline or acid solution soon corrodes it, unless it is thoroughly cleaned each time it is used.

In 1878 I devised an instrument for atomizing fluids, which is represented by Fig. 11. The instrument consists of a receiver with a capacity for four gallons, with a stop-cock at the top and bottom, and a force-pump connected with the receiver by a

piece of rubber hose. Attached to the stop-cock at the top of the receiver is a piece of hose for attaching the atomizer. The advantages of this mode of cleansing and medicating are numerous; it economizes time and labor; it is manipulated with more ease than any other instrument used for such purposes. The powerful force with which the spray can be thrown renders it far superior to any form of nebulizer, because the strong current of air carries the fluid into every recess and insures thorough application. The degree of comminution that can be produced with this instrument gives it

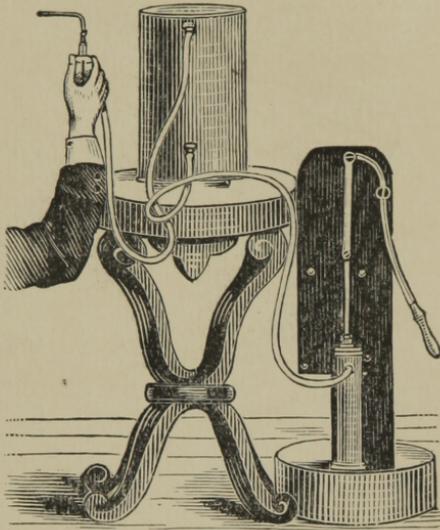


Fig. 11.

an advantage over all others, because it enables us to use agents that would otherwise be exceedingly difficult of application and distressingly painful.

Steam Atomizers.—Atomizers of this kind are impracticable, even for office use, on account of having to keep them constantly running to avoid the delay in raising steam, so to speak; and, moreover, the instrument is unwieldy, and can not be manipulated with the ease of the air instruments.

The instrument represented by Fig. 12 is one of the best in use. It is manufactured by G. Tieman & Co., New York. These instruments are better adapted to the treatment of laryngeal affections, and to disinfecting purposes. If it is desirable to use warm fluids in the naso-pharynx, it can be done by heating them to a

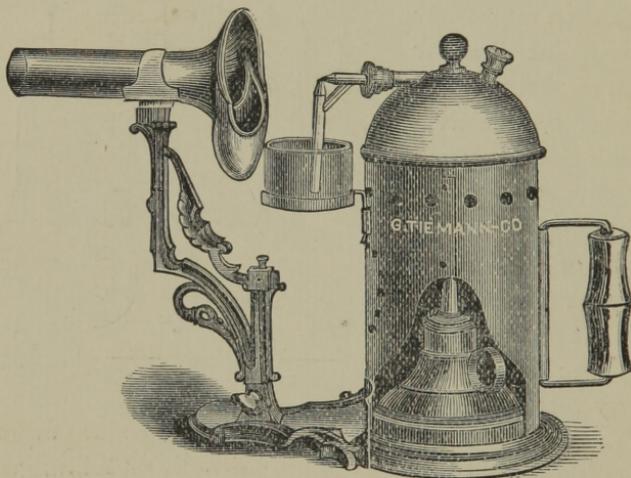


Fig. 12.

temperature of 140° Fahr., and using with the air instrument.

Fig. 13 represents an instrument devised by Dr. Lewin, of Berlin, for generating the vapor of the chloride of ammonium, and applying it in the nascent state. "The bottoms of two bottles, through the corks of which a tube passes all the way down, are covered with an ounce or so of strong muriatic acid and caustic water of ammonia, respectively; a second tube, passing from just below the corks of each of these bottles, is carried

down to the bottom of third or wash bottle, half filled with water. A third tube from just below the cork of this bottle communicates with a nozzle to be placed in the nostril. As the vapors from the generating bottles are driven together into the wash bottle they unite to form vapor of the chloride of ammonium, which becomes washed before it escapes from the apparatus."

In this apparatus it was intended that the patient should inhale the vapor by the mouth and pass it out by expiration through

the nose; or else inspire for a short period through each nostril alternately. It is much better to pass a current of air from a special reservoir, or from the hand ball compressor that is used with the ordinary spray producers, and force the current of air and vapor on through into the passages. The small pocket instruments sold in drug stores are not so efficient as Lewin's instrument, and evolve too strong a vapor.

In throwing atomized fluids in the nose, care should be taken not to direct the current upward at more than



Fig. 13. Shepard & Dudley.

an angle of 45 degrees, because the current passing in, directed upward at a greater angle than this, will come directly and forcibly in contact with the membrane covering the upper portion of the middle and the superior turbinated bones, and produce such an amount of irritation as to cause violent sneezing, with congestion of the membrane and sense of fullness about the frontal cells.

It is best to direct the spray into the nose through the inferior meatus and parallel with the floor. In spraying the nose the patient should sit or stand erect, with the chin slightly elevated, so as to allow the fluid to flow back into the pharynx. The patient should be directed to hold the breath, or to respire gently, and refrain from swallowing while the fluid is in the cavities of the nose and pharynx, as the act of deglutition at this time is apt to produce strangulation by a part of the fluid trickling into the pharynx, thus causing the patient to experience the unpleasant effects of strangling and occasionally forcing a small quantity of the liquid into the tympanic cavity or into the Eustachian tube, producing more or less pain.

But a few years ago Dr. Weber, of Halle, introduced the nasal douche, an instrument for cleansing the cavities of the nose by forcing a stream of fluid through them. The instrument is simple, consisting of a vessel with the capacity of about one quart, with a stop-cock at the bottom for the attachment of a small hose, about three feet in length. The vessel being filled with fluid, is elevated above the head a short distance, so as to permit of pressure sufficient to force the fluid through

the nose. The amount of force is regulated by elevating or lowering the vessel.

Of all the methods resorted to for cleansing and medicating the nasal cavities, there is none more popular than the douche. Its popularity is to be accounted for in several ways. First of all, at the time of its introduction the profession were sadly in need of something to meet the demand, which the douche is claimed to fill. Secondly, the simplicity of the instrument, and the apparent ease with which it is managed. Thirdly, its extreme cheapness.

Considering these facts, and that there was no instrument but the ordinary syringe that could be used by the patients, it is not at all surprising that the douche should at once become a popular instrument.

Giving Dr. Weber all due credit for his discovery, or rather his application of hydrostatics, I feel confident that the profession and humanity at large would be better off without the nasal douche than with it. There can be no doubt but what the douche is a prolific source of acute inflammation of the tympanic cavity, notwithstanding the fact that some of its advocates claim to have used it in thousands of cases without a single mishap. Ample evidence from the best authority can be obtained to show that it is not an infrequent occurrence for the drum cavity to be flooded accidentally by the use of this instrument. The accidents are, in the majority of instances, followed by violent acute inflammation, which in most all cases results in suppuration. I have seen numerous instances in which the douche has unquestionably produced acute otitis media, and

this is the experience of every gentleman working in this special line. The collection of cases to be found in St. John Roosa's work on the ear is sufficient evidence to convince the most incredulous of its evil results.

Insufflation or Snuffing.—This is practiced to a great extent by all classes, and especially while bathing the face. In some instances it is done to cleanse the nose, and in others to medicate the passages. Physicians frequently recommend their patients to "snuff" salt water for the purpose of curing catarrh. The insufflation of liquids is certainly an inefficient method of cleansing, because it is an utter impossibility to reach the entire surface of the diseased membrane.

It is not an infrequent occurrence for the drum cavity to be flooded by snuffing fluid into the nasal passages. A number of such cases have come under my observation, the majority of which resulted in inflammation of the tympanic cavity, and several terminating in suppuration.

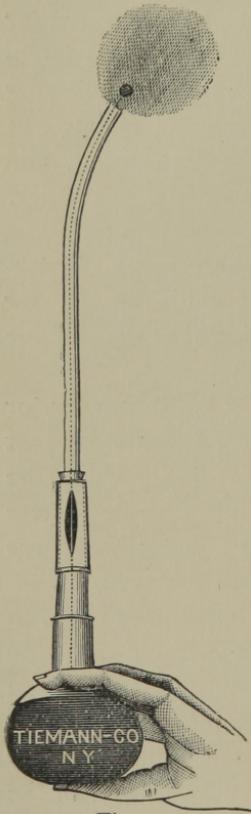


Fig. 14.

The insufflation of powders is occasionally beneficial, especially where the disease is confined to the middle and inferior cavities of the nose. Insufflation may be practiced by the doctor or patient.

It is most usually done by the latter, in the ordinary way of snuffing, which is quite sufficient.

In the event that it is desirable to blow powder into the nose and pharynx, it may be done by means of an insufflator, such as is represented in Fig. 14. In the absence of an instrument which has been especially devised for the purpose, a simple tube of any kind attached to an air bag may be used; or, what is still more simple, attach the tube to a small rubber hose, and in this way blow the powder into the nose or throat as may be desired.

Probes, Mops, etc.—In many instances a suitable probe well wrapped with cotton wool serves as a valuable adjunct in the removal of inspissated secretions from the nose and pharynx. The probe should be just sufficiently covered to protect the soft parts, unless it is desirable to swab out the cavities, as in cases where the bones have been lost and the patient is unable to remove the secretions by forcibly expiring through the nose; then it is well to have as much cotton on the probe as the nostril will admit. If the probe is used unprotected it should be done with good illumination, otherwise there is danger of injuring the membrane. Mops or swabs should not be used for applying medicaments, unless the disease is confined to a circumscribed spot, as in cases of ulceration.

The plan of saturating a sponge with a forty grain solution of the nitrate of silver, or saturated solution of the sulphate of copper, and thrusting it into the cavities of the nose and pharynx, tearing the membrane in its passage in and out, is barbarous, to say the least

of it, and the individual who presumes for an instant that the cavities of the nose can be thoroughly cleansed or medicated by this method, simply expresses his ignorance of the anatomy of the parts with which he is dealing.

Digital Exploration of the Pharynx.—The superior portions of the pharynx and the posterior surface of the soft palate and uvula may be explored by passing the index finger through the mouth and carrying it up into the pharyngeal vault. This method will frequently enable us to determine the presence of enlarged glands that are sometimes found on the posterior surface of the soft palate, tumors, and vegetative growths. The practice is rather an unpleasant one, but is of exceedingly great value in many instances. Dr. Guije, of Amsterdam, practices this method very extensively, and recommends that the vegetations and enlarged gland-like substances be scraped off with the finger nail.

It occurs to me that there should be considerable discretion used in practicing this method, as laceration of the membrane in the region of the Eustachian orifices would be likely to produce cicatrization and contraction or closure of these openings, thus materially impairing the hearing. A spoon-shaped scoop has been recommended by Justi, but the danger attending the use of such an instrument is so great, and the pain it produces is so severe, that few may be found who will be willing to use it, and fewer still who would submit to its use.

The following blank is one which I have adopted in recording clinical notes. It insures accuracy and system, and saves an immense amount of labor:

No..... Name..... Age..... Sex..... Color.....
 Date..... 18..... Residence.....
 Occupation..... Duration of Disease

General Health

Specific Taint

Pinnæ.....

Pain	AD	AS.....
Tinnitus.....	.....	.....
Meatus Ext.....	.....	.....
Memb. Tympani.....	<input type="radio"/>	<input type="radio"/>
Audition .....	.....	.....
Tub. Eustach.....	.....	.....
Tymp. Cav.....	.....	.....
Cerumen Imptd.....	.....	.....
Morbid Growths.....	.....	.....
Foreign Bodies in.....	.....	.....
Aspergillus.....	.....	.....
Furuncles .....	.....	.....

Septum Norum inclines toward.....

Condition of { R

Nasal Passages... { L

Character of { R

Nasal Secretion.. { L

Sense of Smell..... Epistaxis

Frontal Headache.....

Condition of Pharynx.....

Tonsils

Soft Palate..... Uvula.....

Epiglottis

Larynx

Trachea

Cough

Expectoration

Local Complications.....

Injury

Probable Cause

Has been Treated

Constitutional Treatment.....

Local Treatment.....

Condition at the time of Discharge or when last seen.....

REMARKS:

.....

.....

.....

.....

LOCAL MEDICATION.

This is one of the important features to be considered, for much of the success in establishing a cure is due to local medication. The first consideration is that of cleansing the diseased membrane. To do this it is necessary to employ agents that possess the power of dissolving the secretions.

At the head of this list we may place the muriate of ammonia, and next the bromide of potassium, then the chloride of sodium, and lastly the bi-carbonate of soda. The solvent powers of these agents may be estimated in the order in which they are mentioned. The ammonia and potash salts are very nearly the same as regards their solvent properties; but the potash, being a local anæsthetic, is preferable in some instances, especially when the disease is confined principally to the pharynx, and where there is considerable irritation and cough accompanying it. The solvent power of the chloride of sodium is not so great as that of the former agents, but it is an excellent substitute. Variations in the strength of the solutions of these salts modify their action materially, and the same solution is productive of different effects upon different persons, and even upon the same individual. Saturated solutions of ammonia or potash salts applied in any manner are exceedingly painful, and when applied with the post nasal syringe is much more so than when applied with an atomizer. The greater the comminution of the fluid, the less severe the pain. It is not an infrequent occurrence to meet with an individual

who has been tolerating a drachm solution with comfort to suddenly rebel against it on account of the intense pain caused by its application. They occasionally become so sensitive as to be unable to tolerate a stronger solution than five grains to the ounce of water. I have seen cases in which a ten-grain solution of the ammonia or potash applied with the spray to the nose caused the most intense pain for a short time, which was followed by a dull, heavy frontal headache, with a sense of weight across the upper third of the nose. In such cases the solution should be discontinued and a milder one used in its stead. In those cases where the membrane is extremely sensitive it is best to be governed by the sensations of the patients in the application of all medicaments, and especially cleansing agents. The application should be sufficiently strong to produce only a slight smarting pain in the nose.

The bromide of potassium deserves more than a casual notice, inasmuch as it possesses peculiar properties, which make it an important adjunct in many instances, especially in rendering the walls of the pharynx and soft palate insensible, which enables us to make rhinoscopic examinations that would otherwise be impossible. In cases of tonsillitis and pharyngitis, it is valuable as a wash. An ounce to the pint or quart of water, to be used as a gargle every hour or so, is one of the most efficient agents that can be employed. It cleanses the parts and at the same time renders them pliant, and produces a cooling sensation which is very grateful. In cases of acute catarrh, when the discharge is profuse, with or without frequent sneezing, weak solu-

tions of the bromide of potassium, from five to ten grains to the ounce of camphor water, applied with the atomizer every hour, is a very efficient and grateful application, and if persisted in will arrest or cut short the disease.

The bi-carbonate of soda is particularly adapted to those cases where the anterior nares is in an eczematous condition. It is a very mild application, and at the same time possesses sufficient solvent power to meet all reasonable demands in most cases. It not only serves as a cleansing agent, but also acts as a curative agent upon the same principle as the alkaline baths applied to other portions of the body for similar affections.

Simple warm water applied to the membrane by means of the post-nasal syringe or the atomizer, if persisted in, will in some cases be sufficient to remove the morbid secretions, especially when they are not incrustated, but it will always irritate the membrane by removing the normal saline ingredients of the mucus. The warm water of itself possesses the power of dissolving or softening the secretions, and in this way they may be detached and removed; and it also acts mechanically by washing away the secretions by main force. It may be well to call attention to the value of hot water in certain cases where the membrane is greatly thickened, with or without profuse secretion, and particularly where the disease is acute and the membrane inclined to be dry. The hot water, containing a minute portion of chloride of sodium, should be applied by means of the atomizer, and a constant spray kept up for four or five minutes at a time, this

to be repeated every three or four hours during the day. The temperature at which the water is tolerated in some cases is almost incredible. I have known several instances in which the Schneiderian membrane would tolerate water at a temperature that could not be borne by the hand of the patient. In one instance the water was so hot as to be painful from the instant it came in contact with the hand, yet it was passed into the nose with perfect comfort. By frequent applications of hot water to the membrane in such cases as just mentioned, the swelling is reduced, and respiration rendered easy and comfortable in a comparatively short time.

Errhines.—Errhines are those agents which provoke sneezing, and at the same time increase the secretion of the Schneiderian membrane. In the true sense of the word, any thing that will provoke sneezing and increase the nasal secretion may be considered an errhine. Many of the quack nostrums and proprietary medicines, especially the snuffs, are composed principally of irritating agents. One of these packages recently came under my observation which was composed entirely of common salt. Among the most valuable may be mentioned one composed of white sugar and pulverized cubebs, in the proportion of one part of the latter to eight of the former, to be used as a snuff. The insufflation of the sugar alone is exceedingly valuable in many instances. It is of most value in those cases where the membrane is studded with neoplasms, and in those cases where the dryness is extreme. The sugar alone, or in combination with

cubeb, should be used immediately after the parts have been thoroughly cleansed by some one of the salines. The sugar acts as a stimulant, increasing the flow of the secretions if applied to a healthy nose, and frequently producing a considerable amount of congestion; not enough, however, to produce headache or any unpleasant effects.

Astringents, Antiseptics, and Soothing Applications.—Powdered tannin is recommended by some authors, but experience teaches that it is inadmissible in the form of powder, unless it be for the purpose of arresting hemorrhage. Insufflation of pure tannin is extremely painful, and produces violent congestion of the Schneiderian membrane and pain in the region of the frontal cells, with more or less headache.

Tannic Acid, in combination with carbolic acid in solution, is one of the most valuable local agents that is employed in the treatment of catarrh of the nose and pharynx. They may be used in the strength of from two to fifteen grains each to the ounce of water, to be applied with a spray producer. In this combination we have both an astringent and a soothing application, the local anæsthetic properties of the carbolic acid being admirably manifested. If there is considerable relaxation of the membrane, it is probably best to use the tannin in excess of the carbolic acid.

