

diagnosis. There may at times be local desquamations in patches scattered irregularly over the surface of the mucous membrane. The changes in the interarytenoid space are usually the most marked. It is here that desquamation is more apt to be seen, and this region may in the later stages be covered by a tenacious mucus. In the subglottic variety the bulging subglottic mucous membrane may be plainly seen when the cords are abducted.

Differential Diagnosis.—From a study of the above-mentioned subjective and objective symptoms the diagnosis should easily be made. The possibility of diphtheria, measles, scarlet fever, or the more rare eruptive fevers, should be borne in mind. In the adult the diagnosis should be easy.

The prognosis is good as to recovery. The disease is never fatal in adults and rarely so in children, but if neglected it may become chronic or may lead to trachitis or bronchitis.

Treatment.—In the early acute stages topical applications must be used with great care. Catharsis may be promoted by the mild chloride of mercury in half-grain doses combined with three grains of bicarbonate of sodium; this to be repeated every two hours until it acts. The old "cold" remedies, quinine and Dover's powder, may be tried, together with a hot foot bath with or without mustard. A pleasanter and often more efficient remedy is aconite or aconitine in full physiological doses.

Local treatment consists in thorough though gentle cleansing of the mucous membrane of the upper respiratory tract followed by the application of sedative and astringent medicines. The nose and naso-pharynx should be thoroughly cleansed by means of an alkaline antiseptic spray such as: \mathcal{R} Acidi borici, gr. v.; sodii bicarb., gr. x.; Listerine, fl. ʒ vi.; aquæ destillat., fl. ʒ vi.; or a solution of Seiler's tablets; or diluted Dobell's solution may be used for this purpose. This should be gently blown out, care being taken to allow the nostril to be entirely free from external pressure during the blowing process. If the nasal mucous membrane is turgescient, a second spray should be used, something like the following: Cocaine hydrochlorate, gr. iiss.; acidi borici, gr. v.; aquæ destillat., fl. ʒ i. Just enough of this solution should be used to cover the turbinates and not enough to pass into the throat. This should be allowed to rest undisturbed for five minutes, after which a watery solution of suprarenal powder (gr. x.—ʒ i.) should be gently applied to the turbinates either with a cotton-tipped probe or in spray. The solution of suprarenal powder will decompose in a few hours, unless it be made more lasting by an addition of one-per-cent. resorcin or of some other preservative. An astringent and sedative solution, such as the following, may now be sprayed into the pharynx and inspired into the larynx: \mathcal{R} Ol. gaultheriæ, gtt. iv.; zinci sulph., gr. v.; antipyrin, gr. xx.; aquæ destillatæ, fl. ʒ ij. A small quantity of the powdered mild chloride of mercury barely sufficient to give them a grayish hue, may be insufflated over the turbinates, and finally the nares may be sprayed with an oily solution of \mathcal{R} Menthol (crystals), gr. v.; liq. petrolei, fl. ʒ i.

After the mucous membrane has lost the extreme sensitiveness of the early stages a watery solution of sulphate of zinc, two to four per cent., may be gently applied to the laryngeal mucous membrane on a curved cotton-tipped probe. The above local treatment is usually all that is necessary in these cases and should of course be carried out by the physician himself. For home use the compound zinc solution above mentioned may be of service. It may be assisted by the inhalation of steam, which may be medicated by a solution such as the following: \mathcal{R} Menthol, gr. xv.; ol. eucalyptol, ʒ ij.; terebene, fl. ʒ iij.; tr. benzoin, comp., fl. ʒ iij.; a teaspoonful of which may be added to a pint of boiling water. For the purpose of these steam inhalations a tin cup, spirit lamp, and paper cone are all that is necessary. The patient should not be allowed to expose himself to cold air from half an hour to an hour after the use of steam inhalations.

The ice pack or Leiter's coil sometimes aids in allaying

symptoms in the subglottic variety of acute laryngitis. Applications by the probe may be carried between vocal cords into the subglottic region. These applications may be used to promote emesis in the croup of children and are superior for this purpose to the old-fashioned ipecac and mustard given internally, as they give the desired local effect without the constitutional after-disturbances.

Many methods have been suggested hastily to clear the throat of one who must use it in public. None of them, however, is infallible, and all of them are to be discouraged as far as possible. Rest of the voice and body in a room heated to a temperature of about 70° F. is amongst the best remedies for this. The air should be properly renewed and kept moist. The patient should drink freely of non-aerated water. The emunctories should be properly cared for, and alcohol and tobacco should be interdicted. The local treatment outlined above should be carried out. At times the desired effect may be more quickly attained by the use of aconite or aconitine to the physiological limit, and by the application of the galvanic current to the external aspect of the larynx.

