an extremely rare, almost an unknown, event to have laryngeal tuberculosis exist alone, the inability to discover the pulmonary disease should make the practitioner cautious in the expression of his beliefs.

Treatment.—The treatment consists in the application of local agents and in appropriate systemic remedies. Guided by the mirror, solutions of nitrate of silver, sulphate of zinc, sulphate of morphine, carbolic acid, carbolate of iodine, and chlorate of potassium, can be applied to the affected area directly. Powders may be thrown in by insufflation—as alum, tannin, iodoform, bismuth, etc. Atomized fluids, consisting of solutions of the mineral and vegetable astringents above mentioned, may also be used. When there is much irritation of the larynx, penciling the interior with solutions of bromide of potassium, sulphate of morphine, and of cocaine are highly useful.

The usual means to improve the nutrition of the body are necessary. Cod-liver oil, the phosphates, and hypophosphites must be freely administered. Indeed, the general plan for the treatment of phthisis should be followed, as elsewhere laid down.

SYPHILIS OF THE LARYNX.

Pathogeny.—Syphilitic lesions of the larynx occur with other mucous affections in from two to six months after infection. Again, the larynx may be affected years after all manifestations have apparently ceased, in this respect behaving as syphilis does in any organ which may be attacked. The disease is invited to this organ by its functional uses, and hence occurs in those who employ freely the organ in speaking and singing.

All the various syphilitic mucous lesions occur in the larynx—as condylomata, gumma, etc. They ulcerate, destroy the mucous membrane, and light up perichondritis with ulceration of the cartilages.

Symptoms.—There is usually but little pain, although some soreness may be developed by pressure. Hoarseness is an early symptom, produced by catarrh or by ulceration. Complete loss of tone may result from destruction of the cords. More or less cough, often husky and stridulous in character, is present in most cases. Difficulty in swallowing occurs when there is much ulceration of the epiglottis and of the aryteno-epiglottidean folds.

The actual condition of the parts is ascertained by laryngoscopic examination. The condylomata appear on the vocal cords, on the aryteno-epiglottidean folds, and on the posterior wall of the larynx, as a flat, wart-like papule, covered with a grayish pellicle. The mucous membrane around it is hyperæmic and catarrhal. Gummata are deposits in the membrane, in size from a pin-head to a pea, and situated on the true and false vocal cords, on the epiglottis, and elsewhere. These syphilitic new formations soon ulcerate. The depth and extent

of the ulcerations depend on the stage of the disease, for the syphilitic deposits lie the deeper the more chronic the duration of the constitutional state. The superficial lesions will heal without deformity, but, when gummata ulcerate, the destruction is so great that the most serious changes ensue in the form and structure of the organ.

Syphilitic ulcerations extend from the pharynx into the larynx by contiguity of tissue. Infiltration of the margins of the epiglottis are followed by ulceration and necrosis; then the aryteno-epiglottic folds are invaded, and ultimately the vocal cords are reached and destroyed. Extensive deformity may result in such cases from the contraction of the cicatrices, and the functions remain impaired permanently.

Course, Duration, and Termination.—The progress of the ulceration in these cases is much affected by the constitutional state, and by the treatment. If permitted to pursue its own course in a constitution depraved by excesses, and by repeated mercurialization, the destruction will be very great. Even extensive ulcerations are, however, remarkably restored by suitable medication. As respects the course, duration, and termination, everything depends on timely and appropriate treatment. When syphilitic perichondritis of the laryngeal cartilages takes place, the duration of the disease is increased, and its importance enhanced in every respect. A fatal termination may occur in these cases by œdema of the glottis or by hæmorrhage. The question of the relief to be expected by treatment is much influenced by the condition of the subject and by the amount of mercury previously taken.

Diagnosis.—There is no well-marked distinction between tubercular and syphilitic ulcerations, as respects the appearances seen on laryngoscopic inspection. The previous history and attendant circumstances possess a high degree of diagnostic importance. In the case of tubercular ulcerations the signs of phthisis accompany the laryngeal symptoms; in syphilitic diseases, mucous patches, cutaneous affections, nodes, etc., are present, or have appeared at some time since a chancre formed.

