

hyoid muscle; the internal wall (vertical) by the genio-glossus and the hyoglossus. The mucous membrane of the floor of the mouth and the *glandulae sublinguales* close its cavity on top. It is through this channel, however, that the infection gains entrance, so that the affection of the submaxillary gland is in many, if not all, instances secondary.

The *symptoms* are constitutional and local. The former are in general those of pus formation, but it is important to bear in mind that the pathological process may also give a distinctly asthenic type of symptoms, with an overwhelming prostration and low temperature.

The local symptoms, in addition to the prominent swelling of the neck, present the following diagnostic points: First, and most diagnostic of all, there is a peculiarly hard and wooden-like induration of the affected region, sharply defined from the surrounding normal tissue; second, the thrusting forward and upward of the tongue toward the palatal vault by the accumulating inflammatory products; third, severe dyspnea, with the possibility of laryngeal edema; fourth, the sensation of pressure as from a hard pad or button-like swelling at the inner aspect of the dental arcade. With all of these there are associated the ordinary features of a phlegmon. Swallowing is painful, if not impossible, on account of the muscular infiltration, and the patient may not be able to open the mouth.

The *prognosis* is always grave and the rate of mortality high, one series of cases reporting over fifty per cent. of deaths. Death most frequently results from sepsis, or from suffocation due to laryngeal edema.

The condition must be differentiated from osteomyelitis of the lower jaw, simple adenophlegmon of the submaxillary gland, and the rare disease known as Fleischman's hygroma. In the first there is no limited focus of inflammation. The entire bone is affected, the inflammatory process is more generalized, and the subhyoid region is rarely involved. In the second, adenophlegmon, the inflammation is superficial, the gland and its capsule are easily accessible, there is no wooden-like hardness, superficial incision gives exit to pus, and the process is localized at the outset behind the internal face of the maxilla. In the third the diagnostic points are suddenness of onset, location in the median line, and lack of either constitutional or local evidences of inflammation.

The *treatment* must be based upon three principles: First, early and free incision; second, careful subsequent antiseptic; and third, constitutional support. The condition is one of ptomain poisoning. The cause must be removed, and the effects already produced must be vigorously counteracted.

Gerster demonstrates that the object of the incision is not so much to evacuate pus as to relieve tension. He supports the modern view that the submaxillary gland is the focus of the disease, and attaches much importance to the fact that pressure over the oedematous area rarely causes pain except directly over the gland. If such evidences appear, delay in operating is not justifiable.

The operation must be done under general anaesthesia, for deep tissues must be explored, in close proximity to important vessels and nerves.

Fluctuation may be delayed because of the pus being confined within a fibrous capsule. Early incision may evacuate nothing more than an ichorous discharge, while pus may form later, but tension is thus relieved and the consequent dangers of suffocation are much lessened.

Deep lateral incision over the submaxillary gland, operation through the mouth, and even external incision in the median line are all to be condemned.

The most effective method is that suggested by Gerster, namely, to lay bare the entire submaxillary region by a careful dissection before making the incision for evacuating the abscess.

To be effective the incision must penetrate the mylohyoid muscle.

Following incision irrigation with bichloride (1 to 1,000) or boric acid (1 to 100) must be carefully carried out, and

stimulants and tonics administered according to indication. The application of cold to the neck, if of any value at all, can be of service only in the very earliest stages.

Hydrogen peroxide may assist in the separation of the sloughs.

A good *résumé* of the literature of this subject is given by J. E. Newcomb in the *New York Medical Journal*, November 23d, 1895. *D. Bryson Delavan.*

PHARYNX, DISEASES OF: CHRONIC AFFECTIONS.—1. SIMPLE CHRONIC INFLAMMATION.—In this form of inflammation the morbid process usually localizes itself on the pharyngeal mucosa proper, the surrounding structures escaping. Occasionally it localizes itself in the faucial pillars and may then be properly called chronic faucitis.