The supraglottic form of acute laryngitis in children is usually trivial, and a mild spray such as the compound Listerine mentioned above may be used in the nose and throat. The Politzer bag may be applied to one nostril and compressed while the other is allowed to remain unobstructed; this forces the secretions from the nose and naso-pharynx through the unobstructed nostril, then a large soft wad of cotton on the applicator may be soaked with a one- to two-per-cent. solution of sulphate of zinc and pressed against the pharyngeal wall, the zinc thus diffusing itself will have the desired effect of clearing the throat of excessive secretion. The child should be kept in a room the temperature of which is maintained at 70° F. and the air of which is kept moist by the croup kettle, slacking lime, or some similar device. Applications of camphor and oil of amber, or simply of suet, applied locally over the bridge of the nose and the laryngeal region, will sometimes be of assistance in these cases.

In the more serious subglottic variety of acute laryngitis, or pseudocroup, in children, more active measures are at times necessary. The routine treatment suggested above may be preceded by a general hot bath to which a small amount of mustard has been added. It may be necessary to pass the curved cotton-tipped probe into the larynx, emesis being brought about in this way. Hot water may be applied freely to the external throat by sponge or cloths. It must be borne in mind that these so-called croupy children have some defect of the nose or naso-pharynx, and these defects should be corrected in the intervals between the attacks. As an adjuvant to the above a spray of suprarenal solution, gr. x.—ʒ i., may be used in the croupy child every two or three hours. Hydrargyrum cum creta, or calomel and soda, when administered internally, aid materially in reducing the quantity of exudate. Tincture of chloride of iron and glycerin may be substituted for the zinc solution used above. In the more severe cases tracheotomy or intubation may be necessary; intratracheal injections of menthol-creosote and liq. petrolei may at times be of use in these cases of the subglottic variety.

EDEMATOUS LARYNGITIS AND PHELGMONOUS LARYNGITIS.—(Synonyms: *Œdema glottidis*; *Œdema of the larynx*, acute phlegmonous laryngitis, laryngeal cellulitis, purulent or suppurative laryngitis.) (Edematous laryngitis is an acute inflammation of the laryngeal mucous membrane, which is characterized by serous infiltration into the areolar tissue of the mucous membrane. It is at times idiopathic, or it may have a local cause, or it may be secondary to some general disease. In infected cases there may be pus formation resulting in the so-called phlegmonous laryngitis, the suppuration in these cases being unilateral as a rule. *Œdema* is accompanied by the usual symptoms of distress caused by difficult breathing, and there may be some febrile disturbances. This disease occurs more often in the acute form, though it may at times become chronic.

Etiology.—Any disease which causes dropsy or anasar-

ca in other parts of the body may cause an *œdema* of the larynx. It has been said to occur idiopathically, but this form is probably the angioneurotic variety of Osler and others. Disease of the kidneys is one of the most com-

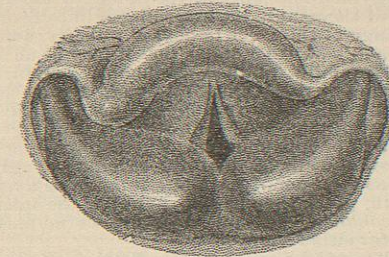


FIG. 3113.—General *Œdema* of the Larynx. (Browne.)

mon causes, since it is prone to bring about a venous turgescence in this region as well as elsewhere. Diseases of the heart, lungs, or liver which cause excess of venous pressure or damming back of the blood in the veins and consequent oozing of serum into the areolar tissue, may also bring about this laryngeal complication. External traumatism, or foreign bodies in the larynx or the neighboring œsophagus, or the inhalation of irritating gases, vapors, or fluids are at times causes. The *œdema* may be secondary to tuberculosis, syphilis, scarlet fever, diphtheria, typhus or typhoid fever, smallpox, or streptococcal infections. In the phlegmonous variety some septic condition is likely to be the cause, such as erysipelas, tonsillitis, or pericervical inflammation. The angioneurotic *œdema* is probably caused by vaso-motor paresis due to a general neurotic condition.

Pathology.—There is a primary engorgement of the vessels and later a consequent leakage of serum into the perivascular areolar tissue; rarely this fluid is sanguinous. This leakage is naturally greater in the localities where the tissue is loosest, so that the most marked swellings are in the ventricular bands and the posterior surface of the epiglottis and to a lesser degree in the interarytenoid commissure. The epiglottis is nearly always involved, while the vocal cords are not often affected, nor is the subglottic region as a rule. In the phlegmonous variety the exuded serum undergoes purulent change

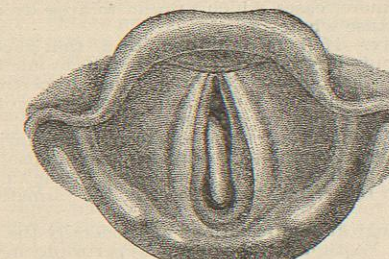


FIG. 3114.—Subglottic *Œdema*. (Browne.)

and an abscess is formed; and while, in the ordinary variety, the swelling is symmetrical, in these cases it is usually unilateral (Fig. 3114). At times the surrounding cervical tissues may become infiltrated with serum.