In cases of acute catarrh, where there is excessive rhinorrhœa, the solution should be weak, not more than two grains of tannic acid nor more than five of the carbolic acid to the ounce of water.

Carbolic Acid in full strength is useful in cases where

it is desirable to use a caustic, as in the destruction of nasal polypi or cauterization of an ulcer. This is preferred to most caustics, because it is almost free from pain, and does not produce such an extensive slough as the solid silver and many other agents that might be mentioned. It may be applied every second or third day without fear. The application is best made by means of a probe and cotton wool; the wool should be wrapped closely around the probe, so that it will not take up a superfluous amount of the acid. In making any caustic application it is important that it should be done under the guidance of a good light, so that the healthy structures may not suffer.

Nitrate of Silver.—This agent is probably used more extensively than any other in the treatment of catarrh. It is difficult to understand why this is so, unless it be from habit, for I am confident that the results are not such as should induce its advocates to adhere to it so closely. It possesses no specific properties of value, and its most earnest advocates will tell you that its application will not cure a case of catarrh. Weak solutions (five grains to the ounce) are painful, to say nothing of the forty and sixty grain solutions that are employed so frequently. The pain induced by the latter solution is extremely severe, and usually lasts from twelve to twenty-four hours; in many instances the patient being compelled to take the bed.

It should be remembered that the most efficient cleansing agents are such as are capable of neutralizing the silver; hence it is impossible to determine how much effect will be obtained from a solution of silver

unless the parts are thoroughly freed from saline matters before the silver is applied. It is to be regretted that an agent which is in such general use as the nitrate of silver should not possess some positive value.

If it is used at all, it should not be used strong enough to destroy or abrade the membrane; and to be certain that it does not injure the membrane, it would seem advisable not to use more than twenty grains to the ounce of water, to be applied with a spray producer. A solution of this strength is sufficient to produce intense pain and discomfort for ten or twelve hours after its application. It is certain that its value is overestimated in the treatment of catarrhal affections. I have seen no benefit from its use, therefore decline to recommend it.

Sulphate of Copper is not to be recommended as a local application to the nasal mucous membrane, as solutions of any strength are painful, and almost valueless.

Hydrate of Chloral, in solution, in the strength of from three to ten grains to the ounce of water, serves an admirable purpose in those cases of rhinitis and pharyngitis accompanied by erosions or ulcerations of the mucous surfaces. The chloral acts as a stimulant and antiseptic, and produces a marked change in this class of cases. It also acts as a deodorizer, and serves a valuable purpose in cases of caries and necrosis. It may be used in combination with carbolic acid.

Disinfectants.—At the head of this list stands Labarraque's solution of chlorinated soda; it is safe to say that there is no other agent that will so com-

pletely destroy an odor as this. If the solution is to be used with an atomizer, from ten to thirty drops of it to the ounce of water is quite sufficient. In many instances the half-drachm solution applied as a spray will produce considerable pain, and after a time excoriate the parts about the anterior nares. If the solution is to be used with the post-nasal syringe, a drachm or a drachm and a half to the pint of water will be sufficiently strong.

Permanganate of Potassa.—A solution of this salt, from five to fifteen grains to the ounce of water, is an excellent disinfectant. Its powers in this respect are inferior to those of the chlorinated soda, but in the absence of that agent it may be substituted. If a very strong solution of the permanganate of potassa be thrown into the nasal cavities with the spray producer or post-nasal syringe, it will produce severe and constant pain in the nose and frontal region for several hours. The pain may be relieved by spraying the parts thoroughly with water as warm as can be borne.

Iodine.—This agent proves a valuable adjunct in those cases where there is an eczematous condition of the membrane. Equal parts of the tincture and glycerine may be used with the atomizer. In cases where the membrane is ulcerated, as in cases of syphilitic rhinitis, the above is an excellent application, acting, in all probability, as a stimulant to the ulcer and the adjacent parts. If the drug is to be applied with a mop or brush, a solution of from one half to two drachms to the ounce of glycerine, with a sufficient quantity of the iodide of potassium to insure its solution, is suffi-

ciently strong. In fact, the application of a solution containing more than a half drachm of the iodine to the ounce of glycerine should be confined to the anterior nares and region of the pharynx, never reaching the regio olfactoria under any circumstances, as such solutions will be sure to produce violent congestion of the adjacent structures, and is almost certain to be followed by severe pain, with frontal headache. I have yet to see the least benefit from any application that will produce prolonged and constant pain in the frontal region. An alcoholic solution of iodine may be used in the same manner as the strong glycerine solutions. It may vary from five to twenty grains to the ounce of alcohol.

Glycerine.—This agent is to be recommended in catarrh only as a vehicle for other drugs, as its affinity for water is so great that its application is followed by a sense of dryness and warmth in the course of two or three hours. It is particularly valuable in making solutions of tannic acid. Theoretically, it would meet the demand in those cases where the membrane is excessively dry; but, practically, it is a failure.

Bi-chloride of Mercury.—Weak solutions of this salt, in combination with a sufficient quantity of the muriate of ammonia to insure its solution, may be used as a local application in the form of a spray in those cases where there is excessive dryness, and particularly in those cases where the membrane is considerably thickened as the result of an increase in the connective tissue. From one-fourth to one grain of the bi-chloride, with thirty grains of the muriate to the ounce of water,

is as strong as it is advisable to use the mercury. It should be applied once a day, or once every other day.

Chloride of Zinc.—This salt may be used in solution, in the form of spray, in from one to thirty grains to the ounce of water. In those cases where there is a tendency to eczema in the region of the anterior nares, with great dryness, the strong solution proves very beneficial, and sometimes will give relief when other agents have failed.

Yellow Oxide of Mercury.—In those cases of eczema which are inclined to be moist, with a tendency to spread from the nose to the lips and face, an ointment composed of twenty grains of this salt and half an ounce of glycamil (glycerole of starch), applied twice a day, is one of the most valuable applications. There is no other agent that proves of such universal benefit. It is less irritating than red oxide, and is therefore preferable to that salt.

The yellow oxide combined with white sugar, in the proportion of five grains of the former to two hundred and forty of the latter, makes an excellent application in chronic cases where there is a tendency to inspissation of the accumulating secretions within the cavities of the nose. The two agents should be rubbed well together and used as a snuff three or four times a day.

Salicylic Acid.—My experience with this agent has not been extensive, but it is favorable. It may be used in combination with the sulphate of morphia in the following proportions: Salicylic acid, three grains; sulphate of morphia, one grain; rose water, one ounce; with a sufficient quantity of bi-carbonate of soda to

insure solution of the acid. This, applied every hour with the atomizer, usually gives marked relief, and by the time the third or fourth application is made the patients usually express themselves as feeling comfortable and free from any desire to sneeze. The uniform results obtained from this drug, as prescribed above, is indicative of its value in the acute form of catarrh, and entitle it to a more extensive trial.

Nascent Chloride of Ammonium.—The nascent chloride of ammonium, generated by Lewin's apparatus, is beneficial and more pleasant than the solutions of that salt, but the unwieldiness of the apparatus renders it impracticable for general use, and, likewise for office work. The nascent chloride has no advantage over the solutions, and, in fact, is not so convenient, because the strength can not be varied.

Cubebs may be beneficially used in two ways, viz.: By smoking in a pipe in the same manner that tobacco is smoked, and exhale the smoke through the nose. This proves very grateful in cases where there is a sense of heat, with dryness of the nose and pharynx. The powdered berry may be snuffed by itself, or it may be used in combination with sugar.

CONSTITUTIONAL MEDICATION.

The demand for constitutional medication can not be said to be general, although it is more frequently demanded than has generally been supposed. There can be no doubt that quinine is frequently demanded in the treatment of naso-pharyngeal catarrh, just in the same manner that it is demanded in other diseases where malarial complications arise. In those cases where there are neoplastic deposits in the submucous structures quinine hastens their removal, and without it they are inclined to remain indefinitely. It frequently happens during the course of a case of catarrh, without any assignable cause, the membrane which has inclined to be rather excessively moist, suddenly becomes dry, hot, and painful, with a sense of weight across the upper third of the nose, and a dull, heavy headache. These symptoms are usually developed in a few hours; the patient having felt comparatively comfortable for days previous to this sudden attack. In those cases no amount of local medication will give relief from the constant pain in the nose and the dull headache; but full doses of quinine internally are always sure to abate these symptoms. It is best given at bed-time, say fifteen to twenty grains for an adult, and a proportionate dose for younger persons. It may not be generally known to the profession that a large dose at bed-time is less unpleasant and more effective than when taken in broken doses of three or five grains every few hours. The large dose may be given during the day if the patient will assume the recumbent position and keep it.

Chlorate of Potassa.—This drug is useful in cases of a strumous taint. It should be given in full doses three times a day, largely diluted with water. It is especially beneficial in those cases where the tonsils are hypertrophied, and where the face is rough and full of pimples. It is necessary to continue its administration for a considerable length of time in order to obtain any marked benefit from its use.

Iodide of Potassium.—This is one of the most valuable agents we have. In addition to its defibrinizing properties, its peculiar action on the nasal mucous membrane renders it an invaluable remedy, and one for which there is no substitute. The physiological action of the iodide is first manifested by an increase in the flow of tears and saliva, and also an increase of the secretions from the membrane lining the nose and pharynx. In those cases of catarrh where the membrane is habitually dry, and also in those where there is a thickened condition of the membrane from an increase in the connective tissue element, this salt is particularly valuable. It should be given in full doses, commencing with ten grains after each meal and at bed-time. The dose should be increased five grains each day, until iodinism is produced. The patient should be kept under its influence sufficiently to maintain a moist condition of the membrane. This treatment should be kept up for a considerable length of time to obtain good results. If given with glycerine and syrup it will be less likely to irritate the stomach than when given in water.

There is another class of cases that the iodide of po-

tassium seems to have a decided effect upon, viz.: those acute cases that come on suddenly and violently, and are attended with frequent sneezing, difficult nasal respiration, with an oppressed feeling about the chest; excessive lacrymation, and a free flow of glairy, tough mucous from the nose. The membrane is usually very much tumefied, and nasal respiration is rendered difficult and, sometimes, impossible. In those cases the iodide should be administered in full doses, and pushed until the effects of the drug have been manifested, either by the abatement of the symptoms or by the establishment of iodinism. In connection with the internal use of the iodide, hot water, containing a minute quantity of chloride of sodium, should be used freely with the atomizer. The hot application may be followed by some soothing anodyne, as the solution of salicylic acid and morphia. All local application in these cases are most beneficial when applied hot as they can be borne.

Muriate of Ammonia.—This agent is found to be useful in many instances, and may be given in cases where there is glandular enlargement or an engorged state of the lymphatic system. Its use must be continued for some time to obtain its effects.

In addition to the use of the above-mentioned constitutional remedies, cod-liver oil, with iron and the bitter tonics, may be administered with benefit.

CLIMATE.

Climatic influence proves exceedingly beneficial in many cases of acute catarrh, especially in the periodical form of the disease. It is a well-known fact that the so-called hay fever, which is nothing but an acute catarrh and which usually resists all therapeutic agents, yields readily to a change of atmosphere. The same locality does not prove beneficial to all who have the disease; the atmosphere of the sea coast giving relief to some, others not being benefited by it. The same is true with regard to mountainous districts and the coast of inland seas.

CATARRH.

The ancients considered catarrh a simple flux, and not an inflammation. The French apply the term to an inflammation of any mucous structure, and this application is generally accepted by the profession, although in a general way it is considered an inflammation of the membrane lining the air passages, particularly that of the nose and larynx. With the laity, the word catarrh is used to express the presence of an inflammation of the membrane lining the nose and pharynx; and it is this form of the disease that will be considered in this volume.

Catarrh may be separated into two grand divisions, acute and chronic; each of these may be subdivided, the former into sporadic and epidemic, the latter into dry and moist. Epidemic catarrh was not particularly noticed by physicians before the sixteenth century. It was first designated as influenza by the Italians. There was no medical description of epidemic catarrh before the year 1510. The epidemic of that year, according to history, was confined to Malta, Sicily, Spain, Italy, Germany, France, and Britain. Short says that "it attacked at once and raged over all Europe, not missing a family and scarce a person." In 1557 an epidemic of the same nature prevailed in different countries. Fonseca says that in this year "it infested Asia, thence came to Constantinople, and having spread itself all over Europe afterward attacked America, its course being westerly." Mercatus asserts that before the beginning of the autumn of 1557 it attacked all parts of Spain at once, so that the greatest part of the population were seized with it almost on the same day. Riverius, in an account of this epidemic, says that the disease was fatal to many in a small town near Madrid, Mantua Carpentaria.

According to the investigations of Gluge the following is the chronological order of the return of influenza: Fourteenth century, 1323, 1326; Fifteenth century, 1410, 1411, 1414; Sixteenth century, 1510, 1557, 1562, 1574, 1580, and 1593; Seventeenth century, 1658, 1669, 1675, 1693; Eighteenth century, 1708, 1712, 1729, 1732, 1733, 1742, 1743, 1761, 1762, and 1775; Nineteenth century, 1800, 1803, 1831, 1833; and to these may be

added 1857, 1843, and 1873. The epidemic of 1873 was an exceedingly mild one, commencing in New York and traveling slowly in a southwestern and southerly direction. It was commonly called the epizootic. The lower animals, especially the equine species, suffered severely, although it rarely proved fatal. The symptoms were much the same in these animals as in man. There was generally more or less cough, with excessive lachrymation, and in the early stages a free flow of watery mucous from the nostrils, which became muco-purulent as the disease advanced. The hair of the diseased animals became rough and fell out, and they seemed to be void of all energy. The cold punished them very severely, much more so than when in health. During this epidemic, which was in the main confined to the lower animals, there was an unusual amount of acute catarrh among the human species, but it was not, in most cases here in Louisville, considered a matter of any consequence, and medical advice was rarely sought.

The disease did not differ materially from ordinary acute sporadic catarrh.

Acute inflammations of the membrane lining the naso-pharyngeal space may be classified in the same manner as those of the conjunctival membrane, viz.: catarrhal, muco-purulent, and purulent. The character of the secretions serve to distinguish them one from the other, the symptoms differing but little, if any; so little, indeed, that for all practical purposes the three diseases may be considered as one, and the secretions of each representing a particular stage of the disease.

The most important point is, that the former disease, or stage, as you may please to call it, is not contagious, while the two latter are, in consequence of pus cells in the secreted matter. True catarrhal rhinitis may assume either of the other forms of the acute disease. In fact, it is an infrequent thing to see a case of muco-purulent or purulent rhinitis that has not been preceded by a true catarrhal inflammation.

Symptoms.—An attack of acute coryza is usually ushered in by well-marked symptoms, which are preceded by a feeling of general malaise, accompanied by stiffness about the joints, and dull, aching pains in the back and extremities, chilly sensations, mental incapacity, etc. The intensity of these symptoms vary considerably; in some instances they are so mild as to be overlooked by the patient, in others so severe as to disable them to such an extent that they are obliged to confine themselves to the bed.

Following immediately after these symptoms, or occurring simultaneously with them, there is a sense of warmth and dryness, which in many cases is so mild as to create little or no inconvenience, while in others it becomes painful and produces a dull, heavy sensation in the region of the frontal cells. There is always more or less sneezing, accompanied by an excessive flow of thin, watery mucus, which contains a small amount of the chloride of sodium, and, according to Donders and Shonbein, also some ammonia. There is usually congestion of the conjunctival membrane, with excessive lachrymation, and a stuffy sensation in the nose, as though the passages were plugged

with cotton wool or entirely closed. A sense of weight, with pain across the upper third of the nose, is a frequent concomitant. Nasal respiration is usually impaired. The impairment may be so slight as to be scarcely noticed, or the passages may be closed, making respiration through the nose impossible. This symptom is always better marked in children than in adults: and in young infants interferes with nursing, and makes them exceedingly fretful. There is always a desire to snuffle and draw the secretions back into the pharynx. This is frequently due to relaxation of the membrane. Accompanying these symptoms there is an elevated temperature which reaches 100° to 101° F., and remains at that for twenty-four to forty-eight hours, and sometimes even a greater length of time than this. If the inflammatory process should extend back into the pharyngeal vault, there may be some disturbance in the ears. The invasion of the ears is usually accompanied by slight deafness, with or without tinitus aurium. If the inflammation should assume an active character and extend along the course of the Eustachian tube and into the tympanic cavity the pain will be severe; in short, the symptoms of an acute salpingitis and acute otitis media will present themselves.

If the pharyngeal box should be invaded in its entire extent, its walls, especially the lateral ones, in the region of the isthmus faucium, will present a rugged appearance, the veins being invisible on account of the loss of transparency in the membrane.

There is usually slight pain when the act of deglutition is attempted. The cervical lymphatics are

occasionally involved, and become swollen and very tender.

The rhinoscopic appearances in a case of uncomplicated catarrh are not at all times the same. The difference in the appearances of the membrane may depend upon numerous causes; as, for instance, the severity of the attack, and the stage of the disease at which the observation is made, will have very much to do with modifying the appearance presented. As a rule, the surface of the membrane is very red, differing materially from the beautiful pink hue of the underlying structure seen in the normally transparent condition. There is generally a moderate amount of relaxation and swelling of the membrane throughout the whole naso-pharyngeal tract; the tumefaction occasionally becomes excessive; and again, in other instances, it is scarcely perceptible. If the cavities are examined in the early stages the membrane will be found bathed in a clear watery mucus, which becomes viscid later on, and, finally, on the third or fourth day, if an examination is made, the structures are found covered with muco-pus, unless the disease has been arrested, when the secretions will be more scanty than in the first stage, and more tenacious. There is rarely any considerable epistaxis, and when present is usually due to the violent expiratory efforts made in attempting to cleanse the nose, or to congestion of the membrane. The anosmia accompanying acute nasal catarrh is temporary, the sense of smell being perfectly restored when the disease disappears. Anosmia is frequently obstructive, due to accumulation of the secretions or to swell-

ing and relaxation of the membrane. The voice is usually changed, and has a nasal sound, such as may be produced by closing the nostrils with the thumb and finger. This is due to partial or complete closure of the nares. If the soft palate is involved the voice will also be changed.