A frequent cause is the continuous action of irritants such as excess in alcohol, tobacco, dusty occupations, etc. Many cases are associated with chronic nasopharyngitis. In many cases also the malady is but one feature in a general catarrh affecting the entire food tract, for to the latter and not to the respiratory tract does the pharynx functionally belong. Acid fumes, over-use of the voice, abnormal humidity of the air, high temperatures, are all to be reckoned as possible causes. It may be difficult to isolate the exciting factor, for many of the cases come on so gradually that it is difficult to determine any special reason for their occurrence. Undoubtedly the modern method of living in overheated houses is a powerful predisposing agent.

The changes set up in the mucosa are those of a proliferative inflammation. The vessels may show an initial hyperæmia, but the essential change is the formation of new connective tissue in the deeper layers of the membrane. Mucous glands are here scanty, but secretion from the membrane as a whole is increased, and in view of the abnormal surroundings it soon becomes viscid. Occasionally nodular veins may be seen coursing over the posterior wall of the pharynx.

The most prominent symptom is local irritation, but actual pain in swallowing is rare. Owing to the co-involvement of the stomach, there are more or less morning retching, nausea, and even vomiting. These conditions may make examination of the throat extremely difficult. The breath may be sour and offensive. Constipation and flatulency are frequent. Cough and huskiness of the voice are not uncommon. Hemorrhage occasionally takes place from a ruptured capillary. The mucosa is dark and beefy in appearance, but this feature does not extend farther forward than the posterior pillars. The pharyngeal wall may be covered with tenacious secretion. The grade of severity of the symptoms is generally conditioned on the amount of accompanying nasopharyngitis.

Treatment should be first directed toward the correction of any vicious habits in eating or drinking. Excesses in tobacco and all alcohol must be cut off short. The former are indicated by a dry glazed look, and the latter by a red, angry appearance of the mucosa. To facilitate a thorough examination of the throat, we may use ice-water gargles, bromide sprays, bromides internally, and even weak cocaine sprays. I have generally found it necessary to interdict, during treatment, tea, coffee, and all very hot or highly seasoned fatty and greasy foods. All food must be thoroughly masticated, and but little fluid should be taken at meals. Attention is now to be given to the gastro-enteric tract. Cholagogues, salines, alkalies with bitters, etc., here find a proper application. Attention in detail to the foregoing matters will often obviate the necessity for local treatment. For topical use we may employ solutions (twenty grains to the ounce) of silver nitrate, the zinc salts (the chloride excepted), alumnol, or protargol. For such remedies as are applied by cotton carriers, the oleostearate of zinc, made of zinc stearate in mentholated alcohol, forms an agreeable viscid menstruum. Before any of these are applied, the mucosa should be thoroughly cleansed with a

warm, alkaline spray. Gargles are of secondary value here, as the puckering of the throat surfaces, incident to their use, gives only a partial contact with the mucosa.

2. CHRONIC FOLLICULAR INFLAMMATION.—This variety practically limits itself to the pharyngeal wall proper, the faucial structures not being involved. It is of clinical importance because the symptoms are out of all proportion to the mild appearance of the lesion.

The brunt of the process falls on the lymphoid follicles and is one expression of "lymphatism" or the tendency of all lymphatic structures to take on overgrowth during the earlier periods of life. While during the very early years this tendency is more noticeable in the nasopharynx, it may become localized, as time goes on, in the pharynx proper. Bad hygiene is an important causative factor. The subvariety of the disease called "granular," because the smallness of the follicular enlargements gives the mucosa a granular appearance, has been referred to a systemic hyperacidity; but this view is objectionable, in that it invokes the relation of the mucous glands to the condition, they becoming stopped up by the action of the acidity which precipitates their mucin. Improper vocal effort, both overuse of the voice and use under improper conditions, may lead to follicular enlargement; hence the familiar name of "clergyman's sore throat."