Treatment.—Syphiloma of the larynx proceeding to ulceration requires the most energetic handling to prevent irremediable damage. If a proper mercurial course has not previously been administered, it should be undertaken at once. The internal use should be conjoined with inunction of mercurial ointment and the local application of mercurial fumigation. If the deposits are gummata, no treatment is so efficacious as the rapid administration of iodide of potassium—from twenty to sixty grains being given every four hours, according to the urgency of the symptoms. When destruction of the vocal cords is threatened, no time should be lost by the exhibition of small doses. For the cases of secondary or tertiary disease, with superficial ulcers, sluggish in character, medium doses of corrosive chloride of mercury

may be given with advantage. The vapor of iodine can be inhaled with good effects, and the tincture painted over the larynx is serviceable. Various combinations of iodine and mercury are prescribed in chronic syphilis, but, generally speaking, it is better to give these agents separately. In broken constitutions stillingia has good effects. Cod-liver oil is always useful when the nutrition is poor.

PERICHONDRITIS OF THE LARYNX.

Definition.—The cartilages of the larynx are occasionally affected by contiguity of tissue, the disease extending from the overlying mucous membrane. *Perichondritis* means an inflammation of the investing tunic, the perichondrium. There occur several forms—for example: *Perichondritis arytænoidea; P. cricoidea;* and *P. thyroidea.*

Pathogeny and Symptoms.—Inflammation of the laryngeal cartilages may be primary or secondary. Injuries and excessive exertion of the voice seem to be causative. The disease usually arises by the extension of tubercular or syphilitic ulcers to the perichondrium. Inflammation of the perichondrium is followed by softening and disintegration, or necrosis of the cartilage, swelling and stenosis of the larynx, the formation of an abscess, swelling of the neighboring lymphatics, the discharge of pus internally or externally, or in both directions, the formation of fistulæ, the separation of the necrosed cartilage, etc. There are special symptoms, determined by the particular cartilage affected, and general symptoms common to them all. The latter consist in cough, alteration of voice, or a toneless voice, enlarging lymphatics, and swelling of the larynx externally, but especially the symptoms of laryngeal stenosis, difficult breathing, suffocative attacks in paroxysms, a suppressed or stridulous cough, aphonia, etc. By a laryngoscopic examination, the seat of swelling may be ascertained, and the position and behavior of the vocal cords will indicate implication of the arytenoid and also of the cricoid. Perichondritis thyroidea may be internal or external. A case of the latter has happened under my observation in which a fistulous opening existed on the front of the trachea. A spot of necrosis probably had formed on the anterior plate of the cartilage. A fistulous communication may exist between the interior and exterior of the larynx, caused by an abscess breaking in both directions.

Treatment.—The prompt opening of abscesses and laryngotomy are very necessary measures when suffocation is imminent. In the very rare idiopathic form, recovery may ensue, even after the necrosis and removal of a cartilage, but, in the tuberculous cases, death is the usual result.

TUMORS OF THE LARYNX.

Forms.—Tumors of the larynx may be divided into the two great classes of benign and malignant. In the former are grouped *papilloma*, the most common form of tumor, having its seat in the larynx; *fibroma*, next in frequency, also known as fibrous polypi; *cysts*, or mucous polypi; *myxoma* and *lipoma*, which are very infrequent. In the malignant form is *carcinoma*, which is comparatively common and is usually primary—that is, begins in the larynx.

Causes.—Tumors occur in the larynx, in the great majority of cases, at the most vigorous period in life—from twenty to fifty. Carcinoma is a disease of advanced life, and develops from forty to sixty. Some tumors may appear early; for example, papilloma, which is found in children under twelve, but is more frequent at a later period. Men are much more liable than women, for in them disease of the larynx is invited by their avocations, by speaking and singing in the open air, by the irritation of cigarette-smoking, and by the inhalation of irritating dust, gases, etc. Carcinoma arises under circumstances with which we are unacquainted, unless heredity may be traced.

Pathological Anatomy.—Papilloma, a tumor of villous structure, develops from the vocal cords, epiglottis, and aryteno-epiglottic folds, but its favorite seat is the anterior portion of the vocal cord. It consists of branched connective-tissue bodies, containing numerous and large capillaries, and are covered by epithelium (Wagner). "The extensive papillomata that occasionally occur in the larynx in children are perhaps always of syphilitic origin" (Billroth). As seen by the laryngeal mirror, they are branched, cauliflower-like vegetations, which, to a greater or less extent, occupy the upper and middle laryngeal cavity.

Fibroma is a roundish tumor, dirty-white or red in color, and usually grows from a vocal cord. It is connected to the point of origin by a pedicle of greater or less length, and may have a considerable range of movement. It consists of connective-tissue fibers variously interlaced, is somewhat nodulated, abundantly supplied with vessels, but contains a small amount of fluid (Billroth, Wagner). It grows very slowly, and ultimately attains to great size.

