

arise by inoculation from animals, possibly from infected cereal foodstuffs, and doubtless often from the frequent habit of field workers of chewing bits of hay, straw, etc. Flies may carry the contagion. In one instance kissing was the method of conveying the disease.

It is difficult to say just how often the pharynx is affected, as reliable statistics on this point are lacking. We may refer to the figures of J. Israel, who found that out of five hundred cases the head and neck were involved in fifty-five per cent, and the throat and lungs in twenty per cent. Figures as to localization in the pharynx are not given. In the latter site the disease may be primary or secondary.

The infecting agent is an organism called the "ray fungus." Its exact place in classification is still a matter of dispute. By some it is called streptothrix actinomycotica; by others, actinocladothrix. It appears in the suppurative foci (hereinafter described) aggregated in small masses of a yellowish color. It can be cultivated in gelatin and more quickly in agar and beef serum. Its favorite temperature is about 95° F. For examination a bit of the suspected material should be smeared or teased on a slide, carefully dried in a flame and then stained a few minutes in a solution of picocarmine, washed in water or alcohol, and mounted in glycerin. Sections of tissue are handled in the same way and mounted in glycerin or Canada balsam. The fungi appear yellow and the remainder of the field red. The actinomycotic tufts and single nodes may be recognized, scattered about in the field, and easily distinguishable from the surrounding red.

According to Leumann each of the yellowish masses may be subdivided into three zones: (1) An outer zone made up of club-shaped, wedge-like rays with rounded bases appearing when viewed in section to be set on star fashion and surrounded by large cells or by cells seeming to contain fragments of the fungi in their substance; (2) a middle zone made up of branching mycelial threads (furcated) passing from the centre to the periphery; and (3) an inner zone made up of cocci in chains. The threads are the active portion of the organism and the portion capable of artificial growth.

Certain observers have noted the presence of structures known as Rainey's or Mieschler's corpuscles. These are cylindrical tube-like bodies and are supposed to be due to the growth of the ray fungus inside muscular fibres. They are therefore rather a result than an essential element of the process.

When once infection has occurred extension is probably not through the lymphatics but by destruction of the vessel walls and the consequent easy access to the inner organs by the blood stream. The accompanying glandular enlargement is due to the admixture, with the ray fungi, of pus micro-organisms, notably the streptococcus pyogenes aureus.

Undoubtedly the mouth is the most frequent portal of infection; especially the alveolar processes of the lower jaw. Israel has found the fungi in the lacunae of healthy tonsils, but they are harmless in the absence of solution of tissue continuity.

The first manifestation of infection is generally a periosteal abscess running the usual course and leading in about six weeks to true periostitis. The surrounding tissues are invaded, and suppuration appears between the chin and the hyoid bone, produced, be it remembered, not by the fungi but by pus cocci. Other cases begin as a gingivitis with spongy gums and alveolar stomatitis. From the foregoing sites the lesion attacks localities farther back, notably the pharyngeal wall. The tonsils and palatal arches are but rarely involved. Not infrequently the cheeks suffer. When once the pharynx becomes invaded, either primarily or secondarily, we note small reddish elevations looking not unlike a subacute pharyngitis upon a mucosa previously the seat of chronic changes. The adjacent tissues swell and then seem to lose their appearance of acute inflammation, becoming more like a zone of chronic infiltration, irregular in surface and firm to the touch. Suppuration soon appears

with the development of angry-looking sinuses with undermined edges.

Aside from general pharyngeal discomfort, there are no local symptoms; actual pain is not constant. Later, comes the general deterioration due to the suppuration, but it is not accompanied by any special features. The characteristics, therefore, of the disease are: (1) The remarkable extension and induration of the parts; (2) the slow dragging course of the inflammation; (3) the extension of the process to the surface, after the lapse of several months, by a softening and final spontaneous evacuation, the pus being sero-sanguinolent; and (4) the quick healing of the local focus with apparently a favorable outlook, but the appearance of the infection in the neighborhood, or at a distance, with fresh vigor. Fatal symptoms are always tardy in development.

Diagnosis is called for from syphilis and from malignant disease, especially sarcoma. Sections of the latter may present appearances which strongly suggest actinomycotic tissue, but in the latter the microscope will reveal the ray fungi.

Treatment calls for radical excision if this is possible. Internally, large doses of the iodide of potassium have been given, and have apparently cured some cases. The internal use of silver nitrate has also been advised. Nearly every antiseptic has been used locally, but there is no specific. Without doubt bichloride is as efficient as any.

8. GLANDERS.—Glanders is a disease primarily affecting horses, and may be communicated from them to man and from one man to another. The exciting agent is the Bacillus mallei, resembling morphologically the B. tuberculosis, though somewhat shorter and thicker. Infection may be conveyed from an infected animal by the fine spray of coughing or sneezing, or by the handling of articles used about the animal.