As noted above, the follicular enlargement may be granular or may occur in the form of large masses like red beads on the pharyngeal wall. At times it may be localized behind the posterior pillars, the appearance presented being not unlike that of columns or bead-chains. This is the "pharyngitis lateralis" of some writers. These longitudinal deposits may fuse with the pillars, but are generally of a darker hue. The follicles nearest the mouths of the muciparous glands are the most involved. In all cases the process is essentially a hyperplasia, an actual increase in the number of lymphoid elements, especially about the efferent channels of the nodes themselves. This hyperplasia may involve the entire thickness of the mucosa or it may confine itself to projections from the surface. At first the enlargements are soft, but they harden and become smaller with time. The process seems to involve the tendrils of the sensory nerve fibres, though whether merely by compression or in some other way not understood is uncertain. This nerve involvement accounts for the relative severity of symptoms.

The most prominent symptom is pharyngeal dysæsthesia increased by swallowing or vocal effort. Secretion is not as a rule increased. It may be blood-streaked by the rupture of a superficial vessel. The tonsils often become adherent to the faucial pillars, and from the frequent efforts at hawking the uvula becomes elongated. The voice is husky and a nervous, irritable cough is present. The patients become very neurotic, and this fact in turn aggravates pre-existing symptoms. The disease continues indefinitely unless treated, though it does not seem to predispose to lesions of the air tract below.

Treatment calls for the same general measures as for simple chronic pharyngitis, and in addition for the destruction of the enlarged follicles. Any of the caustic acids or the electro-cautery may be used for this purpose. A small iron wire, heated in the flame of a spirit lamp, will answer. A drop of a two-per-cent. solution of cocaine injected into the area of puncture makes the latter practically painless. Six or eight punctures may be made at each sitting, an antiseptic spray being used on the intervening days. The minute sloughs should be allowed to come away before treatment is resumed. Curing of the entire area has been advised. Internally we may give the iodides in small doses and the various alkaline mineral waters freely. It is unlikely that the latter are of real service unless they correct some underlying diathesis. Tobacco should be cut off. Alcohol may be used sparingly. Nervous patients need arsenic, strychnine, and phosphorus.

3. CHRONIC ATROPHIC INFLAMMATION.—In this variety there is an actual atrophy of glandular tissue and of the other elements of the mucosa. Some authorities look

on the process as merely the terminal stage of the ordinary catarrh; others as a separate affection. It may occur alone, but is more often associated with similar lesions in the nose and nasopharynx. It may be a sequel of severe local acute conditions such as occur in the exanthemata and diphtheria, and is not infrequently a feature of diabetes and chronic Bright's disease.

There may be a proliferation of new connective tissue, so that in the earlier stages, before the follicles have atrophied extensively, they appear to lie on a whitish bed and the whole membrane is very dry. This is the so-called "pharyngitis sicca."

The main symptoms are an uncomfortable feeling of dryness with more or less pharyngeal dysæsthesia. The mucosa may be covered with thick, dry, tenacious secretion. Removal of this, which strings down from the nasopharynx, may uncover a rather red subacutely inflamed area.

Treatment calls for restoration of the nose and nasopharynx to the normal and for the correction of any vicious habits. Persistent dryness should always lead to an examination of the urine, for the underlying cause may thereby come to light. The dried mucus should be removed by warm, alkaline sprays, and for home treatment the patient may inhale mentholated steam or the vapor of menthol in association with eucalyptol and compound tincture of benzoin. For topical application we may use ichthyol in glycerin (ten to thirty per cent.) or the familiar Mandl's solution—iodine gr. v., potassium iodide gr. x., carbolic acid ℥ij., and glycerin ℥ss. The writer has had much satisfaction with solutions of mucin. This comes in the form of tablets containing gr. v. each of mucin and bicarbonate of soda, and gr. i. of menthol, the latter giving an agreeable odor and flavor, and serving to keep the solution in warm weather. For the latter purpose thymol may also be used. Mucin seems to restore moisture to the mucosa and maintain it simply in virtue of its hygroscopic properties. The above tablet, which has the appearance and odor of pepsin, may be added to half an ounce each of sterilized water and sterilized lime water, shaken well, and applied either on a cotton carrier or in spray. If the latter be used, the spray tube should be flushed out with clean water at intervals so as to prevent clogging. The tablets may also be given to the patient for use as troches.