The following are the microscopical appearances of the secretions. The mucous secretion always shows white blood (pus) corpuscles, besides the so-called mucous corpuscles, sometimes red blood corpuscles and epithelium. A large number of little bodies, recently so much spoken of and called micrococci, may generally be seen covering the cells. In accordance with this general theory of inflammation, Hueter regards these micrococci as the true source of irritation in coryza. In addition to the above, the secretions sometimes contain accidentally formed ingredients, which float on the inspired air, and are thus mingled with the fluids in the nose. The number of pus corpuscles is variable. They usually increase with the duration of the disease, until, owing to the greater power which these cells possess of refracting light, they give the entire mass that turbid, opaque appearance characteristic of what we call muco-purulent or purulent secretions. On close observation, a stage, even though quite short, will appear toward the end of a coryza, during which the fluid effused will at least be entitled to the name of muco-purulent. (Ziemssen's *Cyclopedia of Practical Medicine*, vol. iv., page 124.)

Complications.—The inflammation occasionally extends to the larynx, lachrymal passages, and ears.

There is frequently excoriation of the skin covering the upper lip and immediate vicinity of the nostrils. The integument covering the nose occasionally becomes swollen and glistening, and more or less painful to the touch. I have seen a case of facial neuralgia that was undoubtedly due to the presence of an aggravated nasal catarrh. It was in the person of a lady about thirty years of age, who was suffering with a chronic form of catarrh, and had frequent attacks of the acute disease. The acute attacks were always sure to be accompanied by the most severe facial neuralgia, which disappeared when the attack subsided. "Such neuralgias of the fifth pair, dependent on nasal catarrh, have been described by Duchek, Oppenheimer, Rollet, and others." (Ziemssen's Cyclopaedia of Practical Medicine, vol. iv., page 126.)

Course.—The course of acute catarrh is usually uniform and very rapid, the first stage lasting from twenty-four to forty-eight hours; at this period the irritation is less, and if recovery takes place without the secretions becoming purulent they are materially reduced in quantity and are not so watery and acrid in their character. On the other hand, if the disease should continue to run its course, the secretions will be more turbid and tenacious, and by the end of the third, and, in many instances, on the second day, the discharge will be purulent when the disease may be said to be in the second stage, the duration of which may be from two to five days, if it does not become chronic.

Prognosis.—The prognosis of acute catarrh is always favorable, the majority of cases ending in recovery

without treatment. Those cases that do not terminate in recovery become sub-acute or chronic. All cases recover with proper treatment. This latter statement is contrary to the opinions of many writers, but I have known no disease more tractable, and shall presently introduce a few illustrative cases. I am persuaded naso-pharyngeal catarrh is just as curable as the ordinary form of intermittent fever. On the other hand, I have never known a death from catarrh.

Treatment.—The treatment of acute catarrh should be both local and constitutional. If the bowels are constipated they should be freely moved by the use of some saline; this is especially indicated where there is a marked febrile disturbance, with a fullness about the head. In addition to this a hot foot-bath at bed-time, with ten grains of Dover's powder, frequently gives great relief, and seems to mitigate the disease, if not to arrest it altogether. Opium internally is said to possess the power of cutting the disease short. I am not prepared to say whether there is any truth in this statement or not. Atropia in doses of $\frac{1}{120}$ of a grain may be used with marked benefit.

Many agents are recommended as local applications, and in the selection of a suitable agent for this purpose it should always be borne in mind that the membrane is usually tender and irritable; and in consequence of that fact such agents as will tend to soothe the membrane and allay this extreme sensitiveness are the ones that should be applied. Among the most efficient local agents are the bromide of potassium and carbolic acid; the former being preferable in all ordinary forms

of the acute disease, the latter in cases of erosions from tuberculous or syphilitic taints.

In malarial districts, the indications for quinine should not be overlooked, as its use is frequently demanded.

CASE I.—*Acute Catarrh.*

Miss T—, aged 28 years, called on me March 9, 1877, and gave the following history: About the 20th of the previous month she was exposed to some very inclement weather, and in a few hours afterward was seized with a violent attack of sneezing, accompanied by excessive lachrymation and a free flow of watery mucus from the nose. This state of things lasted for three or four days, when the symptoms became modified but continued to be very annoying. From the date of the attack up to the time of her visit on the 9th, nasal respiration had been very much embarrassed. An examination of the nose showed that the membrane covering the septum and inferior turbinated bones was congested and swollen. There was almost constant expectoration of tenacious mucus.

The treatment consisted in the application of a solution of one-half drachm of the muriate of ammonia in four ounces of water, which was followed by a solution composed of five grains of carbolic acid, two grains of the sulphate of morphia, three drachms of glycerine, and fourteen drachms of rose water. These agents were applied three times a day with the atomizer, the latter solution being used immediately after

the former. The patient improved rapidly, and was entirely relieved in three weeks.

CASE II.—*Chronic Moist Catarrh, accompanied by frequent attacks of the Acute form of the disease, attended with severe Facial Neuralgia.*

Mrs. R. H——, aged 34, was brought to me by a medical friend in January, 1878, when the following history was obtained: The patient had been suffering with chronic catarrh for a considerable time. She said that she had frequent attacks of acute coryza, and that they were always attended with the most severe facial neuralgia, which continued until the acute stage of the catarrh abated; but only to be renewed each time the acute disease manifested itself. There was a great sense of weight across the upper third of the nose, which was much swollen. The nasal mucous membrane was congested and relaxed to an extent sufficient to render nasal respiration difficult, and at times impossible. There was an excessive flow of clear, watery mucus from the nose. The drum membranes were congested, and there was an occasional pain in the region of the tympanum. Most of the agents that are usually employed to relieve neuralgia had received a trial and failed to produce the desired result. The patient's general health was not at all good. The appetite was insufficient, and sleep did not refresh as it should. Tonics and good diet were recommended, with proper out-door exercise. The patient was not heard from again.

CASE III. — *Acute Catarrh, invading the right tympanic cavity.*

In January, 1880, Dr. M——, aged 29, called, and stated that he had been up the greater part of two or three nights previous to the attack, and that he had slept in a room without any fire, which was contrary to his usual custom. Examination showed the nasal membrane to be very much swollen and bathed in a watery mucus. Nasal respiration was impossible. The membrane was exceedingly irritable and tender, and sneezing was frequent. There was considerable pain in the right ear for six or eight hours before I saw him. The drum membrane was very much congested, and presented almost a scarlet hue. The patient was unable to inflate the tympanum. The hearing was considerably impaired.

Treatment: The nasal cavities were sprayed every three hours with a solution of forty grains of the bromide of potassium in four ounces of camphor water. The tympanum was inflated through the Eustachian catheter. The drum cavity contained a considerable quantity of mucus, which was forced out by the counter current of air. The removal of the mucus relieved the pain at once, and there was no further disturbance in the ear. The application of the bromide was kept up for six days, when all evidences of the disease had passed away.

CASE IV.—*Acute Catarrh, with Dysphonia.*

Miss H—, aged 19 years, a member of an amateur theatrical club, consulted me in the winter of 1877, and stated that, on the evening previous to her visit, she had experienced a chilly sensation, which was followed by fever and slight headache; during the night there was a free flow of watery mucus from the nose. She experienced also, in the latter part of the night, a feeling of warmth about the larynx, which was soon followed by hoarseness. The Schneiderian membrane was found to be very much congested, and covered with mucus; nasal respiration was embarrassed; and there was a fullness of the blood vessels of the pharynx. The vocal chords were congested and considerably relaxed. The patient was very anxious to be relieved of the hoarseness, as she had, on the following evening, an engagement to fulfill which demanded a clear voice.

Treatment: I commenced by spraying the larynx with fifteen minims of Monsel's solution of the per-sulphate of iron in an ounce of water. This application gave marked relief at once, enabling the patient to speak in an ordinary tone of voice. She was directed to spray the larynx every two or three hours with a five-grain solution of tannic and carbolic acids. In the intervals a troche containing five grains of the bromide of potassium was used every two hours. The nose was sprayed with a ten-grain solution of the bromide of potassium. The hoarseness was sufficiently relieved to enable the patient to fulfill a successful engagement for a public

performance. In five days all catarrhal symptoms had disappeared and she remained well.

CASE V.—*Acute Catarrh, invading both drum cavities.*

Edward C—, aged 7 years, was brought to me February 14, 1878. On the night of the 12th he suffered with severe pain in the left ear, which was relieved some time during the following day. The 13th, at night, he had intense pain in the right ear, which continued until he reached my office the next day. The hearing was very much impaired on both sides. There was an excessive flow of mucus from the nose, and frequent sneezing. The left external auditory canal was full of muco-pus, and the drum membrane on that side was perforated near the center. The right drum membrane was bulged, and presented an opaque appearance. The nasal mucous membrane, and that lining the pharynx, were congested and relaxed. The tonsils were slightly enlarged.

Treatment: The patient was unruly, and would not submit to the use of the Eustachian catheter. Politzer's method was employed and both drum cavities inflated. The inflation of the right side ruptured the drum membrane of that ear, and a quantity of muco-purulent matter escaped. The rent closed in twenty-four hours, and there was no further trouble with that ear. The left ear was cleansed two or three times a day, and a solution of fifteen grains of carbolic acid and ten grains of the sulphate of zinc to two ounces of water was dropped

into it each time after cleansing. The nose was sprayed several times a day with a ten-grain solution of the bromide of potassium. On the fifth day the catarrhal symptoms had entirely disappeared, the left drum membrane had healed, and the only remaining evidences of the disease was the congestion of the membrana tympanæ.

CHRONIC MOIST CATARRH.

Chronic moist catarrh may exist in two forms, the first of which is accompanied by symptoms similar to those of the second, but more mild in character. The first may be termed muco-purulent rhinitis, and the second purulent rhinitis. The following are the symptoms of the former:

Symptoms.—The resonant quality of the voice is not lost in all cases of catarrh, as asserted by some. Indeed, not even in the majority of cases of chronic catarrh do we find the voice materially altered. There is a mistaken idea about this particular symptom, because there can be no doubt there are more cases of chronic catarrh unaccompanied by a change in the voice than otherwise. In those cases where there is an alteration in the voice, it is usually of a peculiar nature, the patient being unable to pronounce the consonant *n* and *m* distinctly. The defect in these cases is due to an obstruction in the nose or pharynx, or faulty action of

the soft palate. The obstruction may be caused by a thickened membrane, by vegetations on the posterior wall of the soft palate, by an accumulation of secretions in the passages of the nose, or on the posterior wall of the soft palate.

Nasal respiration is impaired in most cases. The patient breathes with the mouth open, and snuffles when an attempt is made at respiration through the nares. It is asserted by some authors that patients suffering with nasal catarrh present a peculiar expression of countenance, due to the fact that they have to breathe through the mouth. Obstruction of the nasal passages compels the patient to breathe through the mouth; but this does not necessarily render the expression stupid; and can not be considered as a symptom of the disease. Snoring is not met with more frequently in individuals suffering with chronic catarrh than other persons. In a recent work on the throat, Mr. Lenox Browne says: "Unless the tonsils are enlarged the patient does not snore; this act of snoring being, according to Michel, due to obstructions of both fauces and nares, which causes the inspired air to be rarefied, and to produce a flapping up and down of the epiglottis. According to our knowledge of anatomy and physiology, snoring does not in any manner depend upon the movements of the epiglottis; but is produced by the current of air passing over a relaxed palate and uvula. The palate may be relaxed while respiration is carried on through the mouth or nose, or when it is effected through both of these cavities at the same time: hence the act of snoring may accompany respi-

ration at any time when the palate is relaxed; and, to convince one's self of the fact, it is only necessary to relax the palate and breathe forcibly through the mouth or nose. Enlargement of the tonsils may produce snoring, when it would not otherwise exist; but the inspired air is not rarefied to an extent sufficient to produce flapping of the epiglottis as stated by Michel. Enlarged tonsils necessarily lessen the passage; and in both inspiration and expiration the air is forced through a constricted orifice, which is bounded above by the soft palate and uvula, and with these structures relaxed it is easy to understand why patients with enlarged tonsils should snore.

The cephalalgia which frequently accompanies chronic nasal catarrh is generally confined to the frontal region, rarely extending beyond. The pain experienced in connection with the headache which accompanies chronic catarrh is not acute; there is a sense of tension and fullness, which is increased by violent exertion, and especially when the stooping posture is assumed. There is frequently great sense of weight across the upper third of the nose. This sensation may be produced by grasping the nose across the upper third and pressing backward with considerable force. This symptom, I believe, has not been mentioned by previous writers. The frequency with which frontal headache occurs in chronic catarrh is not so great as we are led to believe it to be. Observation leads to the conclusion that it is not a constant symptom in most cases, and that it occurs more frequently in those cases where the secretions become inspissated and impacted.

This so-called headache, which is not a typical cephalalgia, is brought about by a congested condition of the vessels of the membrane lining the superior portion of the nasal cavities. It is an easy matter to understand how the vessels of the membrane lining the above cavities may be kept in state of congestion, when it is remembered the least amount of tough mucus blown forward into the apices of the funnel-shaped cavities of the nose must remain until decomposition takes place before it can be removed. Remembering these facts, it is not at all surprising that the accumulated secretions in the superior cavities of the nose should produce constant irritation and swelling. Hence the headache.

Anosmia.—This often accompanies both acute and chronic rhinitis. In the acute form it is usually due to obstructions (a) of the cavities from accumulated secretions, or (b) to swelling of the membrane and consequent closure of the nasal passages. The chronic forms arise (c) hypertrophy of the nasal membrane, (d) from ulcerative action, (e) from atrophy.

The loss of the sense of smell, or its impairment, does not occur in all cases. Very severe cases occur without the sense of smell being the least impaired. The prognosis in regard to the sense of smell should always be guarded, especially where there is reason to believe that the anosmia is due to a change in the structure of the membrane.

Cough rarely exists as a symptom of any form of chronic nasal catarrh. Frequent hawking is one of the characteristic features of the disease. The presence of tenacious mucus on the posterior wall of the pharynx,

or on the posterior surface of the soft palate or uvula, is accompanied with a desire to remove the offending substance; hence the frequent hawking. In many cases the secretion is so profuse as to necessitate frequent efforts to remove it. This is one of the most annoying features of the disease. It is particularly so with the more refined class of individuals. It is not an uncommon thing to hear a patient remark that the only object in ridding himself of the disease is to avoid the constant hawking when in society.

Hearing.—Audition may or may not be impaired. If the disease extends to the Eustachian tubes, hearing will be more or less affected. The amount of the defect will depend upon circumstances. If the Eustachian tubes and tympanic cavities become involved in the inflammatory process, the hearing is likely to become very much impaired.

Tinnitus aurium is a distressing and almost constant symptom of narrowing of the faucial orifice of the Eustachian tube. Indeed, some of the most stubborn cases of tinnitus are met with in this form of catarrh, and nothing will relieve the symptom short of restoration of the patency of the Eustachian orifice.

Pain.—Acute pain is rarely present in any case of chronic catarrh, unless the ears become involved. There is most always a feeling of discomfort. It may be a fullness about the frontal region, or a burning, hot sensation in the region of the posterior nares, or a sense of dryness in the nose. There is frequently a “stuffy sensation” complained of in the nares. In the morning, when patients first arise, the secretions are likely

to be dry, and at this time it is not unusual to hear them complain of soreness in the region of the posterior nares and soft palate. This soreness passes off after breakfast, or after taking a drink of water or other fluid. The moisture and motion of the parts usually removes or makes the secretions pliant, thus relieving the pain. Occasionally there is pain in the ear and the region immediately along the course of the styloid group of muscles. This is complained of more particularly when deglutition or yawning occurs. The pain is frequently complained of when the tympanum is not inflamed. In such cases it seems to be purely reflex in character.

Epistaxis.—Profuse epistaxis can not be said to be of frequent occurrence in nasal catarrh, while capillary oozing may occur in almost any case. In cases where the nares are in an eczematous condition, hemorrhages occur most frequently. Indeed, there are certain classes which might be styled as hemorrhagic cases. In those cases the secretion is scant, and the membrane is usually glazed, dry, and fissured or cracked. The slightest touch is sufficient, in such cases, to produce hemorrhage. The bleeding is not profuse, and the blood is of a watery or serous character. The hemorrhage is usually from the anterior nares. It is stated by some that “epistaxis is a well known and troublesome symptom.” This seems to be contrary to the general opinion, and I am not prepared to concur with the statement, as clinical experience does not afford sufficient proof to sustain it.

The appearance presented by the membrane is of the utmost importance, as it affords an index which is indispensable in making a thorough diagnosis. In order to be able to recognize the various changes that are brought about in the membrane by disease, it is absolutely necessary to be thoroughly conversant with its appearance in a healthy state. No amount of reading will enable any one to obtain a sufficient knowledge on this point. Nothing but clinical experience affords an opportunity of studying the membrane in its various conditions. The membrane, when not covered by secretions, usually presents an engorged appearance; the individual blood vessels are not traceable, although they may be discernable in some cases. In the majority of instances the surface is a bright, dusky red, and not pink, as in health. In many cases it is impossible to distinguish an individual blood vessel. This condition of affairs is induced by a uniform turgescence of the whole capillary system of blood vessels in the structure. The membrane in such cases is not usually relaxed in the nasal cavities and posterior wall of the pharynx; but, on the contrary, it seems to be rather tense, while in the region of the faucial orifices of the Eustachian tubes it is frequently observed to be in a lax state. In other cases, and at other times during the course of the disease, the membrane presents a spongy appearance, and bleeds on the slightest provocation. As a rule the secretions are rather scanty in these bleeding cases; at all events they are not profuse.