Symptoms.—The prominent symptoms are the dyspnoea, the impairment of the voice, the cough, and at times

orthopnoea. The dyspnoea comes on suddenly as a rule, reaching its height in about thirty-six hours from its onset. Inspiration in the severe forms is more difficult than expiration, owing to the rolling in of the swollen mucous covering of the ventricular bands and epiglottis. The voice becomes deep and may later be lost entirely. The cough is very wheezy and labored, brings no relief from the symptoms, and is accompanied by but little expectoration. Pain is not usually present, although it may be experienced on swallowing or when the cervical tissues become infiltrated. As in other diseases which obstruct the breathing, the patient wears an anxious look, is usually restless, and is more comfortable in the sitting posture than when lying down. In the phlegmonous variety there is apt to be fever or even a chill. The laryngoscope reveals a swollen mucous membrane, smooth, glassy, and semitranslucent, not unlike the appearance of a myxomatous polyp. There are usually three prominent projecting folds formed by the epiglottis and the two aryepiglottic folds. Between these three folds is a triangular opening in which it is at times possible to see the true cords and the interarytenoid commissure. When the use of the laryngoscope is impracticable, which is rare, a digital examination may be necessary to disclose the true condition.

The diagnosis is made from the above symptoms and signs.

Treatment.—The local symptoms should be relieved by scarifications which may be made with the laryngeal scarifier (Fig. 3115) or with an ordinary curved bistoury protected close to the point with a wrapping of adhesive plaster. A solution of suprarenal powder, sulphate of

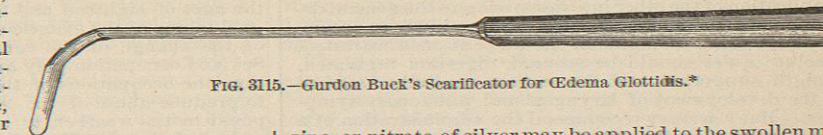


FIG. 3115.—Gurdon Buck's Scarificator for *Œdema Glottidis*.*

zinc, or nitrate of silver may be applied to the swollen mucous membrane. External applications of cold by means of the ice pack or Leiter's coil, may be of service. Free

*The author's description of the procedure is quoted here in full: "The following is the mode of performing the operation of scarifying, as employed in the cases about to be related. The patient being seated on a chair, with his head thrown back and supported by an assistant, he is directed to keep his mouth as wide open as possible; and if there be any difficulty in this respect, a piece of wood an inch and a fourth in width and half an inch in thickness, is to be placed edgewise between the molar teeth of the left side. The forefinger of the left hand is then to be introduced at the right angle of the mouth, and passed down over the tongue till it encounters the epiglottis. "But little difficulty is generally experienced in carrying the end of the finger above and behind the epiglottis so as to overlap it and press it forward toward the base of the tongue. In some individuals the finger may be made to overlap the epiglottis to the extent of three-fourths of an inch.

"Thus placed, the finger serves as a sure guide to the instrument to be used, which is represented accurately in the accompanying plate. The knife is then to be conducted, with its concavity directed downward, along the finger till its point reaches the finger-nail. By elevating the handle so as to depress the blade an inch to an inch and a half farther, the cutting extremity is placed in the glottis between its edges; at this stage of the operation the knife is to be slightly rotated to one side and the other, giving it a cutting motion in the act of withdrawing it. This may be repeated two or three times on either side without removing the finger. The margin of the epiglottis, and the swelling between it and the base of the tongue, may be scarified still more easily with the same instrument, or scissors, curved flatwise, may be employed for these parts, guided in the same manner as the knife.

"Though a disagreeable sense of suffocation and choking is caused by the operation, the patient soon recovers from it, and submits to a repetition after a short interval. In every instance the operation has been performed twice, and in some three times." ("Edematous Laryngitis, Successfully Treated by Scarifications of the Glottis and Epiglottis," by Gurdon Buck, Jr., M.D., Surgeon to the New York Hospital. From vol. i., p. 136, of Transactions of the American Medical Association, 1848.)

See also "Six Additional Cases of Edematous Laryngitis, Successfully Treated by the Scarification of the Epiglottis," etc., by Gurdon Buck, M.D.; Transactions of American Medical Association, vol. iv., 1851, p. 277.

The small knob shown in the illustration was added at a later date, and is intended to serve as an aid to the operator in estimating, by the sense of touch, how far down the cutting end of the instrument has been introduced.

diuresis, catharsis, and diaphoresis should be promoted. For the latter purpose pilocarpine may be administered. The underlying constitutional symptoms should be treated according to the general principles laid down in each case. In a case recently seen by the writer prompt relief of the laryngeal condition followed artificial premature labor which was induced for the relief of the kidney symptoms. It may at times be necessary to resort to tracheotomy or intubation to save life. In these cases the former is usually to be preferred, as the relief is more rapid and is usually brought about with less inconvenience to the sufferer.

George C. Stout.

LARYNX, DISEASES OF: BURNS, SCALDS, AND INJURIES.—Severe acute inflammation of the larynx, involving the submucous areolar tissue, may follow the swallowing of very hot liquids and of corrosive poisons, the inhalation of flame or of highly heated air, or the impaction of a foreign body.