It must be remembered that treatment is at best only palliative, for advanced stages of the affection present a condition practically irremediable.

4. RHEUMATIC AND GOUTY INFLAMMATIONS.—A. *Rheumatic Inflammation.*—Rheumatic pharyngitis occurs in two forms: (1) acute, and (2) chronic.

In the acute form we find the same list of predisposing and exciting causes as for rheumatism in general. The local changes follow the same sequence as in acute catarrhal inflammation, except that the grade of inflammation is less severe, is apt to be localized in patches, and causes an amount of pain out of all proportion to its apparent intensity. An inflammation of the fibrous fascia of the pharynx is possible.

The course of an attack is somewhat as follows: Local symptoms—burning, dysphagia, and dryness—first appear, and are followed by a mild attack of fever and constitutional depression. After two or three days these disappear, the pain suddenly shifting to the muscles of the neck, back, or extremities, possibly to some joint. The swallowing of the saliva continues to be annoying. Inspection may show livid patches or streaks in the throat. The pain is somewhat peculiar and stinging, so that those affected learn to recognize it. The sudden onset, the character of the pain, the history of rheumatism, and the sudden shifting of the local storm area form a fairly definite clinical picture which lasts for four or five days. In the writer's opinion, a diagnosis from mere inspection of the fauces cannot be made. Some writers have reported pharyngeal ulcerations which proved to be resistant to every other mode of treatment, but healed under anti-rheumatic measures.

Treatment calls for the exhibition of the usual remedies

for rheumatism, together with local anodynes and sedatives.

In the chronic form we find the same list of causes as for chronic muscular and joint rheumatism. It is more common in men than in women, and the period from the twentieth to the sixtieth year marks its age limits. The onset may be sudden, but it is generally very gradual, and patients come under observation only after months or even years of indefinite pharyngeal pain. This is often referred to the region of the hyoid bone. Ingals finds the lesion more common on the right side. From this site the pain may radiate to or be felt on one side of the larynx, in the tonsils, trachea, side of the base of the tongue, etc. The parts within reach are painful on pressure, and are generally so during swallowing or phonation. Continuous speech is especially tiresome. Curiously enough the pain may disappear during eating. It is very capricious as to character, localization, and intensity. All combinations in these respects are possible. The gastro-enteric tract is generally sluggish. Inspection reveals nothing constant. An area of congestion may surround the painful spot. The affection may be confounded, as far as subjective symptoms go, with almost any common inflammation of the throat, and each must be ruled out by exclusion, special stress being laid, for rheumatic pain, on the shifting of the area of annoyance, a change of severity according to the weather, and a history of the rheumatic diathesis.

The treatment is identical with that of the chronic rheumatic state in general plus the use of local sedatives. To the areas of tenderness we may apply solutions of aconite, morphine, metallic astringents, etc. Ingals advises the use of applications of the following mixture: Morphine sulphate, gr. iv.; tannic acid, gr. xxx.; carbolic acid, ℥ xxx.; and glycerin and water, of each fl. ℥ ss. This may be used as a spray by the physician or applied in one-half strength by the patient at home. Internally he gives three grains each of salol and extract of *Phytolacca* every few hours.

B. Gouty Inflammation.—As in rheumatism gouty manifestations in the pharynx may be either acute or chronic.

The acute form occurs in those of a lithæmic diathesis, in heavy eaters who indulge in but little exercise, and in those who have lead poisoning or renal changes. The outbreaks are more common in cold weather and follow dietetic excesses, over-indulgence in wine, heavy mental or emotional strain, etc. Most of the patients are between thirty and forty years of age.