There is another class of cases in which there is extreme relaxation, so much as to render nasal respira-

tion impossible. The greatest amount of relaxation occurs in the membrane covering the inferior turbinated bones and the anterior portion of the septum. The redundant structures may be mistaken for a polypus, and in some cases a correct diagnosis will be difficult to make unless the proper light and instruments are at hand. In these cases the secretions are usually profuse, and composed almost exclusively of tenacious mucus. The membrane is inclined to be pale, which is a peculiarity that characterizes this one phase of the disease. In cases of long standing it is not uncommon to find the greater portion of the surface of the membrane covered with inspissated secretions. Nasal respiration in these cases is always very much interfered with, in many instances necessitating respiration through the mouth. When the crusts are removed there may be slight hemorrhage, which is generally due to the rupture of some small vessel by the instrument used in propelling the fluid into the cavities, or by the forcible removal of the accumulation, which produces a breach of continuity in the surface of the membrane. Again, the hemorrhage may result from capillary congestion, which is brought about by the application of the cleansing solution. It is not an unfrequent occurrence to see considerable epistaxis follow the application of strong solutions of the muriate of ammonia or the bromide of potassium.

There is another class of cases that might be very properly called the eczematous cases. This class is met with more frequently in children of strumous diathesis; in fact, it seems to be confined almost exclu-

sively to such subjects. The eczematous crusts are found more frequently in the region of the anterior nares, and usually form on the inner surface of the alæ and anterior portion of the septum. They are also found on the membrane covering the lower portion of the inferior turbinated bones, and rarely met with elsewhere. These crusts are formed principally by the exudation of a sero-san-guinolent fluid, which dries very rapidly, and becomes exceedingly hard, and they adhere to the membrane so closely as to render removal very difficult and painful. It is not an infrequent occurrence to find the anterior nares completely occluded by these crusts. Hardened secretions may be mistaken for carious or necrosed bone. This is the class of cases which are frequently complicated with severe frontal headache, loss of smell, and fetid odor. The odor which is present in cases of chronic catarrh may proceed from three sources, viz. : from decomposing secretions, from ulceration of the soft parts, and from diseased bone. When an offensive odor is emitted from the nose it is termed ozena. It is thought by many that unless there is destruction of the osseous tissues connected with the naso-pharyngeal space, or those within its cavities, that there will be no ozena ; such is a mistaken idea, for it may result, as stated above, from destruction of the soft parts, decomposition of secretions, or accumulation of blood. In some instances the membrane covering the posterior wall of the pharynx presents a regular thickened appearance, and is constantly bathed in tenacious mucus or muco-pus. In those cases there is a continual desire to expectorate.

The second form of chronic moist catarrh differs but little from the first, except that there is an aggravation of all the symptoms that are present in the former, and occasionally a new one added. The secretions are composed almost entirely of pus, and present a creamy, yellowish, or greenish appearance. The headache is always more severe and constant than in the former. An offensive odor is frequently met with in those cases where the secretions become inspissated and remain in the cavities. The osseous and cartilaginous structures are occasionally invaded. The soft structures are also implicated in some cases, and may be involved when the osseous tissues remain in perfect condition.

The causes of these two forms are the same, usually being the result of neglected acute disease, polypus, foreign bodies in the passages, etc. The purulent form, as before stated, may be the result of contagion. The prognosis of muco-purulent and purulent naso-pharyngeal catarrh is favorable to a certain extent if the proper plan of treatment is instituted and carried out. It is favorable as regards the arrest of the inflammatory process; but it is not possible to restore the impaired functions and form of the organ.

CASE VI.—*Chronic Moist Catarrh, with great relaxation of the nasal mucous membrane, and invasion of the tympanic cavities.*

Mr. J——, aged 17 years, was brought to me by his father December 26, 1878, who stated that his son had

great difficulty in breathing through the nose, and that he was constantly spitting and hawking. There was occasional pain in the region of each drum cavity. The membrani tympanæ were slightly congested along the course of the handle of the malleous, and there was more or less tinnitus in both ears. The watch was heard at thirty-six inches on both sides. The sense of smell was impaired. The membrane covering the inferior turbinated bones and the anterior part of the septum was thickened and relaxed to an extent sufficient to render nasal respiration impossible. The secretion was muco-purulent in character.

Treatment: Saturated solutions of the bromide of potassium were used for four or five weeks without any benefit. I then removed as much of the relaxed membrane from each side as could be included within the range of an ordinary pair of angular scissors at one cut. Profuse hemorrhage followed, which was arrested by the application of Monsel's solution of the per-sulphate of iron. After the lapse of several days, when the parts had healed, the bromide solution was again applied with the atomizer as before, and was followed by a solution of three grains each of carbolic acid and hydrate of chloral to the ounce of water. Nasal respiration was perfectly free after the excision of the redundant membrane. The local applications were continued until May, 1878, when all symptoms of the disease had disappeared, with the sense of smell completely restored.

CASE VII.—*Chronic Moist Catarrh.*

G. D. P—, aged 38, white, a railroad engineer, consulted me January 14, 1875, stating that he had catarrh of the nose and pharynx. Examination of these organs verified his statement. The membrane covering the inferior turbinated bones, and that in the region of the posterior nares and faucial orifices of the Eustachian tubes, was very much relaxed and bathed in a thick muco-purulent secretion. Expectoration was profuse; and the constant hawking rendered the patient disagreeable to himself and his associates. The disease had existed about four months, being very much worse at some times than others. His general health was excellent.

Treatment: The treatment consisted in having the parts thoroughly cleansed two or three times a day with a solution of one drachm of the muriate of ammonia to the ounce of water. Soothing astringents were applied immediately after the parts were cleansed. At the end of six weeks the patient was well.

CASE VIII.—*Chronic Moist Catarrh, with chronic suppurative otitis media.*

L. B. S—, aged 11 years, was brought to me by her mother on the 10th of March, 1878. At the age of two years she had an attack of scarlatina, which left her with catarrh and suppuration of both tympanic cavities. The right drum membrane was perforated in

the center and the left in the posterior portion. The mucous membrane of both tympanic cavities was inflamed and discharging a muco-purulent secretion. The audition was sufficient to enable the patient to hear ordinary conversation across a medium-sized room. The nasal cavities were full of decomposing secretions, which emitted a very offensive odor. When the cavities were cleansed several small abrasions were found in the surface of the membrane. The sense of smell was considerably improved by the removal of the decomposing secretions, thus showing that the impairment was obstructive. The ears could be inflated by Valsalva's method. The tonsils were enlarged and interfered with respiration when they were acutely inflamed.

Treatment: The tonsils were scarified, or, more correctly speaking, they were sliced to a depth sufficient to cause free sloughing, after which they were very much reduced in size and caused no further inconvenience. The ears were syringed out once in twenty-four hours, and sometimes oftener, with a weak solution of the bicarbonate of soda; and after they were cleansed a solution of fifteen grains of carbolic acid and ten grains of the sulphate of zinc to two ounces of water was dropped into each ear. The nose was cleansed with a solution of the chloride of sodium, and afterward sprayed with a solution of three grains of the hydrate of chloral and three of carbolic acid to the ounce of water. This treatment was continued until the following November, when the catarrh had disappeared and the ears ceased to suppurate. The hearing was much improved.

CASE IX.—*Chronic Moist Catarrh, with dacryo-cystitis and lachrymal fistula.*

Mrs. M—, aged 45, consulted me on March 3, 1877, and stated that five years previous she contracted an acute catarrh, which became chronic. The voice was very much impaired, and the sense of smell almost completely destroyed. The nose was full of decomposing secretions, and not only was the pharyngeal walls covered with inspissated mucus and pus, but there was a solid mass of decomposing secretions occupying nearly the whole upper part of the pharynx. It projected down sufficiently to be seen through the mouth. The odor emitted from the nose and pharynx was offensive and nauseating. No amount of spraying and syringing would remove the mass from the pharynx. After some difficulty it was detached by means of a stout iron probe. The patient was unable to remove it after it was detached, and it had to be drawn out with a pair of forceps. There was no complication save that of dacryo-cystitis, with lachrymal fistula.

Treatment: The canaliculus was slit up, and the stricture, which was located in the nasal duct, was dilated with Bowman's probes until the canal was restored to its natural size. In the meantime the lachrymal sac was syringed out with a solution of carbolic acid and sulphate of zinc, ten grains of the former and five of the latter to the ounce of water. In six weeks the fistulous opening closed, and the inflammation of the sac subsided. The nose and pharynx were cleansed with a saturated solution of the muriate of ammonia, which

was followed by soothing applications. The posterior walls of the pharynx were touched with a two-drachm solution of iodine crystals* every third day for two weeks, when its use was discontinued. The cleansing and soothing applications were continued until September, 1877, when the patient was discharged cured.

CASE X.—*Chronic Moist Catarrh, with ozena.*

Miss C——, aged 18, white, called on me in February, 1875, and stated that she had suffered with catarrh for five years. The nasal cavities and the superior part of the pharynx was almost filled with decomposing secretions, which were of a semi-solid consistence, and emitted an exceedingly offensive odor. The sense of smell was very much impaired; but this was due to the passages being obstructed by the secretions, for when the nose was clean the sense of smell was perfect. The irritation produced by the secretions accumulating in the pharynx was so intense that it kept the patient constantly hawking and spitting. The frontal headache was very severe and almost constant. The removal of the inspissated secretions was frequently attended with considerable hemorrhage. There was no diseased bone to be detected. The patient had been under the care of a number of practitioners, most of whom had ordered solutions of the nitrate of silver or sulphate of zinc to be applied by means of an ordinary syringe.

Treatment: The treatment in this case was difficult on

* See section on Therapeutics.

account of the passages being narrow, thus favoring the retention of the secretions. It was necessary for me to cleanse the nose once a day for three weeks, as the patient was unable to do so by any amount of washing and spraying. The principal cleansing agents were strong solutions of the muriate of ammonia and chloride of sodium. The strength of the solution was varied, from a drachm to the ounce, to saturation. Applications were made with the post-nasal syringe and atomizer. It was frequently necessary to remove the crusts by means of a probe. Solutions of carbohc acid, permanganate of potassa, hydrate of chloral, and Labarraque's solution were used with a view of destroying the offensive odor. At the beginning of the fourth week the offensive odor had disappeared and the patient could keep the nose clean from day to day, and by the end of the fifth week her condition was such as to only necessitate coming to the office once in four days. The treatment was continued until the following June, when the patient was discharged cured, with the sense of smell perfect. In addition to the local treatment, cod-liver oil and iron were administered internally.

CASE XI.—*Chronic Moist Catarrh, with great relaxation of the membrane.*

Mr. T——, aged 55, white, was admitted into the Eye and Ear Department of the Louisville City Hospital March 1, 1877. The patient stated that he had been afflicted with catarrh of the nose for fifteen years, and

that it had recently become very much worse, and that nasal respiration was so embarrassed as to prevent his sleeping more than three hours in the twenty-four. The discharge of glairy mucus from the nostrils was abundant. The frontal headache was constant and severe. The voice was altered, having a peculiar nasal sound. The membrane lining the cavities of the nose and pharynx was considerably thickened and relaxed. There was occasional closure of the Eustachian tubes, which produced temporary deafness. The patient was pale and anæmic, with no appetite.

Treatment: First of all, good diet, such as beefsteak, eggs, milk, and such vegetables as his cravings might call for. In addition to the diet he was allowed a liberal amount of good whisky, with iron and quinine as a tonic. The local medication consisted in the application of a solution of equal parts of a saturated solution of the muriate of ammonia and a solution of five grains each of carbolic and tannic acids to the ounce of water. The medicine was applied principally with the post-nasal syringe. Under this treatment the patient improved so rapidly that by the 7th of April he was able to sleep six or eight hours in succession. His general health improved, and he was discharged cured in the following June.

CASE XII.—*Chronic Moist Catarrh, with frequent attacks of the acute form of the disease, accompanied by severe bronchial irritation.*

Mrs. ——— consulted me on the 28th of February,

1878, stating that she had been afflicted with catarrh of the nose and pharynx for nearly twenty years, and that she frequently had violent attacks of the acute disease, which often lasted for a week and even longer, and that during these attacks she was unable to sleep until almost exhausted. The right drum membrane was slightly opaque; audition in both ears was unimpaired. The Schneiderian membrane was congested and relaxed to such an extent as to prevent nasal respiration. The secretions were composed almost entirely of tenacious mucus. Expectoration was profuse; the pharyngeal walls presented marked evidences of the lavish use of caustics. The fauces, larynx, and bronchial tract were exceedingly irritable, a full inspiration being quite sufficient to induce a paroxysm of coughing, which was usually very severe. The epiglottis was slightly congested. The patient experienced a feeling of oppression about the chest, and said that it was difficult for her to take a full inspiration. The expectorated mucus was so tough and ropy as to render its removal from the pharynx very difficult.

Treatment: The patient informed me that she had taken almost every conceivable drug with a view of relieving herself of her present ailment. The iodide of potassium was suggested. She at once stated that she had taken that drug in five-grain doses for several days on different occasions without any apparent benefit. Notwithstanding her assertions in regard to the iodide, it was ordered in ten-grain doses every four hours, with directions to double the quantity each day until some evidences of its effects were manifested.

The local medication consisted in the application of a solution of one hundred and eighty grains of the muriate of ammonia to two drachms of glycerine and six of water, which was followed by a solution of three grains of tannic acid and two of carbolic acid to the ounce of rose water. The applications were made with an atomizer. March 4th, the oppressive feeling about the chest had disappeared, nasal respiration was re-established, and the secretions had become thin and watery. Expectoration was easy, and the quantity of mucus very much lessened. On the 7th of March all acute symptoms had subsided, and the patient was comfortable aside from the chronic catarrh which still existed. The iodide was reduced to twenty grains per diem, and continued in that dose until about the middle of April, when it was withdrawn. The local applications were not materially changed, except that the bromide of potassium was substituted for the muriate of ammonia toward the latter part of June, and continued until August, 1879, when the patient was discharged cured.

CASE XIII.—*Chronic Moist Catarrh, invading both tympanic cavities.*

Miss N——, aged 13 years, was brought to me in March, 1876, by a medical friend, who stated that she had been suffering from catarrh for several months. The drum membranes were congested and slightly opaque. At times there was considerable pain in the ears. Hearing was impaired to such an extent that the

patient was unable to perceive the sound of a watch unless the instrument was in contact with the ears. Nasal respiration was difficult, and at times impossible. The sense of smell was impaired. The Schneiderian membrane was inflamed, relaxed, and bathed in mucus. There was some swelling and tenderness across the upper third of the nose, with slight frontal headache at times.

Treatment: The drum cavities were inflated by means of the Eustachian catheter and air-bag, and a quantity of mucus blown out with counter currents of air. It was necessary to repeat this operation several times; but finally the hearing was completely restored and there was no further trouble with the ears. It was necessary for the patient to visit the office three times a week for two months. At these visits I cleansed her nose and pharynx with a solution of the muriate of ammonia in the proportion of one ounce to eight ounces of water. The solution was usually applied with the post-nasal syringe, and if this failed to remove all the secretions the atomizer was used until the naso-pharyngeal cavities were thoroughly clean. After cleaning, the cavities were sprayed with a solution of five grains each of carbolic and tannic acids to the ounce of water. In the intervals between the visits to the office, the patient used the above agents three times a day with an atomizer. The treatment was kept up until the following November, when the patient was discharged cured.

CASE XIV. — *Chronic Moist Catarrh, with suppurative otitis media.*

Mr. T. A——, aged 18, white, brass finisher, consulted me May 19, 1877, and stated that for the last eighteen months he had been very much annoyed by an offensive discharge from the nose and pharynx. In February, 1877, he placed himself under the care of a general practitioner, who sought the advice of a specialist, and, according to the directions of the consulting physician, the doctor proceeded to inject the nose and pharynx with a caustic solution, using the catarrhal syringe, and being ignorant of the manner in which the instrument should be manipulated, the patient was ordered to hold the tongue out of the mouth while the solution was thrown into the pharynx, and the result of this procedure was strangulation and flooding of the drum cavities, which produced the most excruciating pain for several hours, and terminated with perforation of the drum membranes. At the time I first saw him there was a profuse discharge of pus from both ears, with a perforation of each drum membrane. The nasal cavities were filled with decomposing secretions, which emitted an offensive odor. The sense of smell was slightly impaired. The hearing equaled the watch in contact.

Treatment: The treatment consisted in cleansing the ears once each day by the use of the Eustachian catheter and air-bag, and blowing a solution of carbolic acid and sulphate of zinc into the drum cavities. In less than six weeks the perforated drum membranes had

closed, and in a short time the hearing was quite restored. The catarrh was treated with muriate of ammonia, followed by soothing astringents and deodorizers. The treatment was kept up until November, 1877, when the patient was discharged cured.

CASE XV.—*Chronic Moist Catarrh.*

Mr. N. F——, aged 30 years, consulted me in March, 1877, and stated that for four years he had been very much annoyed with the sensation of a foreign body substance in the region of the posterior nares and posterior surface of the soft palate, and that he was obliged to make frequent and violent efforts by hawking to remove it. There was a feeling of warmth and dryness in the pharynx. The sense of smell was perfect. The membrane lining the nose and pharynx was glazed; the secretions were of a muco-purulent character. The patient had frequent acute attacks of the disease, which usually subsided in two or three days.

Treatment: A solution of one hundred and eighty grains of the muriate of ammonia to the ounce of water was applied two or three times a day with the atomizer for six weeks. At this time the membrane was exceedingly sensitive and the strong solution was withheld, and a solution of thirty grains of the muriate to the ounce of water was used until the following November, when the patient was discharged cured.