The pathological condition commonly met with in the three accidents above-named is, practically, acute laryngeal oedema. The early symptoms are pain, dyspnoea, dysphagia, aphonia, and shock. Respiration is rapid and stridulous, the face pale and anxious, and the patient very restless. The symptoms may be mild at first but later they are severe, especially after the ingestion of caustic liquids. Often oedema of the larynx and fatal dyspnoea rapidly come on, or serious pulmonary complications quickly follow.

Mild cases may end in recovery in a few days. Death is apt to occur in from one to two days from dyspnoea or shock, or later from laryngitis, bronchitis, or pneumonia. The inhalation of flame or of steam is always a very serious complication of the other injuries, owing to the general depression and the mental shock which are likely to accompany such cases. Treatment should be at once instituted. Absolute quiet should be secured, digestion regulated, strength supported, and the patient carefully watched for the development of laryngeal and pulmonary symptoms. Many writers recommend the administration of a dose of calomel at the outset.

The sucking of cracked ice, the administration of a non-depressant emetic, and thorough scarification of the oedematous tissue, as described in the preceding article, have been highly recommended. Applications of cocaine must be used with great caution, on account of the depressing effect of this drug upon the heart. Extract of the suprarenal glands is very valuable. Of course, in case of the impaction of a foreign body the offending object must be removed. Too much stress cannot be laid upon the necessity for energetic treatment, and when the symptoms are urgent, immediate recourse should be had to tracheotomy or, better still, to intubation of the larynx after the method of O'Dwyer (see *Intubation*).

Laryngitis from corrosive poisoning is frequently followed by extensive sloughing, and eventually by cicatricial contraction which may require more or less important surgical treatment for its relief. (See *Larynx, Diseases of: Stenosis*.)

D. Bryson Delavan.

LARYNX, DISEASES OF: CHRONIC INFLAMMATION.—There is, to say the least, some diversity of opinion as to the etiology of chronic laryngitis—this diversity being mainly as to whether the chronic form is a secondary stage or a sequel of the acute attack or attacks; or whether it results from the propagation downward of the same disease of the naso-pharynx.

Seiler evidently adheres to the first supposition, viz., that the acute attack passes into the chronic, particularly in any case of depression of the general system; but he also admits that nasal obstruction or misuse or abuse of the voice may lead up to the same condition.

Cohen speaks of the development of chronic laryngitis from a series of attacks of acute laryngitis as a very rare occurrence, but he believes that it may be caused by phthisis, syphilis, or carcinoma, or may occur as an extension from bronchitis or tracheitis, and he thinks it is frequently idiopathic.

Mackenzie seems to lean about equally to both views, for he says that the disease may be a result of the acute lesion or be due to propagation from the pharynx. He also goes minutely into a consideration of many other causes, such as the prolonged use of the voice as in the case of clergymen and singers, the abuse of alcohol, the elongation of the velum, the breathing of impure or dusty air, the change of the voice in boys at puberty, and in the aged, etc., and he further states that it may be an accompaniment of syphilis, phthisis, carcinoma, polypi, etc.

Of the later writers Coakley—who divides chronic laryngitis into an hypertrophic and an atrophic form, and also into various other sub-forms according to the particular seat of inflammation, whether above or below the vocal cords—believes that the chronic laryngitis occurs either as a sequel of the acute form, or as a result of nasal catarrh, gout, rheumatism, syphilis, the inhalation of dust, alcoholism, etc., and he expresses no particular preference for either view.

Newcomb mentions as causes all affections of the upper air passages such as atrophic and hypertrophic disease of the nose, pharynx, and tonsils, and all impediments to normal respiration, the continued respiration of irritating substances, the excessive use of tobacco and alcohol (their moderate use he does not think responsible), severe or prolonged vocal exertion—such as speaking in the open air to large crowds, faulty methods in singing or speaking, etc.—and abnormal conditions of the digestive apparatus.

Shurley, who divides the subject into many heads, admits that in the greater number of cases chronic laryngitis arises secondarily to acute inflammation or other injury to the larynx. He says it occurs most frequently between the ages of eighteen and fifty years, commonly as a sequel to one of the exanthemata, or as an accompaniment of the change of the voice at puberty, or in old age. Sex and occupation play an important part in the causation, the occupations of the male being much more apt to produce abuse of the voice, and he is also more exposed to the weather, to excesses in the use of tobacco and alcohol, etc. He says that chronic laryngitis may also occur as a direct extension of disease of the nose, naso-pharynx and pharynx, tonsils, or lingual glands. Shurley appears to believe somewhat in heredity, while not quite acknowledging the existence of a catarrhal diathesis which the French (according to Beverley Robinson) believe in. Nephritis and ovarian disease are cited by him as causes, also rheumatism and lithaemia.

Endeavoring to assimilate the various ideas of these six undoubted authorities, besides many other writers whom I might quote, I would say that the chronic form of laryngitis is often the final ending of one or more acute attacks; and also that it is difficult to conceive of any variation from perfect health or perfectly normal habits, which may not cause chronic laryngitis. There are, furthermore, cases which appear to arise from no assignable cause whatever.