In man the nasal structures are generally the portals of infection, and the process extends to the pharynx. It begins with evidences of a low-grade inflammation, and changes with the formation of granulation tissue containing the characteristic bacilli in swarms. Suppuration soon follows along the avenues of lymphatic distribution. Pus intoxication rapidly develops, the suppuration showing a distinct tendency to burrow. Cartilage and bone may be attacked.

The symptoms are those suggested by an area of local infection. Following the latter we have, within a few days, pain and swelling with degenerative changes. When the pharynx becomes affected we have interference with deglutition and phonation. There is a breaking down of the cervical submaxillary and sublingual glands, with occasional fistulae opening externally. Finally, the general picture of septicaemia develops.

In these days of early examination of all suspicious discharges there is not much danger of overlooking a case of acute glanders, but there are cases in which the only evident changes are those of a subacute pharyngeal catarrh with variable pain, slow glandular involvement, and indefinite and remitting constitutional symptoms. The pharynx shows reddened elevated areas, over which are scattered small undermined ulcers from which dirty pus exudes. At first the pharyngeal functions are not greatly hampered, but increase of the infected areas may mechanically block the breathing and food channels so that death follows from general exhaustion.

Diagnosis is called for especially from the destructive lesions of syphilis. A history of possible glanders infection will of course put us on our guard. This we supplement by the detection of the Bacillus mallei. Some of the chronic cases have been mistaken for ulcerating sarcomata; in such doubt inoculation tests should be made.

The acute form of the disease is rapidly fatal. The use of mallein, an artificial product from potato culture of the Bacillus mallei, may be used for purposes of diagnosis, as it gives a reaction similar to that of tuberculin. Its curative properties are still *sub judice*, but in

view of the gravity of the situation it should always be tried. No positive means of cure is at present known. Supporting treatment merely retards the inevitable end.

Some of the chronic cases are said to have ended in recovery, but the vast majority have been fatal within two years. In these cases treatment should consist of thorough currying of the infected area, the use of antiseptic washes, and the administration of strychnine and iron in full dosage. Some authorities recommend the pushing of the iodides as in tertiary syphilis.

9. RETROPHARYNGEAL ABSCESS.—These cases are often overlooked, because no digital examination is made of the pharynx, the observer contenting himself with mere inspection. The affection should always be suspected in a child with difficulty in breathing and swallowing without apparent cause.

The phlegmon forms in a flat shallow cavity behind the pharynx and oesophagus, limited posteriorly by the spinal aponeurosis and anteriorly by a connective-tissue sheath. Its lateral boundaries are sheaths which stretch from the aponeurosis to the lamellar spinal sheaths. Above is the basis cranii, and below, the mediastinum. The contents are sympathetic ganglia and lymph nodes receiving drainage from the neck, nasopharynx, and pharynx. Externally are important vessels and nerves. The above is the most frequent site of the abscess, but lateral sites are possible; many of the latter are doubtless but "pointings" from a central focus.

The inflammation begins in the lymph nodes and extends to the cellular tissue. It may, however, begin in the latter from irritation, as from instruments or a foreign body. In children in whom the disease is far more common than in adults, infection may come from such conditions as otitis media, erysipelas, pharyngitis, etc. An antral empyema is recorded as the cause of one case. In children of the tuberculous, syphilitic, and lymphatic diatheses, there is always a lessened resistance to infection, and it is in just such children that the malady is most common.

In infants the first symptom may be refusal of the nipple; then follow a metallic cry, dysphagia, and dyspnoea. In older children there is the usual sore-throat symptom complex, and inspection may at once reveal the nature of the trouble, but *palpation should never be omitted*. This may reveal a soft, boggy tumor, which pushes forward the soft palate, and in which perhaps fluctuation may be felt. Lateral cervical swelling is also possible.

The main danger previous to rupture lies in possible laryngeal oedema with bulging of the entire larynx forward, and consequent asphyxia. Burrowing may lead to infiltration of the cervical tissues and death from sepsis. The most common danger is rupture during sleep, escape of the pus into the lower air passages, and speedy asphyxia.

Pus accumulation may occur within twenty-four hours after initial symptoms; other cases may last several weeks, or even several months if they are tuberculous in origin. Diagnosis is called for from coryza, tonsillitis, croup, and even diphtheria.

Immediate evacuation of the pus is necessary. The child must be held in a good light with open mouth, a gag being used if necessary. With a protected blade an incision should be made from the middle of the fluctuating area to its bottom. *Immediately after incision, the child which has been held with its head forward should be inverted so as to allow the pus to run out of the mouth*. Meanwhile the finger which was *in situ* directing the incision, should be passed into the sac so as thoroughly to open it and thus prevent refilling. Lateral pressure of the pus will direct the large vessels outward so that there is little practical danger of injuring them. In one case sudden death occurred as the incision was made. Oedema of the glottis was not present, but the pneumogastric nerves had been stretched by the pressure of the pus. Death was ascribed to reflex syncope. In cases with much cervical swelling lateral incision from the outside has been suggested. Some have even recommended this procedure for central fluctuation, the escape

of pus into the lower air passages being thereby prevented.