CASE XVI.—*Eczematous Rhinitis.*

Mattie F—, aged 9 years, was brought to me in the month of May, 1875, by her father, who stated that for three months crusts had been accumulating about the nostrils and lips, so as to frequently interfere with nasal respiration; and that their removal was difficult and painful. The membrane lining the inferior portions of the nasal cavities was very much congested and swollen. The secretions, save those which were in the region of the anterior nares, were scanty, and composed principally of tenacious mucus. The general appearance of the patient was that of a strumous individual.

Treatment: The treatment consisted in the local application of a solution of carbolic acid of five grains to the ounce of water. This was thrown into the nose two or three times a day with the atomizer. The crusts were removed once a day and the open surface touched with a half-drachm solution of iodine.* In addition to the local medication, the iodide of potassium was freely administered internally. Under this plan of treatment the disease rapidly disappeared, and she was discharged cured on the first of the following July.

CASE XVII.—*Eczematous Rhinitis.*

Miss R—, aged 7 years, was brought to me by her mother August 11, 1877. Her general health was ap.

* Vide section on Therapeutics.

parently good, notwithstanding she had recently had several attacks of intermittent fever. She had several small flecks around the margin of each cornea, just within the ocular conjunctiva. The tonsils were slightly enlarged, and the nasal mucous membrane thickened. The region of the anterior nares and the upper lip were covered with eczematous crusts, which so obstructed the passages as to interfere very materially with nasal respiration. The pharyngeal mucous membrane was congested, with a quantity of brownish looking muco-pus deposited upon its surface.

Treatment: The treatment consisted in the free administration of quinine internally to break up the malarial paroxysms, which occurred every few days. A solution of the sulphate of atropia of one grain to the ounce of water was instilled into the eyes three times a day. The nose and pharynx were sprayed three times a day with a solution of fifteen grains of the bromide of potassium to an ounce of water. She was discharged, cured, August 29, 1877.

CASE XVIII.—*Eczematous Rhinitis.*

Jane McD——, age 12 years, was admitted to the Louisville Eye and Ear Infirmary April 12, 1878, suffering with phlyctenular keratitis and eczematous rhinitis. There were a few small vesicles at the juncture of the cornea and sclerotica, with considerable lachrymation and photophobia. The Schneiderian membrane was inflamed and inclined to bleed upon slight

provocation. There was little or no secretion from the nose, and no unusual amount of expectoration. The nostrils were almost or quite occluded by eczematous crusts, which extended down on the lip to considerable distance.

Treatment: Quinine was administered internally, and a solution of atropia dropped in the eyes two or three times a day. The crusts were softened with a solution of the bicarbonate of soda and removed once a day, and the open surface anointed with a salve of ten grains of the yellow oxide of mercury to the half an ounce of glycamil. At the end of six weeks she was discharged cured.

She had another attack in September of 1879, which was not so severe as the first, and which was cured by a similar plan of treatment.

It will be seen that two of the three cases reported under this head were complicated with malaria and phlyctenular ophthalmia. These two complications are frequent in this locality. It is thought by some observers that phlyctenular ophthalmia is produced by this peculiar form of catarrh; and there can be little doubt but that such is the case.

CHRONIC DRY CATARRH.

Dry catarrh may be subdivided into dry atrophic and proliferous. The dry form is not a catarrhal inflammation, as defined by most authors, the characteristic feature, the increased secretion, being absent.

Dry Atrophic.—In dry atrophic inflammation of the Schneiderian and pharyngeal mucous membrane, the nasal cavities are usually free and capacious, unless there should be some malformation of the bony or cartilaginous structure. Nasal respiration is perfect, the membrane is pale, and seems to be drawn closely over the irregularities of the cavities, and is entirely free from any secretion whatever. There is frequently a few dry, mealy-looking scales about the anterior nares. When the disease invades the pharynx, the membrane covering its posterior wall presents a dry, glazed, and attenuated appearance, and seems to be very thin. There is always a sense of dryness, which is exceedingly annoying when the membrane covering the posterior surface of the soft palate and posterior nares is involved. The pathological change is just the opposite in this form of the disease to what it is in proliferous rhinitis. The etiology of this peculiar form of nasopharyngeal disease is a matter about which there is but little known. It is supposed by some to be the result of sleeping with the mouth open. This may possibly assist in bringing about the disease by inducing dryness of the fauces and Schneiderian membrane. The injudicious use of caustics probably has much to do in

establishing this abnormal condition. The most common form of caustic application is that which results from the smoking of tobacco. It is well known that tobacco contains a large amount of nitrate of potash, which, being oxydized by the burning, is rapidly converted into the caustic form.

Treatment: These cases may be palliated, but a permanent cure is not to be expected. The local application of stimulating agents, such as iodine in combination with glycerine and iodide of potassium, and persistent nasal respiration both day and night, are about the most efficient means of alleviating the deplorable state. If there is any difficulty about keeping up constant nasal respiration it may be done by wearing a mask over the mouth. This will usually be necessary at night.

Proliferous Rhinitis.—In proliferous rhinitis the membrane is considerably thickened, and is of a pale, pinkish hue in the anterior portion of the nasal cavities, causing it to resemble the integument in color. There is almost an entire absence of the normal secretions; the membrane presenting a velvety appearance. The thickening in these cases is due to an increase in the connective tissue cells. What it is that induces the increase in the cell element of the connective tissue in this locality is to be conjectured. It may be due to local inflammatory action, or mal-nutrition from other causes, as a deranged circulatory or lymphatic system. I am inclined to believe that the change is brought about by constant irritation of the vaso-motor nerves in the affected locality. The irritation of these nerves would undoubtedly invite an extra amount of blood,

which would tend to increase the bulk of the structures just in the same manner that any other tissue may become hypertrophied by an increase in its circulation. The inflammation sooner or later extends to the pharynx, thence to the Eustachian tubes, and, lastly, to the tympanic cavities. The tympanum and Eustachian tubes may escape for a considerable time; they generally become involved, but the invasion is so gradual that the patient is not aware of the affliction until considerable damage has been done.

Tinnitus aurium is one of the earliest signs of the invasion of the tympanum in these cases, and should always receive the proper consideration in this connection. While tinnitus aurium of itself is not significant of the presence of any special malady, it is always well to determine its cause if possible, for it is often due to narrowing of the faucial orifices of the tube.

Impairment of the hearing usually accompanies or follows the tinnitus. The drum membranes may be depressed or opaque. The defect in the hearing is usually slight at first, and if allowed to continue the patient becomes gradually worse until the power of audition is practically lost. Suppuration of the middle ear rarely occurs in connection with dry catarrh, and there is little or no pain accompanying the ear complications.

Anosmia is usually present in this form of disease. It may be due to organic changes in the olfactory membrane, or it may be caused by the thickened membrane obstructing the passages and preventing odors from coming in contact with the regio olfactoria. Nasal

respiration is usually more or less impaired. The voice is changed when the membrane is much thickened. The frontal headache, which is frequently met with in other forms of catarrh, is ordinarily absent in this form of the disease.

Epistaxis, so common in other forms of rhinitis, is rarely met with in the so-called dry catarrh.

The prognosis of this form of rhinitis should always be guarded. If the disease is taken in its incipiency there is a fair chance of arresting it, and preventing extension to other organs; but if the Eustachian tubes and tympanic cavities are involved, it is doubtful if we can do more than arrest its progress and keep the disease in abeyance.

Treatment: This is an affection that in all probability is more or less influenced by the so-called strumous diathesis, and therefore demands special attention. The iodide of potassium is possibly the most valuable agent we have in the treatment of hypertrophy, whether it be in the nasal membrane or other tissues of the body. It seems to possess a peculiar influence on the thickened membrane. It should be given freely until symptoms of iodinism are manifest, and then withheld a few days and repeated again, and the patient kept on the verge of iodinism for weeks at a time. The bi-chloride of mercury may be given in small doses, but it is not so efficient as the iodide. The muriate of ammonia proves beneficial in some instances, and should not be lost sight of in the course of treatment. Local applications must be of a stimulating nature, such as saturated solutions of the muriate of ammonia, bromide of

potassium, solutions of iodine, etc. (See section on Therapeutics.) Caustics should never be applied under any circumstances, as harm must necessarily result from their use.

CASE XIX.—*Dry Atrophic Rhinitis and Pharyngitis.*

John S—, carpenter, was admitted into the Louisville City Hospital December 17, 1878. His general health was good, and the only inconvenience which he experienced was an excessive dryness in the nose and pharynx. The Schneiderian membrane was perfectly dry and glazed, and very much attenuated. The vocal chords were congested.

Treatment: The walls of the pharynx were touched once a day with a solution of one drachm of iodine to the ounce of glycerine. In addition to this, the nose and pharynx were sprayed twice a day with a saturated solution of the muriate of ammonia. Respiration was carried on through the mouth as much as possible. After a trial of three months the patient was discharged, without improvement.

CASE XX.—*Dry Atrophic Rhinitis and Pharyngitis.*

Susan J—, aged 41, colored, cook and washer-woman, consulted me in March, 1877, and said that for several years she had suffered with a dry throat, which frequently kept her from sleeping. The pharynx was

as dry as the palm of the hand, and the membrane attenuated. The nasal mucous membrane was also diseased to an extent sufficient to completely destroy the sense of smell. The membrane here, as in the pharynx, was dry and attenuated, and free from secretion of any kind whatever.

Treatment: The treatment in this case consisted in the application of the iodine solution as in Case XIX, with the addition of almost every conceivable agent that was thought to have any special tendency to increase the activity of the mucous follicles. There was considerable improvement at times, but it was not permanent. This woman had been an inveterate pipe-smoker for twenty years, which no doubt had much to do with the production of the disease.

CASE XXI.—*Chronic Proliferous Rhinitis, invading both tympanic cavities.*

James R—, aged 14 years, was brought to me in March, 1876, by his father, who stated that the boy's hearing had been failing for two years. There was occasional pain in the region of the drum cavities. The hearing on the right side equaled the watch in contact; on the left side the sound of the watch could not be perceived at all. The membrane lining the nose was thickened, and free from any secretion whatever. The posterior wall of the pharynx was studded with neoplasms. The tonsils were very much enlarged; and the Eustachian tubes were both closed. The drum mem-

branes were slightly depressed, and there was congestion along the course of the handle of the malleus on both sides. There was considerable tenderness about the faucial orifices of the Eustachian tubes.

Treatment: The tonsils were sliced sufficiently to produce free sloughing, which reduced the size of the glands very materially, and enabled the patient to breathe with much more comfort than previously. The Eustachian tube on the right side was catheterized twice a week, and a single drop of a solution of the bi-chloride of mercury, one grain to the ounce of water, was blown into the tube and drum cavity. The cavities of the left side of the nose were so distorted as to prevent the introduction of a catheter, and the ear on that side was inflated by Politzer's method. The nose and pharynx were sprayed twice a day with a saturated solution of the muriate of ammonia. The iodide of potassium was given internally in full doses. The above plan of treatment was kept up for about four months. There was a decided improvement in all the symptoms. The hearing in the right equaled $\frac{8}{36}$, and in the left $\frac{3}{36}$. The patient became dissatisfied because the improvement was not more rapid, and discontinued the treatment.

CASE XXII.—*Chronic Proliferous Rhinitis, invading both tympanic cavities.*

Mr. D— consulted me in June, 1877, and stated that he had been annoyed more or less for fifteen years

with tinnitus aurium, which at times was distressing. He was not certain, but thought his hearing had been failing for ten years. The watch could only be heard when in contact with the ears. The membrane lining the nose and pharynx was very much thickened, and at times was inclined to be moist. Respiration through the nose was difficult, and the voice had a peculiar nasal sound. The membrane in the region of the faucial orifices of the Eustachian tubes was thickened to such an extent as to nearly close them. The drum membranes were opaque and depressed.

Treatment: The tympanic cavities were inflated by the catheter and air-bag. This was repeated on several occasions, but without the slightest benefit. A single drop of a solution of one grain of the bi-chloride of mercury to the ounce of water was thrown into the drum cavities every fourth day for three weeks. The nose was sprayed twice a day with a saturated solution of the muriate of ammonia. The catheterization was discontinued at the end of the third week, and the ammonia solution at the end of the sixth week. There was not the slightest improvement, and, feeling satisfied that the patient was not to be benefited, I advised him to discontinue treatment.

CASE XXIII.—*Chronic Proliferous Rhinitis, invading the drum cavities.*

Mr. W— called on me in May, 1877, and stated that for two years he had been gradually losing his

hearing. There was no pain in either ear. The hearing on the right side equaled $\frac{2}{36}$, and on the left $\frac{4}{36}$. The drum membranes were opaque and depressed. The Schneiderian membrane was thickened and pale, presenting more the appearance of integument than mucous membrane. The Eustachian tubes were closed, but could be easily inflated.

Treatment: The nose was sprayed every third day with a saturated solution of the muriate of ammonia. In the intervals a solution of sixty grains of the bromide of potassium to the ounce of water was used three times a day with the atomizer. This treatment was kept up for two months, at the end of which time the hearing equaled $\frac{12}{36}$ in both ears. The patient concluded that his hearing was sufficiently restored, and discontinued the treatment. He has retained all that was gained by the treatment, never having suffered a relapse.

CAUSES OF CATARRH.

The causes are numerous, among the most common are contagion, trauma, atmospheric influences, germs, irritants (rose perfume), inhalation of acrid gases.

Contagion.—“Among the laity it is regarded as an incontrovertible fact that a cold in the head may be communicated from one person to another, both by

direct contact with the secretion (as in using the same handkerchief, etc.), as well as by mere approximation of the diseased organ to the healthy one—in the act of kissing, for instance.” It can not be denied that there is a great deal of evidence in favor of the theory of contagion, and yet a sufficient amount of positive proof has not been collected to establish it as fact, and therefore to declare it as such would be unwarrantable. But, nevertheless, I am quite certain that naso-pharyngeal catarrh, in an advanced stage, is a contagious disease. It is a well-known fact that the Schneiderian membrane can be inoculated by placing pus cells on its surface. This, however, is a fact that most practitioners can testify to, having, in the course of their practice, met with cases of gonorrhœal rhinitis which were unmistakably the result of contagion. It may be claimed that gonorrhœal virus possesses some specific properties which render it more infectious than the secretions of a purulent rhinitis arising from atmospheric causes. It is impossible to determine the difference between specific and non-specific urethritis; and, likewise, it is just as impossible to determine the difference between gonorrhœal conjunctivitis and the purulent conjunctivitis resulting from atmospheric causes or ordinary traumatic injuries, followed by suppuration. The same is true of purulent rhinitis. Many attempts have been made to demonstrate the contagiousness of catarrh by inoculating the nasal mucous membrane with secretions taken from the noses of individuals suffering from catarrh in its various stages. The results so far have been negative; but I think that the causes

of failure are to be accounted for in many ways, as they are numerous and difficult to avoid. First of all, there can be no doubt but that the activity or virulence of the secretions in cases of gonorrhœal conjunctivitis or rhinitis depend to a great extent, if not altogether, upon the number of pus cells and their condition at the time of inoculation. I do not believe that there is any difference in the activity of pus cells when they arrive at maturity, unless they possess some specific property aside from that of the cell found in cases of ordinary inflammation; it matters not whether they are taken from the urethra, vagina, conjunctiva, or Schneiderian membrane. And, furthermore, it must be conceded that there is a period during the course of all suppurative diseases in which the contagious element is particularly active. The time at which this activity is manifested can not be positively determined, but it is fair to presume that it occurs when the greatest number of pus cells are being eliminated, as these bodies, or the "granular matter" resulting from their degeneration, are known to contain the propagating germs or particles. Taking the above view of the matter, failure to inoculate may depend upon the condition of the secretions at the time of their transfer, or upon the quantity placed on the membrane. In addition to these, the locality upon which infectious pus is placed would have a great deal to do with its producing the desired result; because the membrane lining the anterior nares and the inferior meatus is much less sensitive than that covering the middle and superior turbinated bones, therefore pus cells coming in contact with the membrane of the former

locality would not be so apt to reproduce themselves as if they were deposited in the superior cavities of the nose. Again, the secretions of the nasal mucous membrane may be so profuse as to wash the infectious material off, or the membrane may be so dry as to render it inert, and it remains upon the thin crust of inspissated mucous until the whole is removed from the cavity.

There can be no doubt but that many cases of acute catarrh which are met with in new-born children are the result of contagion, the membrane having become contaminated by the vaginal secretions of the mother during birth. An allusion is made to this by Herm. Weber, in Ziemssen's Cyclopedia, vol. iv., page 119: "A well-developed boy, whom they were not able to wash until some three hours after his birth, and whose mother, during the last weeks of pregnancy, had shown an abundant vaginal leucorrhœa, soon developed a yellow discharge from his nose, and inflammation of the left eye, with secretion of pus. In the same way, on closer examination, it will be found that by far the larger proportion of cases of coryza neonatorum arising within the same period as the ophthalmia of that age, and sometimes associated with it, is to be attributed not to taking cold immediately after birth, nor to a peculiar susceptibility of the mucous membrane, but to an infection in the vagina of the mother. At least in almost all cases of coryza neonatorum that I have investigated I have been able to show the existence of lucorrhœa in the mother."

The snuffles which is said to be pathognomonic of inherited syphilis in the infant is doubtless in many

instances due to coryza, instead of any hereditary taint. I am inclined to believe that snuffles, as spoken of in this relation, is in no way connected with syphilis. There is nothing peculiar about the secretion that would serve to distinguish it from that of ordinary coryza. The membrane in many cases where the snuffles is present does not show any evidences that would lead us to believe that the affection was anything more than common catarrhal inflammation. I have not seen a case of syphilitic coryza in which there was not a breach of continuity in the Schneiderian membrane, or an involvement of the bony or cartilaginous structures.