So far as concerns pathology, nothing more than a catarrhal inflammation can be found. There is a patchy hyperæmia with redness and œdema of the pharyngeal wall, possibly with swelling of the soft palate and uvula. The tonsils may be moderately enlarged and the larynx congested.

The symptoms are pain, out of all proportion to the apparent severity of the inflammation, irritable pharynx, coated and flabby tongue, scanty and high-colored urine. After a series of such attacks the teeth may appear large from retraction of the gums and they have a yellowish appearance. Diagnosis must be made from rheumatism and from simple neuralgia. Assistance is derived from the presence of tophi or other gouty manifestations elsewhere. The pain may suddenly leave the throat and appear in the joints, usually bearing the brunt of gouty outbreaks.

Treatment calls for the exhibition of colchicum and the use of local sedative washes, as for rheumatism.

In the chronic form of gouty pharyngitis we find a dark-red discoloration of the uvula, soft palate, faucial pillars, and tonsils, the "angina uratica" of the older writers. Occasionally an acute œdema of the parts is added. At times the process localizes itself in the corner between the posterior and lateral pharyngeal walls, which may be swollen and red. In young patients the mucosa may be covered with mucus or muco-pus; in older patients it is more apt to be dry and glazed, with a network of enlarged vessels or scattered livid spots. In one case

there was a daily casting off of lime salts from the mucous follicles.

The symptoms consist of attacks of sharp pain radiating to the ears, irritable cough with the expectoration of pellets of viscid mucus, intense throat irritability, and disordered gastro-enteric tract. Possible symptoms are spasmodic obstruction of the nose (alone or with coryza), dysphagia, laryngeal spasm, modification of voice, and rapid vocal fatigue. There is always a tendency to acute exacerbations. The urine shows an excess of oxalates, phosphates, and urates.

Treatment comprises an anti-gout regimen and local sedatives. The mineral waters are of especial service. One of the best local applications consists of menthol gr. x., and terebene ℥ xv. in liquid paraffin.

5. SYPHILITIC INFLAMMATION.—For information as to present-day views of the nature of the syphilitic virus, other articles in this HANDBOOK must be consulted. It may be said in passing that acute and chronic inflammations of the pharyngeal mucosa distinctly predispose to specific infection.

The initial lesion may appear on either the soft palate or the tonsils. A chancre, more or less indurated, is present with later erosions from irritation or ulceration. There is invariably enlargement of the cervical glands, and in due time constitutional symptoms develop.

Erythema appears in from the sixth to the sixteenth week or later. The mucosa on the lips, cheeks, tonsils, uvula, soft palate, and posterior pharyngeal wall has the appearance of passive congestion. The areas involved vary in size from a pea to a penny. The erythema is symmetrical and shows a sharp demarcation from the surrounding tissue. This demarcation and symmetry are strongly suggestive, for otherwise the mucosa appears as if only ordinarily inflamed.

The mucous patch may occur at any time, though it is generally one of the "secondary" manifestations. It poisons the buccal secretions and is therefore especially dangerous. The patches are ovoid and shallow, possibly symmetrical, and represent areas with an exudate of serum and a free supply of imperfectly developed cells. Without treatment these areas and their surrounding zones of tissue ulcerate and cicatrize, the cicatrix being stellate.

The gumma appears in from five to fifteen years after infection. Its favorite site is on the posterior surface of the soft palate. This lesion rarely passes over anatomical boundaries, that is, it does not extend directly in front of the faucial pillars, above the pharyngeal tonsil, or to the larynx. It appears as a diffuse infiltration, may form rapidly, and may undergo rapid destruction. It may be nodular, in which case there is a bulging of the superjacent mucosa. There is an infiltration of the tissues and vessel walls with small round embryonic cells embedded in a gelatinous basement substance. The mutual crowding of these cells shuts off the blood supply, and the whole mass breaks down into a cheesy consistency surrounded by a zone of granulation tissue, which later becomes fibrous. Abscess formation is rare. Destruction does not pass beyond the confines of the original deposit. Large areas may give way while bands of fibrous tissue pass from one point to another, thus distorting the parts. Fluids may therefore regurgitate into the nose and the soft palate becomes adherent (rarely completely so) to the posterior pharyngeal wall. The hard palate may become involved and perforated and occasionally a large vessel is eroded. Gummata are more rarely absorbed in the pharynx than elsewhere. Occasionally the course is so acute that immense destruction occurs in a very few days.