10. PHARYNGEAL MYCOSIS.—Over one hundred organisms are found in the healthy mouth. The most common are the oïdium albicans, actinomyces, aspergillus fumigatus, bacillus fasciculatus, the fungus causing nigrities linguae or "black tongue," and various species of leptothrix. By common usage the term pharyngeal mycosis, when used without modification, refers to the affection characterized by the growth of the leptothrix. It was first described by Fraenkel in 1873, receiving the name mycosis tonsillaris benigna. It occurs on the tonsils, tongue, pharyngeal wall, faucial pillars, epiglottis, and rarely in the nose, nasopharynx, and larynx.

The fungus clings to the epithelia and often prefers a healthy to a diseased surface, above which it appreciably projects. It is of horny consistency and is removed with difficulty. Threads may connect the isolated deposits so that the general appearance is that of roots with running tendrils. If a portion be teased out and examined in glycerin under the glass, we note a mass of epithelia surrounded by irregular granules in which are embedded the spores of various species of leptothrix. These spores are arranged in link-like processes, their ends being rounded or club-shaped. The processes vary in length, and may be curled up at the ends in hair-like filaments. Besides these bodies there are round or oval, highly refractive bodies arranged in colonies or scattered among the branching spores. The link-like processes are the mycelia of the fungus, and staining with methyl blue will show alternating colored and uncolored segments. The fungus has never been cultivated outside the human body.

As clinically seen the affection follows previous pharyngeal inflammation, deposits of tartar on the teeth, altered reaction of the buccal fluids, disordered digestive states, etc. There is no reason to believe that rheumatism or gout has any direct causative relation. Incidentally it may be said that the same fungi have been found in fetid bronchitis, tracheal oedema, pulmonary gangrene, rhinoliths, tonsilloliths, vesical calculi, the tongue coating of low febrile states, in the lachrymal duct, intestines, vagina, and feces. At any site they may precipitate lime salts from fluids holding the same in solution.

In 1895 Siebenmann advanced a different view as to the nature of the familiar pharyngeal mycosis, claiming that it was essentially a hyperkeratosis of the mucosa. All tonsils exhibit this in a varying degree, and this collection of hyperkeratosed epithelium is a constant menace to the integrity of surrounding structures.

The symptoms are pharyngeal dysaesthesia, cough, difficulty in swallowing, sensation as of a foreign body, and occasionally reflex pain in the larynx. Possibilities are fever, enlarged submaxillary glands, and congestion of the palate and uvula. Periods of improvement and relapse succeed each other without any treatment whatever. The affection is in no wise dangerous, and it alarms patients out of all proportion to its gravity.

Treatment.—In treating a case the teeth must be placed in proper condition, the digestion regulated, and for a time at least all sweets must be cut off. Climatic changes may give surprisingly favorable results. Nearly every caustic has been suggested for the destruction of the roots of the fungi; mere superficial clipping off is useless. The only reliable measure is the use of the galvano-cautery plunged into each crypt harboring a root of the fungus. If the cautery is unavailable, chromic acid fused on a probe will answer.

James E. Newcomb.

PHARYNX, DISEASES OF: FOREIGN BODIES. See Air Passages, etc.

PHARYNX, DISEASES OF: MALFORMATIONS, DEFORMITIES, AND NEW GROWTHS.—The consideration of this subject naturally requires its division into two parts: (1) Malformations and Deformities; and (2) New Growths.

1. MALFORMATIONS AND DEFORMITIES.

There are two kinds of malformations which affect the pharynx—stenoses and dilatations. We will take up these subjects in the order named.

Stenoses may be congenital or postnatal, and they may be incomplete or complete. Complete stenosis or atresia is accompanied by pocket-like dilatations or pouches. These malformations are to be ascribed to prenatal anom-

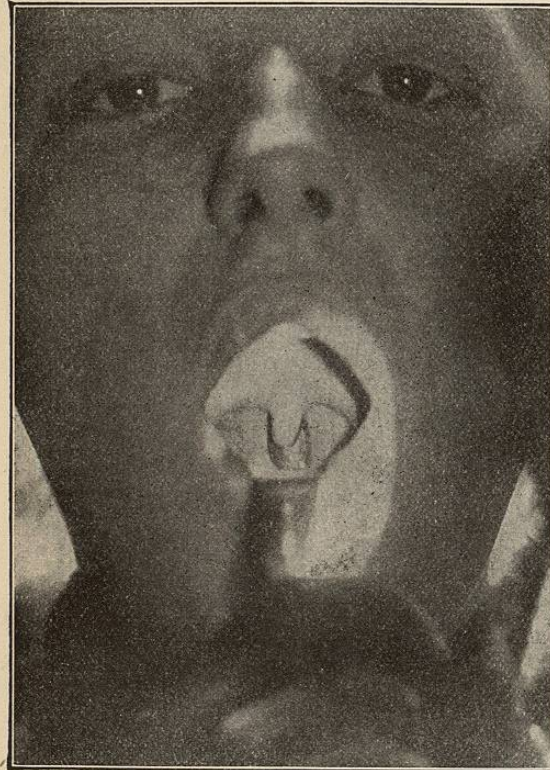


FIG. 3803.—Diaphragm of the Pharynx. (Case of Dr. S. S. Bishop.)

alies of development. The constrictions are most often found in that part of the pharynx which lies adjacent to the cricoid cartilage of the larynx, but they have been met with also in the upper part of the pharynx, at the junction of the oral and nasal portions of this cavity.