The following is a description of syphilitic coryza of infants as found in the recent work of Dr. J. Solis Cohen;

“Much more frequently, however, the disease is manifested in the form of fibrinous coryza, which, in accordance with the opinion of Diday and others, is probably due to the development of mucous patches upon the mucous membrane of the nose. The earliest evidences of the disease is then some impediment to free nasal respiration and consequent embarrassment in nursing; the symptoms being similar at first to those of ordinary coryza. After a short time a thin serous liquid drips from the nose, soon becoming thicker, purulent, and somewhat sanguinolent. The lips sometimes become excoriated by the acidity of the discharge. The nasal passages become more and more occluded, and as this condition increases, the child, while suckling, is forced to take rapid respirations through the nose; this dries up portions of the secretions into crusts, which are discharged from time to time, with more or

less hemorrhage. Finally, these crusts accumulate more rapidly than they can be discharged, and complete obstruction of the nose ensues. When this is the case, great difficulty is experienced in nourishing the child, because it is unable to breathe while at the nipple. It seizes the breast eagerly, but is compelled to drop it almost immediately, and thus rendered cross and fretful. As the disease progresses specific pustules, fissures, and ulcers become developed upon the alæ of the nose and upon the lips, and at the angles of the mouth, and extend outward upon the cheek along the natural fissures of the skin. In this manner, sometimes, peculiar striated appearances are produced, which, according to Prof. Trousseau, are characteristic of syphilis, and are true mucous crusts, though not exactly of the same aspect as in the adult; their size being smaller the greater their distance from the mucous membrane of the lips; their edges are finely fringed and blackened by the adherence of coagulated blood; and they have gristly and bleeding bottoms, more or less bright red in color. Prof. Trousseau states that they often leave indelible cicatrices after recovery, and that he has seen young men and young women still carrying these scars-stigmata, the nature of which they did not suspect.

“As the disease of the nasal passages progresses, ulceration takes place in the structures of the nose also, often destroying the cartilages and the bones, fragments of which are thrown off with the crusts. In this way the septum often becomes perforated, and sometimes the nose flattened. Some cases of so-called

scrofulous perforation of the septum in the adult are of infantile specific origin. Sometimes the general system is poisoned by the exhalations of the decomposing secretions in the nose, and death ensues in consequence. This syphilitic coryza is sometimes the only manifestation of hereditary syphilis, and, according to Trousseau, the earliest sign of the disease in almost every instance."

The flow of bloody yellowish serum referred to in the above description, and the crust that accumulate in the region of the anterior nares, may accumulate in cases of simple eczema, and frequently extend to a considerable distance into the nasal cavities and invade a considerable amount of tissues in the adjacent vicinity.

Atmospheric Causes.—The idea of a vitiated atmosphere being the cause of acute catarrh is not at all new. Most of the literature pertaining to this subject contains statements, if not positive assertions, which lead the reader to infer that the profession have generally supposed one of the prime causes of this disease to be due either to a contamination of the atmosphere, or to the sudden lowering or elevation of its temperature. Whether or not sudden changes in the temperature of the surrounding atmosphere are capable of producing acute inflammation of the Schneiderian membrane is more than the writer is able to say; but it is an evident fact that sudden changes in the temperature are usually followed by an increase of catarrhal affections, and particularly of the nose and larynx. We know by experience that the inspiration of air at a very low temperature produces an unpleasant sensation in the

pervades the air in thunder storms. Ozone has remarkable purifying properties. It has also the effect, when breathed in large quantities, of irritating the mucous membrane of the air passages. While M. Schonbein was engaged in examining its chemical relations, he found that the inhalation of strongly ozonized air produced a painful affection of his chest, a sort of asthma, with violent cough, which obliged him to discontinue for a time his investigations. Reflecting on this circumstance, he began to suspect that certain catarrhal disorders might be caused by atmospheric ozone. He got several physicians at Basle to compare their lists of catarrhal patients with his tables of atmosphero-ozonometric observations; and he and they were struck by the occurrence of an unusual number of catarrhal cases on the days or during the periods when M. Schonbein's test papers showed that ozone was unusually abundant in the air."

The observations of Schonbein and his colleagues, notwithstanding the fact that they were limited, carry with them a great deal of weight in support of the theory that ozone is an active agent in the production of acute catarrh.

No one has ever undertaken to push the investigations of Schonbein, and they stand to-day just in the same condition as when he ceased his labors. Attempts have been made to refute his arguments in relation to the ozone theory, but they have been unsuccessful.

The inhalation of dust and irritants produce catarrh occasionally, and tend to aggravate it very materially where the disease already exists. The inhalation of

acid gases, as the fumes of chlorine, bromine, and kindred agents, produce great irritation of the Schneiderian membrane, and frequently an acute rhinitis results from it. The odor of certain flowers, as the Damascus and other roses. The probabilities are that the pollen of the flower acts as the irritant in those cases. Dr. C. M. Sebastian, of Martin, Tenn., reports, in the August, 1879, number of the Medical Herald, the history of an interesting case in which he has succeeded for three years in warding off periodical attacks that had occurred annually for twenty-one years. He compelled the patient to keep his face covered with a thick veil during the period at which the disease recurred. This is very strong evidence that in this instance the irritant must have been in the shape of pollen or bearded spores, as suggested by Dr. Sebastian in his paper. I have tried this plan in a case after the disease had manifested itself, but the patient was not faithful in carrying out the treatment, and the results were not so gratifying; nevertheless the sufferer said that she was benefited by the use of the veil.

Tobacco smoking is a more common cause of inflammation of the membrane lining the nose and pharynx than it is generally thought to be. Cigarette smoking is possibly more injurious than cigar or pipe smoking, because the smoke is frequently exhaled through the nose, thus bringing hot fumes directly in contact with the delicate membrane, and thereby creating a greater amount of irritation. Mr. Lenoxe Browne, in his excellent work on the throat, in speaking of the causes of chronic laryngitis, says: "In the opinion of the

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author, however, the use of tobacco has but a very slightly obnoxious effect on the larynx, though it undoubtedly tends to induce chronic pharyngeal inflammation, especially when accompanied by frequent expectoration." Many of the exanthems are accompanied or initiated in with acute coryza, which is, to all intents and purposes, a genuine catarrh. It may therefore be called an exanthematous catarrh, in contradistinction to other forms of the disease. The material difference between this and other forms of catarrh of the nose and pharynx is, that it is more violent, and generally invades the entire membrane lining the naso-pharyngeal space, and is more apt to extend to the middle ear.

INFUSORIAL CATARRH.

The discovery of parasites in the nasal secretions of patients suffering with acute catarrh was first made by Dr. J. H. Salisbury, of Cleveland, Ohio. Dr. Ephraim Cutter, of Boston, Mass.; Prof. Paulus F. Reinsch, of Erlangen; and Mr. F. N. Daykin, a student of Dr. Salisbury's, have found the parasite in the nasal secretions. These four observers have seen about 1,100 cases. They prove in various ways, as will be seen in their reports (which I have considered worthy of reproduction in this article), that there is a parasite present in

many cases of acute catarrh. First, they demonstrate its presence by the use of the microscope; secondly, the application of most any of the ordinary parasitocides kills the animal and gives immediate relief to the patient. Personal experience does not enable me to speak upon this subject; nevertheless these gentlemen have certainly opened a new field for investigation, which ought to induce others to continue the search. If this can be established, it opens a new field for the general practitioner, who may just as well administer upon the estate of the parasite without the trouble of examining his person with illuminating or other instruments.

Dr. Cutter says (Virginia Medical Monthly for November, 1878):

“The general practitioner is very familiar with a kind of epidemic influenza that runs through whole families and neighborhoods. It is not asserted that all catarrhs and influenzas are caused by rhizopods (root-footed protoplasmic animals), but it is desired to submit some positive evidence that *sometimes* they have been caused by *them*; that when the rhizopods are destroyed, either by self-limitation or by parasitocides, the influenzas disappear (when uncomplicated). It has seemed to me that Dr. Salisbury has in this discovery given us an example of pure science in medicine, as I regard the discovery of a *cause* of a disease, its *removal*, and thereby the *cure*, as an exhibition of the highest skill in our profession.

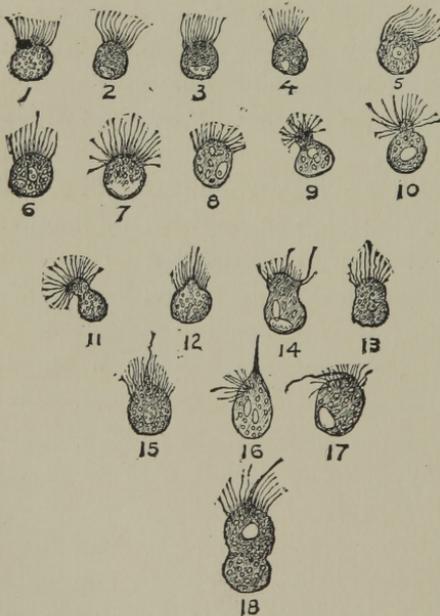
“*First Testimony.*—This is the original paper published by the discoverer in Hallier’s Zeitschrift, Jena, January, 1873, page 7, as follows:

““*Infusorial Catarrh and Asthma.*—By J. H. SALISBURY,
B. N. S., A. M., M. D.

““This is purely a parasitic disease, arising from a peculiar animalcule organism (*asthmatos ciliaris*, Salisb.) armed upon one side with cilia.

““This organism assumes a great variety of shapes and sizes during the different phases of its existence.

FIG. 1.



ASTHMATOS CILIA-
RIS. (S.)

Photo-engraving from
drawing executed by
Mrs. Jerome Thompson,
the celebrated head painter,
of New York.

In the same case, by watching carefully its development and metamorphoses under the microscope, it may be seen to transform itself into all the different forms represented in figures 1 to 17. The most usual shape

seems to be spherical or oval, as seen in figures 1 to 8. These frequently send out a long proboscis, at the end of which is a dilated and elongated cilium, as represented at 14, 15, 16, and 17. This proboscis may be in the center of the mass of cilia, as at 15 and 16, or at one side, as at 14 and 17. It may be drawn in, leaving a nipple-like elevation, as at 10, or may disappear entirely, leaving the organism oval (8) or spherical (6). The proboscis often only partially disappears, or is only partially drawn in, while a constriction occurs in the form, as represented at 13 and 14. It may be simply a large dilated cilium, as at 17 and 18, or the cell walls may go out forming a more or less sharp protuberance, as at 15; or the walls may go still further out, forming a more or less fusiform organism, as at 16. The cilia are simple extensions of the cell-wall, are hollow, and communicate with the cell cavity, and can be dilated and elongated at the pleasure of the animal. The parasite consists of a simple sac, armed upon one side with cilia, and enclosing one or more large nuclei, and many smaller germules of various sizes, as seen in the figures. The young are developed within the parent cell, and, when mature, are discharged at the end of the organism opposite the cilia, as seen at 18. The parent becomes quite large before delivery, and as the young one is discharged, the parent cell becomes shrunken and shriveled for a time. The aperture soon, however, closes; the wrinkled, shriveled condition of the sac walls disappear, and the parent moves about again—fresh, plump, and lively as ever. The cilia are in active motion during the greater part of the life existence of

the animal, and produce a most aggravating irritation of the mucous surfaces they infest. The young organisms (1 to 6) have a rolling, rocking, vibrating motion from side to side, making about one-third of a revolution on the transverse axis at each oscillation. The more mature cells either vibrate slightly or have a tremulous motion, their cilia not moving at all, as at 5, but vibrate in different directions.

“*Symptoms.*—After once obtaining a foothold on the mucous surfaces of the respiratory tract they multiply rapidly. At first they attack the mucous surfaces of the eye and nose, producing sensitiveness of the parts, which results in a free secretion of tears, and thin mucus, uncomfortable, and often intense paroxysms of sneezing. The organisms gradually travel from the nasal surfaces down into the fauces, larynx, trachea, and larger and smaller bronchi. As soon as they reach the fauces there is a burning heat and irritation in the parts that excite severe coughing. This tendency to cough constantly increases as they and the irritation gradually travel further and further down the air-passages. When the larger bronchi are reached, a heavy, hot, feverish pain is felt in the parts they invade, accompanied by more or less flushes of heat and fever. These symptoms ordinarily and very naturally suggest to the physician “catarrhal fever,” under which head the disease is usually placed, especially when occurring during the winter and spring. This stage is accompanied by most intense paroxysms of coughing, which are frequently long and most painful, especially in the morning.

“If the parasite makes its way into the smaller bronchi and air-cells, asthmatic symptoms of a distressing character often supervene, and the sufferings, already almost unendurable, are much intensified.

“The disease may continue a long time if the parasite is not destroyed, though after a period, longer or shorter, according to temperament and constitution and state of the health of the patient, the irritation assumes a chronic form, and the sufferings gradually grow less and less until they disappear. In irritable, sensitive constitutions, the irritation in the fauces, larynx, pharynx, and bronchi becomes so great that the parts spasmodically close in attempts to swallow or to inhale air charged with anything which excites the inflamed parts.

“I have no doubt, from what I have seen, but that death may have occasionally occurred in the acute stage of this disease from spasms of the pharynx and epiglottis.*

“*Secretions.*—The cells of mucus first secreted from the surfaces invaded are large and round, not differing materially from those in health. Soon, however, they begin to be shrunken and jagged, and in a few days many of them assume the appearance and character of pus cells (muco-pus). The amount of secretion discharged from the air-passages at any one time is small; yet the presence of this small quantity creates so much irritation that it is very difficult, during the acute stage of the attack, to keep, for any length of time, from coughing and sneezing. The secretion is thin, clear,

* Probably it is the cause of whooping cough occurring for the second time.—E. C.

and watery at first, and small in quantity, soon becoming thicker and more turbid. The cough is short and somewhat painful, and the invaded surfaces feel irritated and hot. The cough raises but a small quantity of sputa at each time, and relieves the irritation and itching but for a few moments.

“Whenever the parasites are developing rapidly on the velum palati, most intense paroxysms of coughing are excited, which are long and persistent, painful, and sometimes are accompanied by severe spasms of the epiglottis (whooping cough). Often an irritation and itching will be felt on one side of the throat only, exciting constant desire to cough. In such cases, the irritation will always be on the side on which the nasal passage is closed. Under such circumstances inhaling remedies through the mouth very often fails to check the coughing for but a few moments only. By clearing the closed nasal passage, and inhaling through it, the coughing and irritation is soon checked. The reason for this is, that the parasites are developing rapidly on the posterior surface of the wing of the palate, on the side of the nasal passage, and are constantly working down into the larynx and pharynx on that side.

“*Asthmatic Symptoms.*—When the parasites reach the smaller bronchi and air-cells, especially in irritable and sensitive constitutions, asthmatic symptoms begin to show themselves, and often become distressing and almost unendurable. Any excitement in the circulation aggravates the symptoms. The evening and night air always increase the sufferings.

“*Season of Invasion.*—This disease is more common

from July to November in this climate than at any other season of the year, though it may occur at any season. When it occurs during the latter part of the summer and in early autumn, it is usually called "hay fever" or "hay asthma," and sometimes "malarial asthma," of which class it is one *form* only. During the winter it is frequently called "catarrhal fever," and with very good reason, as the disease is always accompanied with fever and chilly sensations. The face is usually flushed, head hot, and pulse rapid, especially during the acute stage. How long the disease would continue if left to itself I do not know, as I have never let a case run long without the use of remedies to destroy the cause.*

"*Contagion.*—This disease belongs to those that may be transmitted from one individual to another, though the transmission is not very readily accomplished. In working very closely over about sixty cases of the disease, examining the sputa under the microscope for many hours together in each instance, and in several severe attacks devoting days to the examination, I have taken the disease only six times myself, and in two instances have transmitted it to my family. I have usually begun to feel symptoms of the presence of the parasite in from four to eight days after commencing to treat a case. In all of my late cases I should state that I have taken the precaution to inhale a solution of crystallized carbolic acid, one drachm to the pint of water, every two or three hours, and to take twenty drops of tinctura ferri chloridi in a tumbler of water two hours

* The writer found himself to get well without treatment in a week or ten days.—E. C.

after each meal. This course has lately protected me from taking the disease.*

“*Name of Disease.*—I have given this disease the name that stands at the head of this paper. It has been given after carefully studying for over *six years*, with great interest, the symptoms and peculiarities of the complaint. During that time I have treated about sixty cases of “infusorial catarrh” and asthma (now, January, 1878, about 1,000), and made over one hundred drawings of the parasite, eighteen of which are given in the accompanying plate.†

“*Treatment.*—All means ordinarily used for colds and coughs are worse than useless in this disease. While they tend to get the system out of order, they do not retard the development and progress of the cause. The only remedies that do any good are such as either destroy or retard the growth and reproductiveness of the parasite. Fortunately, we have many agents belonging to this class, among which are carbolic acid, tinctura ferri chloridi, sulphate of quinia, sulphuric acid, sulphurous acid, nitric acid, hydrochloric acid, etc., all of which remedies should be in solution with sufficient water, so that they can be inhaled without producing irritation. The inhalation should be made freely, and as often as every hour or two. In addition to inhaling, I give two grains of sulphate of quinia every four hours, and twenty drops tinctura ferri chloridi in a glass of water, morning, noon, and evening. It is sur-

* It is almost as contagious as measles in my experience.—E. C.