The symptoms of the initial lesion are painful swallowing and enlarged glands, that is, nothing outside of what may accompany an ordinary sore throat. The diagnosis is often indecisive until cutaneous lesions appear. In erythema we find a peculiar stiffness of the throat muscles and painful swallowing. In the mucous patch there is extreme sensitiveness increased by all irritants and by overuse of the voice. Nutrition may be interfered with.

Fresh patches appear in groups occupying, in order of relative frequency, the soft palate and uvula, anterior surface of anterior pillars, tonsillar convexities, and anterior surface of the posterior pillars. A patch on one side may by contact symmetrically reproduce itself on the other side. A fresh patch is strongly suggestive of a recent application of silver nitrate. A few cases have been seen with a thick exudation suggestive of diphtheria and attended with marked constitutional symptoms.

The symptoms of the gumma are mainly mechanical. After ulceration has occurred pain may be severe. The typical tertiary ulcer is deeply excavated with sharply defined edges, surrounded by an angry red zone and covered with bright yellowish pus.

The diagnosis of the advanced lesions is not difficult; but the same is not true of the earlier ones. At first sight the patients may present nothing but the lesions of an ordinary sore throat. A most careful examination should be made, together with an investigation into the possibility of infection. All apparently simple catarrhal cases not yielding to treatment must be regarded as suspicious, and also those cases presenting a persistent dysphagia without apparent cause.

Treatment must be prompt and energetic. Alcohol, tobacco, condiments, and all irritants must be given up. The tooth brush must be used regularly and followed by rinsing with some weak antiseptic. If deglutition be extremely painful a weak cocaine solution may be used before eating. The patient must be told that he is a potential source of danger to others, and strict hygiene in every sense must be enforced. Local lesions should be cleansed with an alkaline spray and dusted with orthoform, or argyrol (silver vitellin) may be applied in thirty-per-cent. watery solution. For home use as a cleansing agent we may order bichloride solution, 1 to 3,000, or black wash. Each mucous patch should be touched with silver-nitrate stick. Indurated areas may be painted with a solution of bichloride, two grains, in sulphuric ether, five drachms. On fissured ulcerations a ten-per-cent. solution of iodoforn in ether may be sprayed. Small palatal perforations may heal under the combined effect of constitutional treatment and the application to their edges, thrice weekly, of mono- or trichloroacetic acid fused on a probe. Sometimes an obturator may be fitted, with advantage to the act of swallowing.

Constitutional treatment must be adapted to the existing stage of the disease (see article on *Syphilis*). Deformities and stenoses must be treated according to the requirements of each individual case.

6. TUBERCULOUS INFLAMMATION.—In the vast majority of cases pharyngeal tuberculosis is secondary to deposits in other parts of the body. The primary form is, however, possible, and forms about one per cent. of all cases of acute tuberculous inflammations of the upper air passages. As opposed to this rarity is the virulence of the disease. Favorite seats of invasion are the uvula and soft palate, especially the anterior surfaces of these structures; then come the tonsils, posterior pharyngeal wall, and hard palate.

The general causes are those of tuberculosis in general. The exposed position of the parts would seem to predispose them to infection, but their constant movement in normal function tends to clear away morbid material before it has had time to penetrate the tissues. Some authorities believe that the saliva offers a distinct barrier to the acclimatization of the tubercle bacillus, while other forms of bacterial life, with which the oral cavity swarms, are also inimical to bacillary growth. Infection may come through the blood and lymph, through the inspired air, and through foodstuffs.