PATHOLOGY.—If it be admitted, then, that repeated attacks of acute laryngitis eventuate in the chronic form, it is during these acute conditions that hypertrophic changes take place in the mucous membrane of the larynx, these changes varying with the locality. The small-celled infiltration, from whatever cause arising, does not undergo complete absorption and is also associated with proliferation of connective tissue; consequently each recurrent attack increases the formation of new tissue.

The histological manifestations are generally the same in all forms. Although the chronic hypertrophy may be diffuse in all parts of the larynx, yet there will usually be some particular spot where its greatest development will be attained.

In the chronic hypertrophic form the inflammatory changes are found chiefly in the connective tissue beneath the epithelium, being more developed in the vicinity of blood-vessels and the efferent gland ducts. There may also be thickening of the perichondrium and cartilages. There may have been metaplasia of the epithelium—a

change to stratified pavement epithelium, which in some old cases may be composed of from fifteen to twenty layers. The epithelium is infiltrated with leucocytes, most abundantly in those places where the tissue underneath shows great infiltration.

The membrana propria may be thickened and fibrillary. Beneath the stratified cylindrical epithelium, the papillae of the mucosa show proliferation and branching, and may form prominences. The connective tissue of the papillae is soft, poor in fibres, and shows a marked infiltration with leucocytes. The submucosa is in general much altered, but the inflammatory process varies in intensity in different places. The round-celled infiltration appears at times diffuse, or at others circumscribed in the form of nodules, most conspicuously around the efferent ducts of the glands. It appears hard, compact, markedly fibrillary, containing only a few spindle cells. Some of the cells show hyaline degeneration.

The blood-vessels are in general large and thin-walled, well filled with blood, except where the mucous membrane has undergone fibrous degeneration. The mucous glands may exhibit hyperplasia. The epithelial cells may show a high degree of mucous degeneration. The perichondrium, in the regions corresponding to the most marked alterations of the mucous membrane, may be infiltrated with leucocytes and show hypertrophy of the cartilage.

SYMPTOMS.—Among the most noticeable is a huskiness or want of clearness of the voice, which is realized more in the speaking than in the singing voice. Sometimes the voice may be momentarily cleared by taking food, acid fruit, or a little water, but this relief will be only temporary, and at night particularly the voice will be worse. In singers the range of the voice is diminished. There is sometimes a slight cough, but an inclination to clear the throat by swallowing is almost ever present.

The subjective symptoms are more a sense of fatigue in speaking than absolute pain. I have known of cases in which I have said to a singer, "You are hoarse, your voice must be off"; the reply would be, "Oh, no, I can sing very well"—and, on singing, the greater tension put upon the laryngeal muscles would result in the voice becoming quite clear, but it would lapse again into hoarseness when conversation was resumed. Later on in the course of the disease, cough is a more constant symptom, but implication of the trachea and bronchi may be suspected if expectoration is profuse.

The cause of the hoarseness has been variously stated by different authors, some believing it to be due to drying and want of lubrication of the parts, others to peripheral nerve pressure and also to mechanical interference due to the hyperplasia. This hoarseness may so greatly increase in the later stages that the voice may be entirely lost, and then the effort to produce sound by forcing a large air column through the larynx will be followed by great fatigue, sometimes by an aching pain in the chest or larynx. There may sometimes be quite a lancinating pain in the larynx during respiration and, as the patient expresses it, the air seems to cut as it passes.

DIAGNOSIS.—On laryngoscopic examination the most noticeable symptom is congestion, well marked over the arytenoids, aryepiglottic folds, and ventricular bands, of rather a dusky red but not so high colored on the vocal cords, and giving the impression of slight swelling in the hypertrophic form or the converse in the atrophic. The presence of mucus is uncertain, but it is apt to be of a sticky, ropy, tenacious character, and cannot always be removed with the spray. The edges of the cords appear roughened and sometimes greatly relaxed, or even crescentic in form. In some cases there is the appearance of interarytenoid thickening, which seems to prevent the approximation of the cords and thus produces the hoarseness already referred to. In the ulcerative or hemorrhagic variety, in addition to the swelling and congestion, there may be shallow erosions or excoriations, for morning cough, accompanied by an expectoration of mucus, streaked or tinged with slight traces of blood, is common in chronic laryngitis. In the atrophic form, added

to a wasting of the tissues, there is usually a drying of the mucus on the surface, particularly in the commissures. This inspissated mucus will sometimes have to be removed with the cotton-covered applicator, or after spraying with some alkaline solution it may be expelled

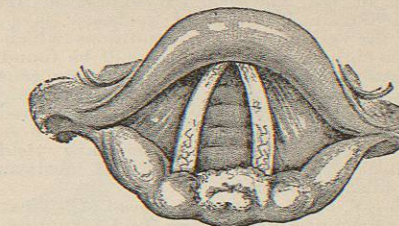


FIG. 3116.—Chronic Laryngitis.

like a cast of the parts; or it may be expelled in smaller pieces which sometimes have the well-known odor of similar crusts in the nasal fossae.