Mucous cysts belong to the class of retention cysts. A duct of a follicle obstructed, the contents accumulate, and thus a tumor is formed, attached usually by a broad base, but ultimately becoming pedunculated. They grow in the ventricle of Morgagni, and at length project into the upper laryngeal cavity (Virchow).*

Of the carcinoma attacking the larynx, the epithelial greatly preponderates over the other varieties. According to Von Ziemssen, of sixty-eight cases of carcinoma, fifty-seven were of the epithelial

* "Die krankhaften Geschwülste," Band i, p. 246.

variety, nine encephaloid and scirrhus, and two villous. The disease first appears on the vocal cords and then extends upward to the aryteno-epiglottic folds. It occurs about equally on the two sides, and involves both ultimately.

Symptoms, Course, and Termination.—In the case of papilloma and fibroma of the larynx, the main symptom is that of a gradually increasing obstruction of the organ—an inspiratory dyspnœa, while expiration is easy. When the obstruction is considerable, inspiration is whistling, noisy, crowing, wheezing, there is constant feeling of a need of air, and the lips are rather bluish, the eyes prominent and injected. The earliest symptom is an alteration of the voice. Before the patient experiences any difficulty of inspiration, the voice has become raucous, hoarse, and finally toneless. There is also some cough, and this becomes husky and stridulous, and violent attacks of inspiratory dyspnœa occur with every paroxysm. A sensation of the presence of a foreign body, stuck fast in the throat, comes on as the neoplasm develops. In the further progress of the cases the dyspnœa increases, swallowing becomes more and more difficult, the nutrition suffers, and the strength declines. Unless relieved by operative procedures or, in the case of syphilitic papillomata, by iodide of potassium, the distress increases with the growth of the tumor, and a slow death is caused, accompanied by the horrors of a gradual suffocation.

Carcinoma of the larynx differs from this disease in other situations, by reason of the existence of a distinct prodromal symptom. Hoarseness precedes the development of the other symptoms by several years, and there appears to be a prodromal hoarseness lasting a year or more. Pain is also an early symptom, but this indicates the formal development of the local morbid process. The pain is situated deeply in the larynx, and is sometimes felt very acutely in the ear. A gradual decline in strength and weight, an earthy hue of the complexion, pearly sclerotics, a weak pulse, and breathlessness on slight exertion, are significant symptoms indicating the development of the cancerous cachexia. The cervical lymphatics begin to enlarge about six months after there are symptoms distinctive of laryngeal disease. The larynx usually enlarges somewhat and is tender to pressure. When perichondritis occurs, extensive suppuration and œdema greatly add to the dimensions of the larynx, as they increase the difficulty in breathing. Some time after the hoarseness, but not long after pain has begun, the symptoms of laryngeal stenosis occur. At first the dyspnœa is excited only by exercise, but after a time becomes constant and most distressing. Cough comes on with the first change in the larynx, and after a time bloody mucus and, in some cases, considerable blood are brought up. Violent paroxysms of dyspnœa occur with the cough, with the inspiratory efforts especially. The cough becomes husky and stridulous with the progress of the changes in the vocal

cords. Pain in swallowing occurs soon after the disease manifests itself in the larynx, especially when the epiglottis and the aryteno-epiglottic folds are attacked. Considerable destruction of the parts about the entrance of the larynx entails great suffering in attempts to swallow, and, the entrance to the glottis not being properly protected, particles of food and drink drop into the larynx, exciting violent paroxysms of coughing and dyspnœa.

The usual duration of carcinoma of the larynx is about two years. Cases have terminated earlier, and others have lasted from five to ten years, but these are exceptional. Removal of the larynx has prolonged life, but the ultimate termination is in death.

Diagnosis.—The differentiation between the several forms of benign tumors is arrived at by the laryngoscope, so far as the naked-eye appearances will solve the question. To distinguish between carcinoma and the benign growths, attention must be given to the following points: the age of the subject, the appearance of a tumor after a long period of hoarseness, the occurrence of rather severe pain in the larynx and in the ear, the enlargement of the cervical lymphatics, and the gradual development of the cancerous cachexia—such are symptoms of carcinoma of the larynx, and to these must be added the ordinary signs of a tumor. To differentiate between carcinoma and syphiloma, the history of the case becomes essential, for there are no means of separating ulcerating gummata from epithelioma on inspection by the unassisted eye. The administration of some large doses of iodide of potassium will, by the results which follow, illuminate the character of the case. This remedy, or its therapeutical congener, mercury, will be necessary to separate syphilitic papillomata from the simple form.