The lower constriction appears as a ring-like septum of mucous membrane, which may reduce the calibre of the tube by one-half or more of its diameter, and cases of complete atresia have been reported. Fortunately, these stenoses may exist without being productive of suffering so long as they do not become the seat of an inflammatory process.

The palatal, or high, stenosis is formed by a membrane which stretches from the soft palate backward and outward to join the posterior and lateral walls of the pharynx. Cases of diaphragm of the pharynx resulting from scarlet fever, such as the writer has reported, and syphilitic adhesions, may be mistaken for congenital stenoses, but a close examination may reveal scar tissue, which is indicative of a previous inflammation.

Postnatal malformations are the result of two classes of causes: intrinsic and extrinsic. Intrinsic causes, or those which have their origin in the pharynx, are such as scarlet fever, lupus, syphilis, diphtheria, and traumatism. Extrinsic causes, or those which operate from without the pharynx, are in the nature of deformities of the spine, tumors, and abscesses.

Intrinsic stenoses are most often due to syphilitic adhesions which spread out above the oral pharynx and

connect the posterior pharyngeal wall and posterior columns of the fauces with the soft palate. The diaphragm thus formed may be partial or complete. The appearance of this adventitious tissue, and the presence of suggestive scar tissue, together with more or less inflammatory destruction of the adjacent soft parts, will simplify the diagnosis. The differentiation is still further facilitated when perforations of the hard palate are present, for these sequels are particularly characteristic of syphilis.

Syphilitic membranous adhesions are sometimes found connecting the posterior pharyngeal wall with the base of the tongue, or a syphilitic stenosis may be formed at a point opposite to the cricoid cartilage of the larynx, where the congenital stricture is most often located. These membranous diaphragms are perforated, and, like the prenatal stenoses, they may cause little or no inconvenience so long as they are not involved in any inflammatory action, and they are not prone to such attacks.

Scarlet fever is sometimes responsible for these membranous obstructions. Such a case was reported, with an accompanying photographic illustration (Fig. 3803), by the writer in 1898.* The subject was a young lady who had had an attack of scarlet fever when she was a small child. The age at which she was sick could not be ascertained. The nasal pharynx was found to be separated from the oral portion by an adventitious membrane, which extended from the posterior columns of the fauces and the arch of the soft palate downward laterally and backward to the lateral and posterior walls of the pharynx opposite to the base of the tongue. Its general direction from the palatal attachment, instead of being nearly horizontal, closely approximated a vertical plane. In the centre of this diaphragm was an oval opening, the long diameter of which was vertical. Through this perforation the posterior wall of the pharynx was visible, and nasal respiration took place. The patient complained of no serious inconvenience resulting from this anomaly, except that food would lodge behind the membrane and demand her attention to wash it out so as to prevent decomposition and its results.

Suppurative processes of the pharynx in the course of other diseases may produce anomalies similar to the one which I have just described. Such diseases are diphtheria, smallpox, lupus, and erysipelas. In such instances the pharyngeal symptoms become very prominent and distressing during the inflammatory stage. The constitutional disturbances are pronounced, the cervical glands may be involved, the difficulty of swallowing is marked and becomes evident to the patient's friends. Inspection of the throat reveals the characteristics of an intense degree of inflammation: redness and tumefaction of all the surfaces involved, oedema of the soft palate and uvula, and, in the advanced stage, suppuration and ulceration. These characteristics of inflammatory affections which eventuate in pharyngeal stenoses should put the practitioner on his guard against such results.

Traumatic causes of pharyngeal stenoses are in the nature of scalds, such as the accidental drinking of hot liquids by children, and the chemical action of caustics, such as carbolic acid, potash, etc.

Treatment.—The treatment of stenoses of the pharynx may most conveniently be considered under two headings—general and local. In the case of syphilitic adhesions general treatment should first be instituted, and should consist of the exhibition of the iodides and mercury according to the principles laid down in the article on syphilis. The local treatment formerly consisted of systematic dilatations by means of graduated bougies, but the firm, fibrous character of the membrane does not lend itself encouragingly to this method of treatment, for the stenosis returns after the dilatations are discontinued. The knife also was much in vogue in early days for the eradication of these anomalies, but we now have, in the electric cautery, a much safer and more certain means of removing adventitious tissue.