The disease may manifest itself in two forms: (1) the ordinary miliary tubercle; and (2) a papular lesion confined to small areas, and especially apt to settle on the anterior surface of the soft palate. In both the microscopic picture is the same, viz., a small round-celled infiltration of the connective tissue gradually extending into the vessel walls. Then follow endarteritis, obliteration, cheesy softening, and ulceration. It is difficult to

find either bacilli or giant cells in scrapings from the surface or in bits of tissue removed.

On inspection we may note either the miliary deposits studding the mucosa and apparently shining through it as white points, or there may be the larger papular masses extending in the primary cases as a fringe of small excrescences along the anterior pillars. After a while these deposits break down into characteristic ulcers. These may by their coalescence involve a large area. The uvula becomes swollen, œdematous, and exquisitely painful. Cases of perforation of both the soft and the hard palate are on record. The general appearance of other pharyngeal surfaces is one of anæmia due either to the endarteritis or possibly to a toxic vaso-constriction.

The most constant symptom is early and constant pain in the affected areas. The palatal muscles are swollen and stiff with resulting dysphagia. Food accumulates in the pharyngeal recesses and may get into the nasopharynx. Cough is present and the accumulation of saliva is excessive. Speech is hesitating, but the voice is not changed unless the larynx is involved. Later the cervical glands are enlarged. If the process is confined to the tonsils the difficulty in swallowing is much less. Owing to the latter symptom the patient is loath to take food, and the emaciation incident to the constitutional malady is hastened.

Diagnosis is based upon the characteristic appearance of the parts and the coexistence of tuberculous lesions in other parts of the body. Syphilis must be excluded in doubtful cases by the results of treatment. The two diseases may coexist. The typical tuberculous ulcer is shallow, with a surface flush with the surrounding mucosa, with the same color, covered with ropy mucus and possibly with a periedema; in cases complicated by syphilis the ulceration is extremely sluggish, has a dirty-looking secretion, and is but little painful.

The prognosis is as a rule bad, though a few recoveries have been reported. The local condition is but one feature of a constitutional involvement. Healing of the ulcerations will greatly conduce to the tolerance of living, even though the constitutional deterioration goes steadily on.

Every hygienic and tonic measure possible should be instituted. Climate does not seem to be of much service in pharyngeal tuberculosis. All sources of buccal irritation should be removed, the teeth placed in order, and the food should be pultaceous. The patient will often find it easier to gulp food down than swallow it in the conventional way. The plan most in vogue at the present time for treating the ulcers is to curette them thoroughly under cocaine and then rub in solutions of lactic acid in water, beginning with say ten per cent. and gradually increasing up to eighty per cent., or even the pure acid. The ulcerated surfaces should be regularly cleansed with hydrogen peroxide, then with a weak alkaline solution, and finally dusted with some such powder as aristol. Enzymol, a proteid ferment, may be substituted for the peroxide. It is less irritating and just as efficient. Menthol in olive oil, twenty per cent., has its advocates. Morphine with cocaine or tannin may be cautiously applied, but the use of the first-named remedy should be avoided as long as possible. For the cough we may give heroin in one-twelfth grain doses every three hours. Orthoform is here used as a local anodyne with great advantage. It may be dusted on with equal parts of stearate of zinc or subcarbonate of bismuth. To insure its contact as long as possible with the affected parts we may use the excellent formula of Freudenthal, viz.: Menthol 10 gm., expressed oil of almonds 30 gm., yolks of two eggs, orthoform (12½ gm.), and water to make 100 gm.

7. ACTINOMYCOSIS OF THE PHARYNX.—This is an infectious, parasitic, and inoculable disease primarily attacking domestic cattle, but communicable from them to man. The original source of infection is grain. Bollinger says that oats grown on newly ploughed land are the main carriers of contagion, but that rye and other grains are at times similarly affected. In man the infection may

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.