Treatment.—As Billroth finds that papilloma occurring in children is apt to be syphilitic, and as the differentiation of certain ulcerations of the larynx also require it, large doses of iodide of potassium, or suitable mercurial remedies, should be administered at the outset. This failing, removal of the neoplasm becomes necessary. There are two methods—endo-laryngeal extirpation, and removal by laryngo-tracheotomy. After a course of manipulation, which has for its object the removal of the sensitiveness of the larynx and fauces, the growth is removed by the application of caustics (chromic acid), by the cutting-forceps, guillotine, wire *écraseur*, etc., or by the galvanic loup, or cautery.

SPASM OF THE GLOTTIS—PSEUDO-CROUP—LARYNGISMUS STRIDULUS.

Definition.—*Spasm of the glottis* is a term applied to spasm of the muscles of the larynx, innervated by the recurrent or inferior laryngeal nerves. The mechanism consists in an irritation of the terminal filaments of the pneumogastric in the mucous membrane of the larynx,

the transmission of this irritation to the pneumogastric nucleus, and its reflection over the motor nerves supplying the laryngeal muscles.

Symptoms and Pathogeny.—Spasm of the glottis is never the initial symptom. For the first day or two, the child suffers from a simple acute catarrh. There may be slight feverishness, but not high fever; there is more or less nasal catarrh; the eyes are apt to be injected; the throat is redder than normal; the voice is a little hoarse, and there is some cough—in fact, the symptoms are those of an acute cold. Toward evening the voice may get hoarser, and the cough assume a more ringing tone. But in the night the child awakes rather suddenly, coughing in the brassy, metallic, resonant tone which is called "croupy." Every strong inspiration is accompanied by a loud, crowing stridor, and on crying each inspiration has the same character, the expirations being wheezy and somewhat stridulous. This peculiarity of the inspiration is due to sudden and high tension of the vocal cords, they being approximated, and consequently narrowing the chink through which the air passes. So difficult is the entrance of air, that the accessory muscles of respiration are brought into use, the alæ of the nose work convulsively, the face and lips are somewhat bluish, the countenance is anxious, and the inferior portion of the chest is drawn in instead of being expanded during inspiration. Such is an ordinary case of pseudo-croup. Undoubtedly, there are examples of the disease in which the point of irritation is the stomach. An indigestible supper, or some improper article eaten during the evening, may set up an irritation of the end-organs of the pneumogastric, which may be reflected over the laryngeal motor nerves, producing the symptoms of laryngismus stridulus. In which mode soever produced, spasm of the glottis quickly subsides under appropriate treatment, and in an hour or two after being awakened by the oppression the child is usually sufficiently relieved to become drowsy, barking in its sleep, occasionally, until the morning. This experience may be repeated on the following night, and indeed for several nights. When this recurrence of the paroxysms takes place, the case awakens renewed anxiety, lest an exudation may be forming in the larynx. If the paroxysms recur for two nights, there will be attacks during the day also. The author has observed a few cases in which the spasms continued for several days; without being violent at any time, the cough had always the "croupy" character, and a strong inspiration developed stridor.

Course, Duration, and Termination.—The simplest cases consist of a mild acute catarrh, inducing a nocturnal attack of spasm of the glottis, which terminates in an hour or two. The catarrh soon subsides, and there is no return of the spasm of the glottis until succeeding attacks of catarrh renew the disturbance in the nervous apparatus of the larynx. As only certain children, though by no means a small proportion, suffer, there is probably a peculiar mobility of the nervous system necessary.

As the mobility of the nervous system is much more pronounced in children than in adults, we have in this an explanation of the fact that spasm of the glottis is a disease of early life, and rarely occurs after twelve. Although a malady of little importance, spasm of the glottis accompanies some of the most serious diseases. Thus it occurs during the course of true croup, diphtheria, œdema of the glottis, etc., and may be the immediate cause of death; and in all cases adds materially to the difficulties, by the frequent spasms in the laryngeal muscles. As it usually occurs in children, arising in a reflex disturbance, having its origin in an acute catarrh, or an acute indigestion, it always ends in recovery. There are occasional (rather rare) cases in which the catarrh terminates in œdema of the glottis.

Diagnosis.—The manner of its occurrence and the promptness of the cure sufficiently indicate the nature of pseudo-croup without the laryngeal mirror.