† Naming always belongs to the discoverer. Some seem to forget this.—E. C.

prising how much a single thorough inhalation will relieve a suffering patient. If the sputa is examined before the first inhalation, and then again after it, a remarkable difference will be observed in the condition of the parasites. Before inhalation, they are all in active motion; after it, if thoroughly done, they will nearly all be found dead or motionless. Occasionally one will be seen that has either not been reached at all, or has not received a sufficient dose to destroy life. As they develop in the follicles as well as on the plain surfaces of the air-passages, it will be seen that frequent inhalations must be resorted to, or the parasites will soon be as numerous as ever. By keeping up the inhaling at short intervals and inhaling thoroughly, the parasites have no chance to get very numerous, and soon the follicles become permeated with the inhaled materials and the cause is entirely destroyed. The sufferings of the patient are much relieved, or almost disappear in a short time after entering thoroughly on the treatment. In fact, they are almost entirely gone in a few minutes after taking the first inhalation. This shows conclusively that the parasite is the cause of the disease.*

“*Asthmatos Ciliaris* (Salisbury).—I have taken the liberty to give this little parasite a name which, perhaps, a more extended acquaintance may deprive it of. *It may be found to be one of the many forms, that are already described, that inhabit stagnant and running waters, and under certain conditions fermenting organic matters.* The name here suggested will, however, answer *present*

* This the writer unqualifiedly indorses.—E. C.

purposes. The generic title is indicative of one form of disease it causes, while its specific name is suggested from the cilia with which it is armed. The figures from 1 to 18 represent the different forms and shapes the parasite assumes during the different phases of its existence. They are magnified from 300–500 diameters. Fig. 18 represents the mode in which the parasite reproduces and discharges its young. The young animal grows within the parent cell, and when mature, is discharged at the posterior part of the organism. In figures 7, 8, 14, 15, 16, and 17, are seen the young cells inside the parent cell. After the young is discharged, the parent soon begins to assume a more plump appearance, the opening closes up, the wrinkled, shriveled condition passes away, the cilia become active, and the organism soon assumes the freshness, activity, and vigor it had previous to parturition.'

“Second Testimony.—1877, June 20, the writer, while visiting Dr. Salisbury, at Cleveland, Ohio, expressed a desire to see the parasite just described, if possible. This day Dr. Salisbury stated that he felt some of the symptoms, and that he might have the disease. He spoke doubtfully, and would not be positive until after a physical exploration should reveal the actual presence of the animal. He then spat up some glairy, tenacious mucus from his pharynx, in which small, whitish patches appeared. Some of these were deposited upon a glass slide and covered with a suitable cover. The object was placed under a microscope *two-inch eye-piece* and *one-fifth objective* of *superlative excellence*. It was a Spencer. Apartment lighted by one window open to the northeast.

“The *first* observation showed a dead protoplasm, globar, with motionless feet or roots on the part, like figure 5.

“The *second* observation of another specimen of expectoration showed several young ones of globar shape, with beautiful cilia, whose length equaled the diameter of the body of the animals. One displayed a marked rocking movement of rotation on its own center of one-third of a circle, with a graceful waving of the cilia.

“Another specimen was observed where the wave and rotation were less, but the ciliary movement was by a longer sweep to the right and left. They were of the size of a common mucus corpuscle. A few specimens only were in the sputa examined. Sometimes, the doctor said, the field is crowded with them.

“June 21.—An examination of the sputa from Dr. S.’s throat showed a dead parasite as large as a dozen of those of yesterday’s examination. It was distended with many young protoplasms. The writer then studied the field and detected five other specimens of the small size in a single field of the microscope. They all were actively swaying to and fro with graceful ciliary movements that continued for a long time. I asked Dr. Salisbury if he thought the disease would be found in the East. The reply was in the affirmative. ‘It is very common everywhere, and *it is only necessary to look it up.*’

“After having thus unmistakably demonstrated the presence of the parasite in his oral excretions, the doctor then partook freely of salicin, carbolic acid, and quinine. He was very much relieved of his hoarseness,

cough, suffused eyes, and discomfort, and only the next day (June 22), on examination, a few parasites were found, but none alive.

“*Third Testimony*.—Mr. F. N. Daykin, a medical student in Dr. Salisbury’s office, thus wrote:

“‘CLEVELAND, O., Sept. 1, 1877. *Dr. Cutter: Dear Sir*—Yours of July 8th was received and should have been answered, but was mislaid while I was studying “infusorial catarrh,” an account of which I shall give you. On *Sunday* morning (no date) there was a slight irritation of the mucous membrane of my nose, but it could not be distinguished from a very mild cold, which I supposed it was. The irritation increased constantly, and on *Monday* morning the eyes also were inflamed and sensitive to light. At 10 A. M., used carbolic acid solution with a nasal douche, which gave relief for half an hour. In the afternoon, the throat became sore and a headache came on, both of which continued through the night. On *Tuesday* morning, the headache continued, the eyes were very sensitive and watery, and the inflammation of the nose and throat was worse. After using salt and water as a douche, I came over to the office and discovered the infusoria under the microscope. From that time I used carbolic acid solution about once an hour until evening, and felt much relieved. *Wednesday* morning my eyes were natural, throat only slightly sore, and nose much better. Carbolic solution continued until evening, when the irritation was hardly noticeable. By *Thursday* morning the infusoria had reached the bronchial tubes and caused some coughing, but no expectoration. Nose and throat

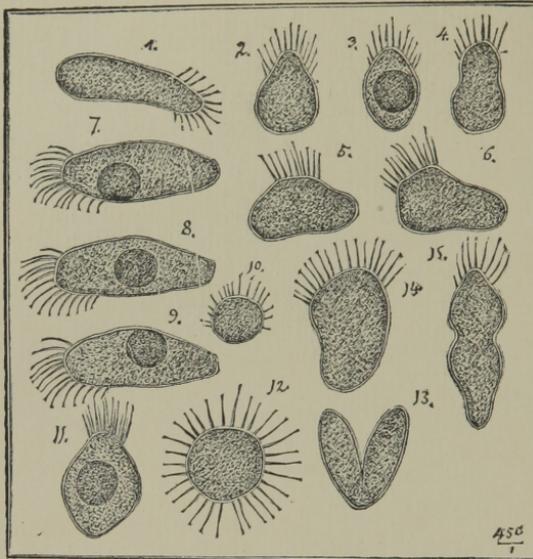
but slightly sore. Inhaled carbolic acid solution with atomizer, which removed all irritation, but I began to feel languid and tired. *Friday* continued carbolic acid and noticed some improvement, and by *Saturday* morning the irritation was all gone, though it was three or four days before the tired feeling ceased and I felt naturally.

“The solution used was about half a drachm of crystals of carbolic acid to the pint of water, and half an ounce of glycerine, warm, as it feels pleasantly in the douche. For the atomizer, one drachm of acid to one pint of water.

“I had a nice time looking at the animal, and saw all the forms, but would have liked to have photographed it also. Yours truly, F. H. DAYKIN.”

The specimens in Fig. 2 were drawn by Prof. Paulus F. Reinsch, of Erlangen, who, with Dr. Cutter, examined a number of specimens:

FIG. 2.



ASTHMATOS CILIARIS. Hatfield's case. Drawn by Prof. Reinsch from life.

1. Mature specimen. 2-4. Young do. 5, 6, 11, 14, 15. More mature specimens. 13. In division. 7. Young cell inside near processes. 8. Do. moved to center. 9. Do. moved to upper part just before escaping. 10. The escaped young individual with moving cilia. 12. A specimen resembling *Actinophrys sol.*

The following extract and cut are taken from a second paper of Dr. Cutter's, which appeared in the April number of the *Virginia Medical Monthly* of 1879:

"In the November (1878) number of this Journal I reported the testimony that I had on this subject. Since that time the matter has assumed a grave aspect. I have had one case to die; another case, with asthmatic symptoms, is expected to die; and have heard

of several other cases in the hands of my contemporaries that I have every reason to believe were similar cases that were also fatal. I do not, then, write in the interest of pure science alone, but for the sake of suffering humanity, of which we ourselves are a part, and with which we suffer or enjoy.

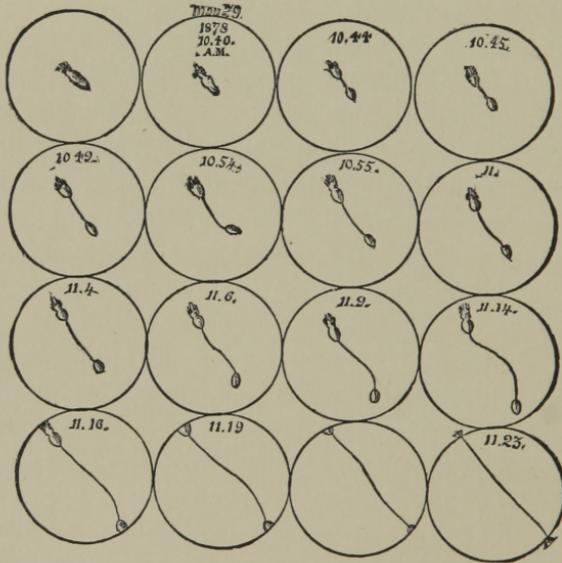
“As a clinical observer, I find that thousands, if not millions, of our people are or have been suffering with contagious ‘colds.’ Some get well of themselves; others are severe cases; some die. I believe that the *asthmatos ciliaris* is the cause, and I think I have the right to submit the evidence on which I base my belief, with the hope that the matter will receive that study which, it seems to me, it deserves. As it is, I can only call respectfully for a consideration of the following testimonies, not included in my former report, above referred to.

“1. Dr. G. B. Harriman, my associate in micrology, has exposed slides, covered with glycerine, in the air of infected districts, and tells me that he has caught forms floating in the air identical with the *asthmatos*.

“2. Dr. J. H. Salisbury writes, January 14, 1879: ‘Frequently I have found the *asthmatos ciliaris* in the mucous secretion of the *eyelids* and nose before the disease has yet extended to the throat. In fact, the parasites almost always attack the membranes of the eyes and nose first—unless it be in persons who habitually breathe with the mouth open.’

“3. (Condensed from the Boston Journal of Chemistry, November, 1878): W. Martin Living, of Arlington Street, Cambridge, Mass., said his one-and-a-half

year old child had the croup or lung fever. I found neither, but there was a severe harassing cough, copious discharges from the eyes and nose, flushed face, fever systemic, breathing free, pulse regular. The nasal excretion contained an abundance of the living, moving, rocking, and still forms of the so-called *asthmatos ciliaris*.



“The passive inhalation of the nascent chloride of ammonium (by means of an apparatus of the writer, made by Codman & Shurtleff, of Boston) was given to the child. Some of the excretion was placed on the stage of a Tolle’s stand with a one-sixteenth inch objective eye-piece for a condenser, and exhibited the phases shown in the cut. Four persons saw the genesis.

“May 29, 1878, 10:40 A. M. It gradually separated itself, as in the cut, until 11:23 A. M., it got out of the field. The gubernaculum then parted in the middle. That part connected with the parent was drawn into its body, and that connected with the new individual was drawn into it. After these changes occurred, Professor Reinsch came in. He said it was new to him, and desired to study the process further on new specimens from the child. It was seen at 8 P. M. We studied the excretion for one hour and found only *one* specimen. It was alive and had forty feet. The child in the meantime had been relieved and was playing about the room, though it was late. It was cured. Next day further examination revealed only one specimen. It was dead. The search was strict and very careful and disappointing.

“The clinical lesson I derived from this was that the nascent chloride had killed the parasites.

“4. September 24, 1878, 1:05 P. M., a specimen from my own nasal excretion had its feet downwards on the lower surface of its oval body. From the nearest end, a gubernaculum extended straight, about twice the length of the body, with a young individual at the end; at 1:11 P. M., it turned over, so that the feet were upwards; at 1:14 P. M., gubernaculum drawn up into two curves like the letter W; at 1:15 P. M., into one large U curve; at 1:20 P. M., gubernaculum straight and inclined at an angle of 135 degrees to the axis of the body; at 1:23 P. M., while the straight gubernaculum still kept the angle, the feet began to disappear. I thought them drawing in; at 1:24 P. M., gubernaculum the same; feet now on the under side once more; at

1:25 P. M., gubernaculum now forms an angle of 45 degrees with the body, which moves towards the gubernaculum; at 1:26 P. M., new individual almost touched the body; gubernaculum curled like a crozier; at 1:30 P. M., body vertical; gubernaculum elevated in a large curve; at 1:35 P. M., gubernaculum thrown backwards and more elevated. A round nucleolar body now formed within."

In closing his paper Dr. Cutter offers the following:

"*Resume.*—1. Testimony has been submitted that there is a parasitic animal, of a protozoic type, that is found in the secretions of the respiratory tract of persons suffering from influenza, colds, catarrhs, and asthma. Dr. Salisbury, the discoverer, has observed over 1,000 cases. Mr. Daykin reports one case. Professor Reinsch reports two cases in one individual. The writer has observed *about* 100 cases.

"2. It is supposed to be the cause of the disease named because, (a), It is infectious; (b), Parasiticides kill the animals; (c), With this killing, comes instant relief to the symptoms of the disease; (d), Because it is found, when it has been carefully looked for, in this class of cases, and not in other catarrhs.

"[It is not claimed that *all* influenzæ, colds, etc., are caused by the animal in question.]

"3. The writer tries to connect the protozoa with the actinophryina found in drinking water, because, (a), Dr. Salisbury suggested the idea; (b), The actinophryina are morphologically identical; (c), Similar forms have nowhere else been found in nature, except in salt water; (d), Thousands are daily swallowed in the drinking

water; (e), At the present time they are abundant in the water, and the disease abounds."

SYPHILITIC PHARYNGITIS AND RHINITIS.

The frequency with which syphilitic affections of the nose and pharynx occur make it necessary that they should be mentioned with other diseases of these organs. We shall consider the disease only in its secondary and tertiary forms, as primary manifestations rarely present themselves in these localities.

Symptoms.—The first manifestations of syphilis in the pharynx frequently escape the observation of the physician on account of their apparent insignificance. However, if the pharynx should be inspected at the commencement of an attack of secondary syphilis, the anterior surface of the soft palate, and possibly of the pillars of the fauces, will be found congested. The congestion may be confined to a single small spot, on either side, but it usually appears in a symmetrical manner. This condition may remain for a few days if nothing is done to arrest the progress of the disease, when the surface of the congested area gradually assumes a grayish color, which is supposed by some to be characteristic of the specific nature of the disease. These patches may appear on the tonsils, tongue, and,

in fact, on any part of the surface of the membrane lining the nose, pharynx, or mouth. They occur most frequently upon the velum, arches, tonsils, and tongue, and rarely appear upon the posterior wall of the pharynx, but often invade its lateral walls. Occasionally the orifice of the Eustachian tubes become involved, and the hearing will be more or less impaired.

The so-called mucous patches may remain almost indefinitely without any material change in appearance, other than the gradual increase in size; and if proper and persistent treatment is enforced they usually disappear without further destruction of tissue than the superficial portions of the mucous membrane, while, if they are neglected, and even in some instances where they are not, the deeper structures become rapidly involved, and ulceration and sloughing ensue in a very short time. If the pharynx is examined at this time, the site of the so-called mucous patches will now be occupied by an ulcer, the surface of which is covered with thick creamy pus. The edges of the ulcer are ragged, and the membrane for a considerable distance out from it presents an angry scarlet hue, showing that the inflammatory process is going on actively. If the velum and uvula are involved to an extent sufficient to interfere with the movements of these organs, the voice will be materially changed. Deglutition will usually be painful, and in some cases almost impossible.

The history of the case, and the existence of other symptoms, as the peculiar cutaneous eruption, enlarged lymphatics in the sub-occipital region, will confirm the diagnosis.

These manifestations are frequently accompanied by an elevation of temperature; especially is the temperature increased if the attack is violent.

If the nose is invaded the attack may be so gradual as to escape the patient's notice; the only subjective symptom being that of any ordinary catarrh. The catarrh becomes worse, and very soon tenderness in the region of the posterior nares, or in some part of the cavity, will be noticed by the patient, and the secretions become offensive and occasionally tinged with blood. The appearances presented by the membrane are similar to those described as occurring in the pharynx at the corresponding stages. If the periosteum or the perichondrium be affected there is usually a dull, heavy, aching pain in the nose, which is more severe at night. When the bones are carious and necrosed, the sensation received through a probe is the same as that produced by diseased bone in other localities.

Prognosis.—The prognosis of syphilitic pharyngitis and rhinitis is favorable in most cases as regards life, but the symmetry of the parts can not always be preserved, even with the most judicious management. The structures likely to be destroyed are the velum palati, uvula, spongy bones, and septum.

Treatment: The treatment in this, as in other forms of syphilis, is in the main constitutional. The selection of agents for internal administration should be made with great care, as much harm may result from the use of improper drugs. It is safe to say that all debilitating agents are injurious. The most effective remedy is the iodide of potassium. It should be ad-

ministered internally in full doses until some perceptible impression is made upon the disease, or until iodinism is produced. The patient should be kept on the verge of iodinism until the local manifestations have subsided. In addition to the iodide, cod-liver oil, iron, and quinine should be administered. Good, nutritious diet is an important adjunct. Cleanliness of the ulcerated surfaces must be insisted upon; and the same agents that are used in cases of catarrh for cleansing purposes may be resorted to with benefit. After thorough cleansing, stimulant applications should be made with spray or otherwise, as may be indicated. Solutions of odine crystals, half drachm to a drachm to the ounce of glycerine, or solutions of similar stimulating character, usually prove most efficient. Caustic applications are not indicated. The external manifestations of syphilis are but evidence of a constitutional dyscrasia, and no amount of cauterization can be of any benefit; on the contrary, may prove detrimental to the chances of recovery.

CASE XXIV.—*Syphilitic Pharyngitis and Laryngitis, terminating in recovery, with preservation of the functions of all the organs involved.*

Mr. G——, aged 21, white, clerk, consulted me May 26, 1879, and said that several months previous he had contracted syphilis, and that the primary sore healed up after a considerable time had elapsed, and that there had been no secondary manifestations until within three or four days preceding his visit to me. There was a

gray-colored spot in the roof of the mouth, on the left of the median line, about three-fourths of an inch in diameter. There were several small ones on the tongue, tonsils, and arches of the soft palate. The vocal chords were of a dusky, red color, and the voice was harsh and rough. The epiglottis was also very much congested.

Treatment: The iodide of potassium was ordered in full doses every four hours, until iodinism was produced. Then the dose was lessened, and the patient kept constantly under its influence. The mucous patches in the mouth were touched once a day with a solution of thirty grains of iodine crystals to the ounce of glycerine. July 2, 1879, the vocal chords were almost normal in color, the epiglottis was but little congested, and the mucous patches were all closed except one about the size of a split pea. The patient was ordered to continue the iodide in moderate doses. I saw him the first of November, 1879, and there was no breach to be seen anywhere in the mouth or pharynx, and the larynx presented a healthy appearance.