COURSE OF THE DISEASE AND PROGNOSIS.—If the chronic inflammation is confined to the larynx, an uncomplicated case may run along for years without occasioning any great discomfort, and it may after that be relieved or cured by treatment; but the tendency is to spread downward, where it becomes a chronic bronchitis and perhaps in time prepares the way for an implantation of tubercle bacilli either in the bronchi or in the larynx, it being well known that diseased tissue offers the best conditions for receiving these germs. The majority of these cases of laryngitis do not, however, by any means have this gloomy termination.

The great majority of patients with chronic laryngitis are never cured; they may get better for a while, perhaps, during warm weather, but they are never quite cured, and when the cold weather comes the symptoms return; and probably the next season of amelioration will not be for so long a period. And so, after a while, there is no period of ease, and the condition is always just the same.

TREATMENT.—An immense amount has been written upon the treatment of chronic laryngitis. According to Newcomb and also Shurley both general and local treatment should be pursued. All "bad habits" should be abandoned. If a smoker, the patient should not smoke; if a drinker he should cease drinking. If there is any abdominal, visceral, vesical, or uterine abnormality it should be thoroughly cured first, in order to permit of a cure of the laryngitis. If there is obstruction of the upper air passages, the nose or pharynx, these crooked paths should be made straight, and then, in mild cases, after all this has been done the laryngitis may subside without much local treatment. In cases in which physical and moral reforms are impossible or in which the patient cannot be confined in prison (see Shurley on the treatment of chronic laryngitis), something constitutionally may be accomplished by drugs. Iodine, by reason of its action on the mucous membrane, deservedly holds the first place, and of the forms of iodine the syrup of hydriodic acid is certainly preferable. In my experience the greatest drawback to the use of iodine is the iodine rash, which seems almost always to follow its use except in specific cases. Muriate of ammonia is also of some value. Shurley suggests mineral waters, and Professor Niemeyer's drink of Vichy water and hot milk is at least pleasant. Galvanism is advocated by some, but I have found it quite as useless as in the cases of chronic pharyngitis and anosmia from nasal catarrh.

In the matter of local treatment, topical applications are preferable to sprays, for with these one can touch exactly the points desired, and much stronger medication can be used than when the whole surface is irrigated with a solution. Of course the parts should be previously prepared for these applications by spraying them with a

mild solution of cocaine (3 to 5 per cent.). Nitrate of silver in its varying solutions (5, 10, or 20 grains to the ounce of water) is a very old but very reliable remedy. The glycerite of tannin, or a mixture of iodine and glycerin (ʒ iss. to glycerin ʒ ij.) is efficacious. In the Transactions of the American Laryngological Association (1882, 1888), Dr. J. O. Roe, of Rochester, says, after considering the various systemic conditions which may predispose to chronic laryngitis: "It will be found that local medication is the plan not only more generally successful than all others when the various associated and contributing conditions are duly considered and treated therewith. . . . Cases which had not been improved by general medication alone have yielded a ready obedience to the applications of medicaments topically applied to the larynx."

Dr. Charles E. Sajous, under the head of "Treatment of Chronic Laryngitis by Chromic Acid," quoting from Dr. Carlo Labus, of Milan (1880), speaks of the process of flaying the vocal bands or denuding them of their mucous membrane, and of the numerous cures of laryngitis and the accompanying hoarseness thereby obtained. This mode of treatment was also extolled by Massini in 1888, but the procedure was apparently abandoned on account of the harshness of the operation. Sajous mentions the fact that in these chronic cases, during an exacerbation, the edges of the cords are irregular and dentated, and he states that it is in this class of cases that vigorous treatment is required. He hesitates to use the flaying process on account of the liability to hemorrhage, and the solid stick of nitrate of silver or the galvano-cautery on account of the tendency to produce hard nodules of scar tissue on the edges of the vocal cords. He advocates first preparing the larynx by applications of resorcin followed by belladonna. A twenty-five-per cent. solution of cocaine is applied to the larynx at the time of operation, and then a covered probe on which chromic acid has been fused is applied to the vocal cords, but not to their edges. This is repeated at subsequent visits until the whole surface is cauterized.

TRACHOMA OF THE VOCAL BANDS.—(Synonyms: Chorditis nodosa, chorditis tuberosa, singers' nodes, vocal nodules.) The various names applied to this lesion are certainly confusing. Dr. Charles H. Knight, of New York, in a paper on "Vocal Nodules" (Transactions of the American Laryngological Association, 1901) says: "The term 'vocal nodules' has already been applied by Elsberg to certain anatomical formations in the larynx, but confusion is not likely to arise since its use in the latter sense has not been generally adopted. The term 'singers' nodules' implies a professional factor by no means always present. A large proportion of these cases in my

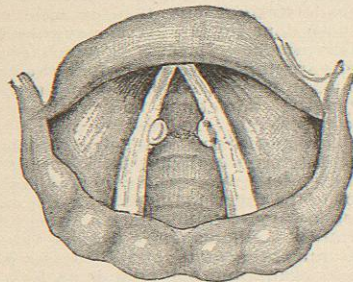


Fig. 3117.—Singers' Nodes. (Copied from a photograph by Dr. T. R. French, of Brooklyn, N. Y.)

experience have been in those who use the voice in singing but little, or not at all. 'Chorditis tuberosa' suggests an inflammatory origin, whereas marked hyperemia even is rather an exceptional feature. 'Trachoma of the vocal bands' and 'Pachydermia laryngis' are terms used

to designate processes histologically allied to vocal nodules, but very different in their clinical aspects."