*See "Diseases of the Ear, Nose, and Throat, and their Accessory Cavities," by S. S. Bishop, 2d edition, p. 416.

A practically bloodless and painless operation is possible by means of the electric-cautery dissection after the application of suprarenal extract and cocaine to the field of operation, as follows: A fresh or preserved saturated solution of the suprarenal gland is applied to the periphery of the membrane which is to be removed. The writer reverses the method usually employed in the application of suprarenal solution and cocaine, and applies the suprarenal preparation first for the following reasons: If the blood-vessels of the tissues to be operated upon are first contracted, the blood current is so far diminished in volume as to reduce to a minimum the amount of cocaine that is taken into the circulation. Hence there is less liability to the toxic manifestations of cocaine. Moreover, when it is possible to contract the tissues before applying cocaine to them the anæsthetic penetrates relatively deeper and produces a more profound degree of anæsthesia. By observing this rule of procedure it is possible to employ a stronger solution of cocaine than would be safe if the order of application of the remedies were reversed. I have demonstrated the importance of these facts in a long series of operations.

Cocaine should be applied to the surfaces to be severed, not by means of a spray, but by the cotton applicator, care being taken that the surplus of the cocaine solution is expressed from the cotton pledget on the carrier before the application is made. This is necessary in order to prevent any excess of cocaine from running down into the larynx or the œsophagus. Strong solutions of this very toxic remedy must be either avoided, or employed in the pharynx with the greatest caution. For the sake of emphasizing this statement it is excusable to cite a case which was brought to the attention of the writer by a former clinical assistant. He was about to operate on a patient's throat after having applied cocaine, but before he began the operation alarming symptoms developed, and the patient suddenly expired in his chair. It must be kept in mind that in these throat operations an extensive surface must be cocaineized, and that, therefore, a large amount of the drug may be absorbed. The writer has seen numerous cases of collapse and acute mania result from its employment in operations where the surfaces requiring anæsthesia were of much smaller area, but these unfortunate manifestations were probably due to the use of sprays that medicated other parts, in addition to those which were operated upon. I believe that such accidents can be avoided by the use of weaker preparations than those commonly employed, since they are often of twenty or thirty-three per cent. strength, and by taking the precautions already advised. The writer attributes to these reasons the fact that he has never had any such distressing experiences as those mentioned above. It is better not to apply to the pharynx solutions of cocaine stronger than from four to eight per cent. I speak in detail of these matters here in order to avoid repetition in treating of pharyngeal procedures under local anæsthesia later. The operation, after cocaineization, consists of passing a bent electrode, at a white heat, through the periphery of the obstructing membrane, carrying the electrode, as it burns its way, throughout the whole circumference of the diaphragm. Care must be exercised not to encroach upon the surrounding tissues, which we do not wish to attack. After the membrane has been thus severed, if any hemorrhage occurs, the suprarenal extract must again be applied; but if the electrode is properly used and is not allowed to cool before being removed from the tissues, little or no hemorrhage follows.

It is advisable to keep the patient under observation for a few hours after the operation in order to anticipate any secondary bleeding that might occur. Should any tendency to the formation of exuberant granulations appear, they may be suppressed by the application of the silver-nitrate pencil. If a ten-per-cent. solution of this remedy be painted over freshly operated surfaces, there is far less danger of hemorrhages, and the desired effects of the operation are enhanced.

Little in addition need be said regarding stenosis due

to lupus, but the present indications are that we are justified in expecting beneficial effects from the x-ray treatment.

Extrinsic causes of pharyngeal stenosis may consist of tumors, such as an aneurism or a goitre, or the cervical portion of the vertebral column may be deformed or diseased, or a retropharyngeal abscess may encroach upon the lumen of the cavity; but the treatment of these conditions obviously does not lie within the limits of this article.

Dilatation of the pharynx may affect the whole, or only a part, of the cavity. It generally exists in the form of a pouch, which is comparable to the aneurismal distention of an artery. The congenital variety is to be attributed to an intra-uterine developmental anomaly.

The acquired, or postnatal, form probably occurs in consequence of an imperfectly developed, or weakened, area of the tunic of the pharynx, which yields to undue pressure. Contributory to these causes are the habits of improperly masticating food, and a hasty manner of forcing large and irregular boluses of food down the gullet. It is easy to conceive that these repeated distentions of the pharynx tend to carry the mucous membrane between the surrounding muscular fibres, especially where the latter may be weak or defective. A pouch so formed may continue developing until it becomes several inches long. It is most likely to be found extending downward and backward between the vertebræ and the œsophagus. Generally this diverticulum consists of the mucous and submucous coats of the pharynx, but it has been found to be enclosed in the œsophageal cellular membrane. Occasionally these pouches extend to one side, and are sufficiently prominent to appear as a tumor in the side of the neck.