CASE XXV.—*Syphilitic Pharyngitis, with partial destruction of a portion of the soft palate and uvula, with permanent alteration in the voice.*

Susan C—, aged 24, white, was admitted into the Louisville City Hospital in the spring of 1878. At the time she was suffering with secondary syphilis, which had invaded the throat. The pharynx was inflamed,

with several small ulcers on the surface of its walls. The soft palate had a small ulcer on its anterior surface, to the left of the median line. There was a purulent discharge from the nose; but no visible breach in the Schneiderian membrane. The sense of smell was impaired to a limited extent.

Treatment: The ulcers were touched with a half-drachm solution of iodine (see section on Therapeutics, page 57) once a day. The iodide of potassium was freely administered internally. Under this treatment the disease was arrested and the throat was apparently almost well. The patient left the hospital and remained absent for about six weeks, at the end of which time she returned in a much worse condition than when first admitted. There was a large ulcer on the anterior surface of the palate at the site of the former one; the uvula was also extensively ulcerated. No amount of local or constitutional medication seemed to have the least influence over the disease. The ulceration continued until the soft palate was completely divided diagonally downwards and outwards to the left; and the uvula cut almost into about one-fourth of an inch from its lower extremity. After this the ulcerative process abated, and there was no further destruction of tissue. The iodide of potassium was pushed to its full extent, and the ulcers healed in a comparatively short time, leaving a cleft in the left side of the palate and the end of the uvula hanging by a mere shred.

CASE XXVI.—*Syphilitic Pharyngitis and Rhinitis, with loss of the vomer and turbinated bones.*

Charles S—, aged 44, an inmate of the Louisville City Hospital, was sent to me May 24, 1879, to have his nose examined. He stated that he had contracted syphilis in the early part of 1869, and that the disease manifested itself by the presence of a single sore on the genitals. The primary lesion soon disappeared, and there was no further disturbance until February, 1878, at which time the pharynx and larynx were invaded. He was then admitted to the hospital, and remained there for a time and improved considerably. He left and did not return for several months. In the meantime the disease had made rapid progress; the structures of the pharynx had become invaded and the patient's general health was much impaired. The ears were both inflamed; one was suppurating, the other was painful, with the drum cavity full of fluid.

Treatment: Tonics and the iodide of potassium were administered internally, with nutritious diet. The drum cavities were cleaned out by the catheter and air-bag, and a solution of ten grains of carbolic acid to the ounce of water was blown into them. Stimulant applications were made to the ulcers in the pharynx. This plan of treatment was continued for several weeks, with some improvement, particularly in the ears and pharynx. The general health did not improve, but, on the contrary, he continued to fail, and finally complained of pain in the left lung, which was examined and found to have a tubercular deposit in its apex. In July, 1879,

the bones of the nose began to drop out, and by December, 1879, they were all removed. After the bones were removed the membrane healed up, and the fœtid odor was no longer present. The loss of the bony structures of the nose caused it to sink down and become very much flattened. The voice was necessarily changed.

CASE XXVII.—*Syphilitic Rhinitis, with loss of the vomer.*

Mrs. K——, aged 39, white. In the spring of 1875 she consulted a physician in regard to her nose. He ascertained that she had contracted syphilis from her husband about one year previously. He prescribed for her, giving the bichloride of mercury and the iodide of potassium in combination. This treatment was kept up for eighteen months, with little or no improvement. In December, 1876, the vomer was lost. October 17, 1877, the patient was sent to me by her attending physician. At this time the membrane lining the nasal cavities was inflamed and thickened; there were small abrasions at several points, which were inclined to bleed at the slightest touch. There was a dull, aching pain in the region of the superior turbinated bones, which was more severe at night than during the day. The anosmia was almost complete, and had been so for several months.

Treatment: The constitutional treatment consisted in the administration of large doses of the iodide of potassium with bitter tonics. Cleansing applications were made three times a day, and followed by a solution of

ten grains of hydrate of chloral, two drachms of glycerine, and six drachms of water. In a short time the nocturnal pain in the nose disappeared and the offensive odor was very much lessened. The iodide was kept up for a year, during which time the patient was almost constantly under its influence. The local medication was not varied. In November, 1878, the patient was free from all pain and inconvenience, and there was no active change going on in the region of the nose and pharynx. She was now discharged, with orders to continue the iodide in moderate doses for several months.

CASE XXVIII.—*Syphilitic Pharyngitis and Laryngitis, terminating in recovery, with complete restoration of function in all the diseased organs.*

Louis S——, aged 23, white, occupation baker, appeared at the clinic of the Kentucky School of Medicine March 3, 1877. In August, 1876, he contracted syphilis. The initial sore healed readily. He stated that about three or four months after the primary sore had gotten well, an eruption made its appearance on the surface of the body and face, and that his throat became involved about the same time. The vocal chords were congested; there was an abrasion on each tonsil; the uvula was inflamed and œdematous; and deglutition was exceedingly painful. The face was covered with syphilitic eruption, and there was a small ulcer on one of the lower eyelids.

Treatment: The end of the uvula was cut off; and a

gargle of half an ounce of the bromide of potassium to the pint of water was used three or four times a day. The iodide of potassium was administered internally in full doses after each meal and at bed-time. The acute symptoms abated in the course of a few days; but, despite all efforts, the disease continued until the posterior wall of the pharynx was invaded and a considerable portion of the soft structures destroyed. When the disease became chronic, a solution of one drachm of iodine crystals to the ounce of glycerine was applied once a day. The iodide was increased until its physiologic effects were manifested, and the patient kept almost constantly on the verge of iodinism. Under this line of treatment he was cured in *four* months, without the impairment of any function.

CASE XXIX.—*Syphilitic Pharyngitis, Laryngitis, and Rhinitis.*

William H——, aged 27 years. In February, 1878, contracted a venereal ulcer, and at once placed himself under the care of a physician. The sore healed in a short time. On the 23d of May he was admitted into the hospital. At that time the inguinal lymphatics were enlarged, without tenderness. There was extensive ulceration of the lateral walls of the pharynx, the vocal chords and epiglottis were inflamed, and deglutition painful. His general health was very much reduced. The debilitated condition, in all probability, was brought about by the excessive use of mercury.

Treatment: Iodide of potassium was given, beginning with ten-grain doses, after each meal and at bed-time. The local medication consisted of cleansing fluids, such as fifteen grains of bromide of potassium, or muriate of ammonia, to the ounce of water, or equal parts of whisky and water, applied with a spray apparatus. After cleansing the ulcers, they were touched daily with a solution of iodine crystals, one drachm to the ounce of glycerine. The dose of the iodide was gradually increased to thirty grains. Under this treatment the man improved rapidly, and left the hospital in August almost well. In November he returned decidedly worse than at his first admission. The vocal chords and epiglottis were in a state of ulceration. There was a large ulcer in the base of the tongue, extending on to the epiglottis and entirely around its free border. There was also an ulcer about one inch in diameter on the posterior wall of the pharynx. The lining of the nose, the face, and scalp were full of syphilitic ulcers; in short, he was a complete wreck, scarcely able to swallow the most bland fluid. The iodide of potassium was given as before. The local treatment did not differ materially from that practiced in his first attack. He was discharged cured in August, 1879.

CASE XXX.—*Syphilitic Rhinitis.*

Mary W—, aged 26, white, consulted me April 2, 1880, and stated that her nose had been sore for three weeks. There was a ragged ulcer on the left side of

the septum, near the floor of the nose, running horizontally backward. Its vertical diameter varied from a fourth to half an inch; the horizontal diameter was fully an inch. The cartilaginous and osseous structures were not invaded. There was a simple abrasion on the corresponding surface of the right side.

Treatment: The iodide of potassium was administered in ten-grain doses after each meal and at bed-time, until its physiological effects were manifested. The patient was kept just short of iodinism for six weeks, at the end of which time the ulcer and abrasion had entirely closed. The local medication consisted in the application of a solution of iodine crystals, one drachm to the ounce of glycerine. The iodine was applied every third day.

CATARRHAL AND PURULENT INFLAMMATIONS OF THE DRUM CAVITY.

Catarrhal and purulent diseases of the tympanic cavities are of such frequent occurrence in connection with naso-pharyngeal catarrh that a work like this would be incomplete without a brief notice of the subject. About two-thirds of all the cases of acquired deafness result from catarrhal inflammation of the drum cavities, the remainder occurring as the sequelæ of the exanthems and other causes, as traumatic injuries, etc.

Considering that the ear is an organ of special sense, and that the disease or diseases which are most destructive to its organism and functions are, in the majority of instances, curable, we ought certainly resort to any reasonable means to prevent so sad an affliction.

Catarrhal inflammation of the tympanic cavity most usually occurs as a secondary affection, by extension from the nose and pharynx.

The symptoms of acute aural catarrh, or what is termed "earache," are so characteristic that they point directly to the seat of the disease in adults, while in children, who are unable to speak, the diagnosis is often difficult. Pain is the most prominent symptom. It is almost intolerable, and often so severe as to cause adults to shriek and tremble. In children the affection is frequently mistaken for some brain lesion. There is always a sense of fullness about the ear, with tinitis aurium.

There is usually some heat about the external auditory canal, with more or less vascularity of the membrana tympani. The congestion may be so great as to prevent the recognition of a single vessel, the membrana tympani presenting almost a scarlet hue. This is typical, and may vary from the scarlet hue to a simple blush. If the disease has progressed a few hours, the membrana tympani is often found bulging outward into the external auditory canal, presenting the appearance of a little bleb, with a number of small arteries coursing over its surface. This bulging of the drum membrane is caused by an accumulation of mucus within the tympanic cavity, which, by the undue pressure that it exercises upon the delicate nerves supplying the tympanum, is one of the prime causes of the intense pain. Hearing is more or less impaired in all cases. The closure of the Eustachian tubes accounts for the accumulation of mucus within the tympanum.

Febrile symptoms are present in many cases. They are usually more marked in children than in adults.

The causes of acute aural catarrh are numerous. Inflammations of any kind that affect the pharyngeal cavity are liable and do frequently extend to the tympanum by continuity of surface. This is the manner in which the majority of inflammations of the tympanum occur. It is a rare thing for a catarrhal inflammation to originate within the drum cavity. It usually invades that organ by extension. The same is true of the exanthematous inflammations, which are also among the common causes of acute otitis media. The nasal douche, as used in the treatment of nasal catarrh, fre-

quently excites the already inflamed surface and causes the inflammation to extend up the Eustachian tube to the middle ear. The prognosis of acute catarrhal otitis media is generally very favorable where the proper plan of treatment is pursued. If there has been an accumulation of mucus in the tympanum, and relief is not obtained within the first forty-eight to sixty hours after the attack, ulceration and perforation of the membrana tympani is almost certain to occur, and it is no longer catarrhal otitis, but muco-purulent. When this occurs the prognosis is not so favorable, as there is a possibility of the drum membrane remaining perforated or thickened, and the power of hearing more or less impaired.

This form demands the immediate attention of some one skilled in the treatment of aural affections; but like most other disease of the ear, it is too often neglected. The local treatment for the relief of pain should consist in the constant application of warm water to the ear. This is best done by means of a piece of rubber tubing, with one end placed in the external auditory canal, and the other attached to a vessel filled with warm water, and elevated above the level of the ear. With this arrangement a continual stream can pass into the external canal. Leeches to the tragus is certainly a means of obtaining relief equal to any. A solution composed of two grains of the sulphate of atropia and six of the sulphate of morphia to the ounce of water is one of the very best medicated lotions for the relief of pain in the middle ear. It should be used with caution on small children, as it may be absorbed and produce poisonous effects. If there is perforation of the mem-

brana tympani it should not be used. Paracentesis of the drum membrane is demanded where the bulging of the drum and head is so great as to threaten perforation. This should not be done until the Eustachian catheter and air-bag have been sufficiently tried. In many cases the current of air that is passed through the catheter opens the closed tubes, forces the mucus out, and gives prompt relief by thus evacuating the drum cavity. If necessary, opiates may be given by the mouth or hypodermically for the relief of pain.

In the absence of the air-bag or catheter, if the patient be an adult, relief may be occasionally obtained by practicing Valsalva's method of inflating the drum cavity. Spontaneous rupture of the drum membrane is dangerous, because it is more extensive than is necessary. When it is desirable to perforate the membrane in cases of acute catarrhal inflammation, the opening may be made in the most prominent part of the protrusion. A small, sharp-pointed knife or a cataract needle will suffice to open the membrane.

The next of these—muco-purulent otitis media—is simply a combination of the catarrhal and purulent form of the disease, being too severe on the one hand to be considered catarrhal, and not violent enough on the other to be characterized as strictly purulent. The causes are the same as those of catarrhal otitis media, or it is better considered one of the results of that form of the disease. The pathological changes of the two are quite different. In the former there is no disintegration of tissue—simply a hypersecretion of mucus; while in the latter the disintegration of connective and

other tissues is well marked. There is generally an absence of febrile symptoms, because the fever is always irritative, unless there is some complication, and as soon as the tympanum is evacuated the source of irritation is removed and the fever subsides in eight or ten hours.

The membrana tympani does not always undergo destructive changes sufficient to cause perforation. In cases of this kind the contents of the tympanum pass out through the Eustachian tube. The subjective symptoms are the same as those of catarrhal otitis media, but in a more aggravated form. The objective symptoms are different. When perforation of the membrana tympani is threatened by ulceration, as it most usually is, the surface of the drum head presents a "boggy, sodden, or swelled appearance." The prognosis is less favorable in this than catarrhal, because of the destruction of tissue. The drum membrane is more liable to become thickened and remain so, and, in consequence of this, audition is more or less impaired. The treatment of this form should be the same as that of catarrhal until perforation takes place. The most important point to be considered is thorough cleanliness. For this purpose the catheter and air-bag are the most efficient. The syringe can do no more than assist in cleansing the external auditory canal. The probe and cotton wool will answer the place of the syringe, and is much more easily managed.

The medicaments to be used in cases of this kind need not be numerous. A solution composed of carbolic and tannic acids, each five grains to the ounce of water, is certainly one among the best agents that can

be applied in this form of the disease. Four or five drops should be blown into the tympanum, by means of the catheter and air-bag, once in twenty-four hours. Solutions of sulphate of zinc, sulphate of copper, and nitrate of silver, from one to three grains to the ounce of water, may be used in the same way as the solution of carbolic and tannic acids. The strength of any of these may be increased as the disease advances.

In purulent otitis media, which is a still more violent form of the disease than either of the above, the disintegration of tissue is very rapid. The membrana tympani soon melts away and the lining membrane of the whole drum cavity becomes more or less involved, and if the disease is not checked it invades the deeper structures of the tympanic walls and may reach the internal ear and brain. In the majority of cases it may be considered an advance of the muco-purulent, or, more properly, one of its results. I believe I may safely say that this is the case in most all instances where it is not due to some traumatic injury. The symptoms are much the same as those of the muco-purulent form of the disease, until perforation of the drum membrane occurs.

The discharge is more profuse and strictly purulent. The febrile symptoms are usually about the same as those occurring in the muco-purulent form. They may or may not continue after perforation of the drum membrane. If the disease continues to invade the deeper structures of the tympanic walls and make its way to the brain, the febrile symptoms will continue in a more or less aggravated form.

The prognosis is rendered less favorable in proportion to the amount of destruction that takes place within the tympanum and its walls. Where the treatment is prompt, energetic, and conducted in the proper manner, its termination is most always favorable. Any neglect renders the disease liable to become chronic. Then its cure is much more difficult.

The local treatment is the same as that of muco-purulent otitis media. It may be necessary to use constitutional remedies. At all events the bowels and skin should be kept in good condition, and the patient take plenty of good diet. In our Southern country it is necessary to keep on the look-out for malarial complications. If they should occur, administer quinine freely.

Lastly, for consideration, is a form of otitis media that has been termed "dry catarrh," and is known as a proliferous or non-suppurative inflammation. The disease is very insidious in its attack, coming on, in many cases, seemingly without any cause whatever. It is frequently produced by extension from the pharyngeal cavity by continuity of surface. It is thought that bad hygienic surroundings, with the want of proper food, has something to do with producing it. Syphilis and phthisis pulmonalis are supposed to be among the causes of this affection.

The pathological changes which take place are varied. In some cases there is simply a thickening of the membrane lining the drum cavity and the tympanal orifices of the Eustachian tubes; in others there are bands of adhesion formed, stretching across from one part of the tympanic cavity to another, with ankylosis of the

ossiculæ auditus. There may be hyperostosis of the petrous bone, fatty degeneration of the tensor tympani muscle, and thickening of the membrana tympani. The symptoms are fullness about the external auditory canal; loss of hearing, which comes so gradually; vertigo is present in many cases, but is not characteristic of the disease. There is one peculiarity about persons affected with it, and that is many of them hear much better when in a rapidly moving railway coach, or in the midst of some similar noise, than persons whose hearing is perfect.

The treatment of this form of otitis is both local and constitutional. Persons of a strumous diathesis are often benefited by the use of the iodide of potassium and other alteratives of a similar nature. Constitutional medication does but little good where the disease is due to some local cause: as in cases where it extends from the pharynx. Where there is congestion present, with slight pain, the application of a leech to the tragus may be of benefit in many cases.

The medicated fluids that may be used with the catheter and air-bag are numerous. Any of the following may be applied: Corrosive sublimate, half grain to the ounce of water; sulphate of zinc, from one to three grains to the ounce of water; sulphate of copper, the same strength as the zinc; nitrate of silver, one grain to the ounce of water; iodine, half grain, with five grains of the iodide of potassium to the ounce of water. These should be alternated, and the treatment kept up for several months.

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