On the other hand, Dr. Clarence C. Rice, of New York (Transactions of the American Laryngological Association, 1900, and the subsequent discussion), says that under the name "chorditis tuberosa" this pathological condition of the vocal apparatus is of interest to the laryngologist because it occurs frequently in public speakers, singers, and actors. He quotes from Türk, who used the same name: "He says he had noticed four cases of this peculiar inflammation of the vocal bands in singers." Rice subsequently states that out of eight cases observed by him six were in singers; the remaining two cases were in people who used their voices more than in ordinary conversation—one a Hebrew, who read aloud some religious ceremony every week, and the other, the foreman of a large number of laborers, who was in the habit of shouting to his men. The six singers were all sopranos. In the subsequent discussion Dr. Westbrook, of Brooklyn, reported the case of a lady who was not a singer, but was a great talker.

Etiology.—Under the head of "singers' nodes," Dr. Frederick I. Knight, of Boston (Transactions of the American Laryngological Association, 1894) gives such a clear description of this lesion as it has come under his observation that I cannot do better than to quote from his article: "The affection of which I wish to say a few words consists, as I have seen it, of a small ovoid nodule situated on the edge of one or both vocal cords at about the junction of the anterior and middle thirds, and can usually be attributed to extraordinary or improper use of the voice. It has been described as one of the conditions found in chronic laryngitis, and also as trachoma of the vocal cord, and as chorditis tuberosa; it occurs, however, as has been pointed out by Rice, as a primary affection, with or without laryngitis. The cases of Türk presented multiple granulations, not only on the edge but on the upper surface of the cords.* The single nodule on one or both cords, although it may be pathologically the same, constitutes clinically a distinct affection and is, I think, entitled to a separate designation."

My personal experience, and I have had several cases, is that this affection consists of the single or bi-cordal nodule usually situated at the junction of the anterior and middle thirds of one or both vocal cords, and is found in those larynges which have been either overexerted or wrongly used by shouting or singing too high, or in those belonging to persons who have indulged in singing when not knowing how to sing.

Finally, when looking at the causation of this lesion, we must not overlook the fact that it is sometimes associated with tuberculosis, and also that the presence of hypertrophied tissue at the base of the tongue seems to be a cause.

Pathology.—Some confusion exists with regard to the conceptions of the nature of the so-called vocal nodules. Three hypotheses have been brought forward:

1. *Physical, i. e., mechanical*, friction of the margins of the cords at points determined by swelling of the vocal cords.
2. *Physiological*. The vibrating nodes of the vocal cords, being points of the most violent action, are predisposed to the formation of the nodules.
3. *Anatomical*. The vocal nodules stand in relation to a gland situated at the posterior end of the free portion immediately under the margin of the cord.

The present consideration is limited to those cases which are dependent upon hypertrophy of the epithelium. The swellings are composed of stratified pavement epithelium, ranging in thickness from 10 to 40 μ , due to a considerable increase in the layers of polyhedral and cylindrical cells. At the level of the polyhedral layer the protoplasmic substance is well marked, the nuclei are large, and stain well by carmine. The cells are intimately connected with each other by a protoplasmic substance and prickle cells without the interposition of leucocytes.

*This is evidently a description of pachydermia.

The chorion is composed of fusiform cells with bipolar prolongations, which one may follow over an extent of 60 μ . The deeper layers of the section show a few strands of elastic fibres. There is no actual papillary layer present. The fibro-elastic chorion is thickened and distinctly less vascular than normal. In some cases a process of degeneration and cyst-formation occurs.

Symptoms.—Hoarseness, even aphonia, in singers' nodes comes on very suddenly, following quickly upon the voice strain, and it is accompanied by a good deal of laryngitis of the acute form, and want of tone in the tensors. The edges of the cords look flabby, perhaps each cord will be bicrescentic in outline and at the junction of the horns of each crescent will be seen the little node. In phonation this node strikes its fellow of the opposite cord, or the edge of the cord if there is no fellow; but the edges of the cords do not approximate, and thus the aphonia is produced. Time and vicarious action of the other cord will to some extent modify this aphonia, particularly in singers who, when well trained, have such wonderful control over the action of the larynx.

Prognosis.—The prognosis depends largely upon the ability of the patient to rest the voice, and whether the lesion is a recent one or not. It is like the law of storms: "long foretold, long last—quick coming, soon past."