The most prominent and constant symptom is a difficulty in swallowing. Food lodges in the pouch and forms a temporary tumor, which obstructs the act of deglutition, until the pouch is emptied automatically or by the patient. He generally learns, however, that by digital pressure and manipulation of the tumor he is able to express the contents and enjoy relief. Unless this is done the imprisoned food may decompose and set up an inflammatory condition. Indeed, such an inflammatory process has given rise to the formation of adhesions which have resulted in a closure of the sac and a consequent permanent cure. But a less fortunate termination of such an inflammation may be the occurrence of sloughing of the surrounding tissues.

Other distressing symptoms arising from the ejection of food retained in the pouch are in the nature of an irritation of the lower respiratory tract. For example, the emptying of food into the larynx occasions violent spasms of coughing, and some particles may even reach the bronchial tubes and cause attacks of bronchitis or pneumonia.

The *diagnosis* of this condition is made with comparative facility. The obstruction to swallowing, the tumor which disappears and recurs, or which can be dissipated by pressing out its contents, the ejection of undigested food in the absence of actual vomiting, the entrance of particles of food into the larynx subsequently to, instead of during, a meal, together with the results of an examination with the throat mirror and digital exploration, afford a mass of evidence that is of a pathognomonic character.

The *prognosis* is not a cheering one. Without operative interference the condition is rarely corrected. In an occasional instance an inflammatory process is instituted which eventuates in a spontaneous closure of the pocket and a resulting cure. But there is always the danger of retention and putrefaction of food. In some cases patients must needs subsist on a fluid diet in order to avert such results; but in conditions that lend themselves favorably to operative measures the anomalies may be corrected.

Treatment.—We may best consider this subject under two divisions—palliative and curative. Palliative treatment rests mainly with the patient. By avoiding hurried

eating and imperfect mastication he removes the principal cause of acquired pharyngeal pouches, for it is the forcing of boluses of food through the cavity that distends the mucous coat of the pharynx and pushes the membrane between the fibres of its muscular tunic. After a meal during which ingesta enter the pouch he should manipulate the distended sac with his fingers until it is emptied, and he may even be able to wash it out by means of a properly curved syringe. By this means the fermentation and decomposition of retained food may be prevented.

When the diverticulum is situated at the side of the neck the patient may be able to prevent it from filling if he will press upon it with his fingers, or if a compress be worn over it at meal time. If these means do not suffice, and if the symptoms become urgent, it may become necessary to resort to an operation.

Operative Treatment.—The simplest and most promising measure of this nature consists in the application of the electric cautery to the periphery of the pharyngeal mouth of the sac. Cocaine should first be applied to the field of operation, the surgeon being careful to observe the precautions already mentioned. After this preparation for the adhesion of the adjacent borders of the pouch rectal alimentation is resorted to for a few days. In certain cases it may be necessary to operate after the methods employed in pharyngotomy or œsophagotomy, suturing the edges of the divided mucous membrane to hasten recovery and insure the subsequent integrity of the pharyngeal cavity.

II. NEW GROWTHS.

Neoplasms of the pharynx will be considered under the following classification:

1. <i>Epiblastic and hypoblastic.</i>	2. <i>Mesoblastic.</i>
Papilloma	Fibroma
Adenoma	Lipoma
Cystoma	Angioma
Carcinoma	Sarcoma

Fortunately the pharynx is not so often the seat of neoplasms as are the nose and some other areas; but when growths do occur in the pharynx they give rise to warranted apprehension, even if they are of a benign nature, since, as Virchow has observed, they may take on a malignant character. More particularly is this true of tumors situated, as these are, in a passageway which renders them subject to frequently repeated disturbances and irritation. A still further important consideration is the hindrance which they may cause to the acts of swallowing and breathing, and the consequent impairment of nutrition and deficient oxygenation of the blood. To these genuine reasons of anxiety may be added the tendency to recurring attacks of inflammation to which these growths predispose the subject, and the proneness of the inflammatory process to invade the larynx and lungs.

PAPILLOMA.—This is an epithelial tumor of a benign character, which occurs less frequently in the pharynx than in the larynx and mouth. The structure consists of epithelial cells, with a framework of connective tissue beneath the epithelial proliferation. Within this tissue, and separated from it by the membrana propria, is the vascular area. What has been said relative to the transformation of innocent tumors into malignant ones applies with especial appropriateness to papillomata, since no other growths are so likely as these to undergo degeneration. Add to this fact the exposed situation in the pharynx and the frequently repeated irritation to which their location subjects them, and all of the conditions favor their malignant transformation. Aside from the pillars of the fauces and the tonsils, the most common location of papillomata in the pharynx is the posterior wall. They vary in size from a hempseed to a cherry.

The *diagnosis* of pharyngeal papilloma ordinarily presents little or no difficulty, particularly when no inflammatory process is present. But since they are often as-

sociated with an inflammatory condition, or follow it, in such cases there is room for doubt. Then a section should be taken from the base of the tumor, or tumors if they are multiple; for a microscopical examination. The growths have a warty or cauliflower shape, and are of a pale pink or gray color when not made red by irritation or inflammation. Their glistening appearance is due to the reflection of light from the secretions which moisten their surface.

Unless they attain to a considerable size they do not provoke any symptoms sufficiently marked to call attention to their presence, such as a sense of a foreign body in the throat, or impeded deglutition or respiration.

The *prognosis* of papillomata of the pharynx is favorable, provided that they do not undergo a transformation into carcinomata or sarcomata. They rarely become larger than a small-sized grape, and so long as they remain of an innocent nature no suffering is experienced.

Treatment.—Treatment consists in extirpation and cauterization of the seat of attachment. This is best effected by means of the electric cautery, which accomplishes both purposes at the same time. Or the tumor may be severed close to the surface from which it springs, by means of the scissors, knife, or the cold snare; but the base should be well cauterized afterward either with the electrode, or the silver nitrate, or one of the other chemical caustics, in order to lessen the likelihood of a regeneration or degeneration of any tumor tissue which may remain.

ADENOMA.—True adenoma does not occur in the pharynx proper. Adenoid vegetations in the nasopharynx are discussed under the heading of *Tonsils*.

CYSTOMA.—The true cystic tumor, or that in which the wall of the cyst is produced from a matrix of embryonic cells, and the products of tissue proliferation of the cells lining the cyst wall constitute the contents of the sac, is rarely, if ever, met with in the pharynx. Retention cysts, however, occur as the result of an inflammatory process, which causes a stenosis or closure of the duct leading from a gland, with the result of distending the duct, as the glandular secretions accumulate behind the stricture until the consequent tumefaction becomes apparent. The continued accumulation of the contents of the sac causes sufficient pressure on its walls to account for the degeneration of its epithelial lining and for the atrophy which is present in the attenuated membrane. These cysts are generally found in adult life, or in those who have passed the meridian of life.

Treatment.—A simple and effective method consists in opening the sac and destroying its walls. This may be accomplished by an electrode, which serves the double purpose of dividing the wall and destroying the cyst after the contents escape. Or the opening may be made with a knife, after which the walls of the sac are destroyed by a curette. Then the parts had best be treated with tincture of iodine or a ten-per-cent. solution of silver nitrate.

CARCINOMA.—When cancer exists in the pharynx proper it is generally either secondary to the same affection of adjacent tissues, such as the tonsils, the soft palate, the œsophagus, or the larynx, or it is associated with such an affection; and as diseases of these structures are considered in other sections, in order to avoid repetition the reader is referred to their proper headings.

FIBROMA.—Fibromata are found in various parts of the pharynx, but they are more common to the nasal portion than to the oral division of the cavity; and they more frequently spring from the basilar process of the occipital bone. A fibroma is a representative tumor of the mesoblastic type. Like the submucous tissue from which it takes its origin it is a connective-tissue growth, and is the offspring of a highly vascular area. It is made up of mature fibrous tissue from a matrix of fibroblasts. The growth of this neoplasm is always slow, and frequently there is a tendency toward a myxomatous degeneration, or it may undergo transition into a sarcoma. As it is most often seen in the superior portion of the pharynx it is pear-shaped (Fig. 3804), but it may be sessile, and it is a product of youth rather than of old age,

for it is rarely encountered above the age of thirty or forty years.

The *symptoms* referable to pharyngeal fibromata are determined by the position and size of the tumors. Located in the upper or nasal portion of the pharynx they interfere with nasal respiration and impair the resonance of the voice. They sometimes attain to enormous proportions, extending forward into the nasal fossa, crowding forward the nasal and orbital bones, protruding and separating widely the eyes so as to constitute the unsightly deformity known as "frog face," and giving rise to persistent headache. Extension of the growth upward causes encroachment on the cranial cavity, evoking cerebral symptoms. If the direction of the tumor is principally downward it

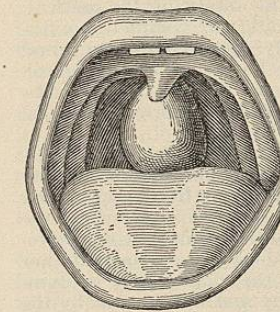


FIG. 3804.—Fibroma of the Pharynx.

causes frequent efforts to swallow, and it may produce sufficient pressure on the soft palate to impede its movements in speech and deglutition. When it reaches the aperture of the larynx it may even threaten suffocation. Mouth-breathing is a prominent symptom, and hemorrhages frequently occur as the tumors are exceedingly vascular. Impaired respiration, mental torpor, and "thick speech" characterize large growths; and when pressure is produced on the orifices of the Eustachian tubes, the proper ventilation of the middle ears is interfered with and the hearing becomes defective. A copious muco-purulent discharge is sometimes present.