Treatment.—The most important thing is rest for the voice, and many cases are cited in which the nodules have spontaneously disappeared under complete rest. This, however, is denied by Capart, who says he has never seen the slightest benefit from rest. Charles H. Knight and Holbrook Curtis advocate vocal exercises, or courses of elocution performed in about the following way: "The first point insisted upon is a correct method of breathing. The upper ribs are raised, the chin is depressed, and respiration carried on by the diaphragm and lower ribs; an effort is made to focus tones in the face, producing them, as it is expressed, 'dans le masque.' The word or syllable used is 'Ma,' or 'Man,' the 'M' of course being formed while the lips are closed. The muscles of the pharynx and neck are thus supposed to be completely relaxed and the vocal bands to be in a state of greatest possible tension. A peculiar tickling vibration of the lips against the incisor teeth can be felt during the humming 'm' sound, provided the muscles about the mouth are properly relaxed. Most remarkable results from the practice of these vocal gymnastics are claimed in various laryngeal derangements due to misuse or fatigue of the voice." "Capart divides treatment of vocal nodules into hygienic, medical, and operative. Sprays and insufflations of astringents and antiseptics he looks upon as useless, and chemical caustics like nitrate of silver and chromic acid he discards on account of the risk of their diffusion. Ablation of the growth with a fine delicate forceps, or, if that is impossible, its destruction with the galvano-cautery is recommended. He warns against the so-called punch forceps, lest an excessive amount of tissue be removed and the voice irreparably damaged."

Change of the method of singing may in some instances conduce to a cure. Change of climate is also suggested. Absolute silence, though generally recommended, will be found difficult to enforce. And the difficulty of operating on so small a neoplasm without injuring the surrounding cord must be borne in mind. C. H. Knight saw considerable improvement in one of his cases following the instillation of adrenalin chloride, 1 to 5,000, carried on daily for a period of three weeks. C. C. Rice (discussion of Dr. C. H. Knight's paper, Transactions of the American Laryngological Association, 1901) states that he has had a few cases which have done well under treatment with chromic acid, and he prefers this to the galvano-cautery.

PACHYDERMIA LARYNGIS.—There is one form of pachydermia, of syphilitic origin, which I shall not touch upon, as it will be treated of in connection with syphilitic perichondritis of the larynx. The form with which we have to deal here is probably of inflammatory origin, according to Virchow; or is caused by friction, according to Schrötter. However, it is a form of chronic laryngitis,

and is seen in those cases in which laryngitis is either chronic or recurrent in form, and has been present for a long period of time.

Cases which I have seen have been in persons who have found it necessary to use the voice while suffering from acute laryngitis, not necessarily straining the throat, by pitching the voice too high, as in the case of chorditis

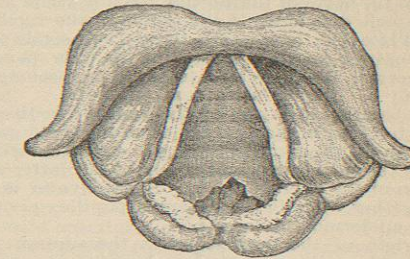


Fig. 3118.—Pachydermia; Central Vegetation with Gray Plaques on Each Side.

tuberosa, but merely using the voice when it should have been at rest. The theory of the causation by friction hardly seems tenable, for the reason that the "plaques" and enlargements seldom form on the free edges of the cords, but usually on the aryepiglottic folds, where friction is very slight. This observation as regards location is that held by E. Meyer and P. Bergengrün.

On laryngoscopic examination the cords are seen to be thickened and there is a want of approximation in their entire length, a condition which is largely due to the thickening in the posterior commissure, as well as to the irregular growths which may be seen there. These flattened and irregular nodules are not at all of the same size or shape as the singers' nodes (which are small and round like large pinheads), but are more like flattened warts. From these warts as a centre patches of thickened membrane of a grayish-pink color extend outward, and are always raised above the surface of the surrounding mucous membrane. Occasionally these patches are present by themselves and not connected with the warty growths.

Symptoms.—This being a form of chronic laryngitis, the symptoms are necessarily similar, and it is only on laryngeal examination that the lesion will be recognized. Hoarseness, and hoarseness of a most persistent character, is generally observed, and there are great dryness and some little soreness of the throat. There will be exacerbations of the hoarseness, it frequently getting somewhat better, but never disappearing completely.

After persistent efforts to make themselves heard the patients often experience great fatigue.

Cough is generally present to some extent and mucus is frequently expectorated, but the improvement of the voice after this clearing of the throat is never so great as might be expected, the condition differing in this respect from simple laryngitis.

Pathology.—Pachydermia laryngis, histologically considered, is an inflammatory hypertrophy of the connective tissue of the mucosa which subsequently affects the epithelium. This is evident in those places where this process can develop unmodified by external influences. Histologically the epithelium is seen to be thickened and horny in its upper layers, which are formed by flat cells with indistinct nucleus and without nucleolus. Among them there occur layers of cells in which keratohyalin may be encountered. The lowest layers of the epithelium, which are situated upon the connective tissue, are composed of cylindrical cells. Between these and those which contain keratohyalin are layers of polygonal cells with prickle processes and deeply staining nuclei, which correspond to the rete Malpighi of the external skin. These horny alterations occur not only in the vocal cords