The *diagnosis* of fibromata is not attended with serious difficulties. Their occurrence in young persons and their slow growth are characteristic. From mucous polypi they are recognized by their firm, dense substance. They are distinguished from adenoid growths in the vault of the pharynx by the soft, spongy, lobulated appearance of the latter and their occurrence in the very young only. Fibromata are dense, smooth, and of a dark red color.

Prognosis.—It should not be forgotten that, as Virchow says, "fibroma only needs an increase in the size of its cells and a diminution of the cement substance to change it into a sarcoma." The location of a fibroma in the pharynx subjects it to a great amount of irritation; hence it is thereby predisposed to a degenerative transition into a sarcoma and to attain to large dimensions. Unless the growth can be removed, or unless its development can be repressed until the patient has passed his twenty-fifth year, the prognosis is grave.

Treatment.—Curative results have been claimed by numerous writers from injections of alcohol, caustic potash, chloride of zinc, dilute acetic or hydrochloric acid, etc., into new growths. It is asserted that if alcohol will produce contraction and atrophy of tissues, as occur in the cirrhotic liver of the inebriate, it will have a similar effect on a neoplasm, into the parenchyma of which it might be injected. While some observers believe that the curative effect is produced, when the alcohol is injected into the interior of the tumor, by causing the formation of new connective tissue, with the obliteration of blood-vessels, lymphatics, and the parenchyma, others inject it into the circumference, maintaining that the new connective-tissue formation, girdling the periphery of the growth, will choke the afferent and efferent blood-vessels, cut off nutrition, and thus cause atrophy.

Electrolysis is especially indicated for growths having a sessile formation, which precludes the use of torsion or the snare. For this purpose a strong current is employed under general anæsthesia. Much has been claimed for the method of introducing medications with the electric current, or cataphoresis; but

whenever it is practicable to remove the tumor in its entirety, this procedure should be preferred.

Operations.—There are several methods of operating from which to choose according to the size and situation of any given tumor. However, before detaching the growth it should be secured by passing a strong thread through it, in order to prevent it from falling into the laryngeal region of the throat and producing suffocation when the attachment is severed. The old method of removal by the cold wire snare is in quite general use, but on account of the great vascularity of these tumors and the consequent operative hemorrhage the electric snare recommends itself, since it sears over the tissues and closes the mouths of the blood-vessels with coagula as the tissues are being severed. For the same reason, in those cases in which the form and position of the attachments of these neoplasms lend themselves to such a procedure, the use of the electric knife at a white heat is advantageous. Torsion can be practised when the tumor is distinctly pedunculated.

Certain cases of pharyngeal fibromata can be operated on through the natural oral or nasal passageways by the method mentioned above. Others, either on account of peculiarities of attachment or by reason of excessive or irregular development, must be removed through the soft or hard palate, or by means of resecting the nasal bones or the superior maxilla. Sufficient room for operating may be obtained by dividing the nose along the side of the septum, beginning at the nasal process and cutting from within outward. If more room is required, the nasal process is resected; still better access is afforded by incising the upper lip in the middle line and separating its attachments liberally. The tumor is then detached by one of the methods already described, or by the periosteal elevator, or by blunt-pointed scissors, when it is drawn out with strong forceps. These are very bloody and dangerous operations, and may require a preliminary tracheotomy and ligation of the common carotid artery. However, since the details of these operations, as devised and modified by König, Dieffenbach, Langenbeck, Rouge, Ollier, Kocher, and others are given in other articles in this HANDBOOK, they will be omitted here.

D. Bryson Delavan strongly favors the employment of electricity both for the purpose of cutting off the blood supply of fibromata and shrinking them preparatory to their removal, and for their extirpation as well. Electrolysis is recommended, either by the unipolar or by the bipolar method. Either one is attended with pain. The first is the more painful and slower of the two. The bipolar method is less painful and more rapid and extensive in its destructive effect. Some operators make use of so strong a current as from 80 to 340 milliamperes. After reducing the volume of the tumor it is removed, preferably, by the incandescent wire snare, with the electric current of sufficient strength to burn its way slowly, so as to destroy the tissues thoroughly at the attachment, and to close the mouths of the severed blood-vessels. Delavan gives credit to Lincoln for introducing this method into America after the suggestions of Voltolini and Michel, and he presents, in addition to many cases collected by others, statistical data compiled by himself, which bear out the claims for the superiority of operations by the electrolytic needles and the electric snare through the natural passageways.

The statistical tables referred to cover the decade from 1891 to 1901, and include 80 cases operated upon by various surgeons who performed preliminary operations, such as resections of the nose, the superior maxilla, and the palate. There were 106 cases in which the method of operating was through the natural passages. Of these, 48 are classed as surgical and 58 as electrical procedures. Eliminating all of those cases in which the operators forgot to inform their readers regarding the nature of the results of their work, we have remaining 89 cases which are of actual value in determining the relative merits of the various methods employed. This shows 13 operations involving a preliminary intervention, with 54 per cent. of cures, 23 per cent. of deaths,