Treatment.—Formerly, every case of the disease was subjected to a severe ordeal, and, when bloodletting and tartar emetic were abandoned, emesis was still persevered in. No perturbating agents of this kind are really necessary. A few drops of the fluid extract of ipecac, given every twenty minutes until nausea is produced, will relieve if a cold wet pack about the neck has failed. From five to twenty grains of the bromide of potassium will usually succeed, and will be more effective if some chloral is added. From ten minims to ʒj of paregoric often arrests the paroxysms. A minute dose of pilocarpine nitrate or muriate ($\frac{1}{40}$ to $\frac{1}{8}$ grain) will stop the spasms usually when diaphoresis begins. As it is so mild a disease, the simplest means will suffice to cure an attack. Children accustomed to the attacks should receive prophylactic treatment. A daily morning cold bath to diminish the susceptibility to colds, the sirup of the iodide of iron, or the lactophosphate of lime, to promote the body nutrition, suitable clothing, and outdoor occupation, are the most approved means to prevent a recurrence of the seizures.

CROUPOUS LARYNGITIS—TRUE CROUP.

Definition.—The preponderance of authority is in favor of that view that the so-called membranous croup is only laryngeal diphtheria. The author is one of those who maintain that *croupous laryngitis*, or membranous croup, is an independent, substantive disease; that we have a croupous laryngitis as we have a croupous bronchitis and a croupous enteritis. The author believes that this disease is distinct and separate from diphtheria, for the following reasons: it occupies the larynx exclusively, is a purely local affection, the exudation is *on* and not *in* the mucous membrane, and that systemic poisoning, or secondary septicæmic and infective embolic processes never result from it.

Causes.—Croup is a disease of childhood, and very rarely occurs

later than the second dentition, and attacks male children by preference, in the proportion of three to two. It is not merely the ill-fed children of the poor, or the inheritors of scrofula and rickets, who are chiefly attacked, but the vigorous and well-nourished are more liable. It is certain that heredity has an important influence in its causation, in that certain families are especially liable to destructive visitations, and others, living under similar conditions, escape. Notwithstanding the prevalent opinion that humidity, coldness, and variability of climate favor the development and spread of croup, we find that Lombard says "he has sought in vain to discover any difference in the development of this disease as regards climate, latitude, and altitude."* It seems, nevertheless, well established, that humidity favors its occurrence, and that more cases occur in winter and spring than in summer. That true croup prevails as an epidemic is highly improbable, but, as diphtheria does, the error, if it exist, has arisen by confounding the diseases. A croupous laryngitis sometimes arises during the course of the acute infectious diseases, as measles, scarlatina, small-pox, etc., but of measles especially. This may be a diphtheritic process superadded to an existing lesion, but is more probably a mere croupous inflammation.

Pathological Anatomy.—The initial hyperæmia is of an intense character; the mucous membrane is swollen, has a deep-red color, is marked by an exceedingly fine but diffused arborescent injection, and here and there by minute ecchymoses, and the sub-mucous connective tissue is more or less œdematous. In the progress of the case the redness subsides to a large extent, but the membrane continues somewhat thickened for some time longer. Soon after the hyperæmia attains its maximum, there appears on the surface of the inflamed mucous membrane a grayish, semi-transparent pellicle, which soon becomes thicker, grayish-white, yellowish, or brownish—an opaque false membrane. At various places the false membrane differs in coherence, density, and adhesiveness: here, several lines in thickness, uniform in structure, and firmly attached to the mucosa; there, in flakes or patches, loosely attached to the surface beneath. The false membrane is found on the vocal cords throughout their whole extent usually, spread over the ventricles, and attached to the inner surface of the epiglottis. There may be none found *post mortem*, it is alleged; but probably in these examples there was an error of diagnosis. Successive deposits—two or three—may occur; the first exuded is softened by the serum which transudes, as does the albumen, and is mechanically detached in the act of coughing. As expectorated it usually appears in the form of grayish-white shreds or casts, several lines in thickness, and tolerably tough. Sometimes a cast of the trachea and tubes of considerable extent is

* "Traité de Climatologie Médicale," etc., tome iv, Paris, 1880, p. 401.

thrown off, but this is exceptional. On microscopic examination, the false membrane is found to be composed of a fine network of fibrillæ, holding in their interstices leucocytes, and chemically of an albuminous nature, or of fibrin. Soon after the false membrane forms on the epithelial surface of the mucosa, a process of detachment begins, by the accumulation of serum, having suspended in it muco-pus, cast-off epithelial cells, blood-corpuscles, etc. The mucous membrane, when the exudation is detached, is found to be unaffected, except the hyperæmia, and the imbibition of fluid affecting the epithelial cells. In this absence of direct implication of the epithelium lies the distinction between croup and diphtheria, for in the latter the false membrane is closely united to, and is probably developed from, the cells of the epithelium, as E. Wagner has apparently shown. After the exfoliation of the first croupous exudation, there may be several successive crops of exudation, or, ceasing to form again, a cure is effected. The false membrane is not confined to the parts on which it first appears, but extends upward into the pharynx, but especially downward into the trachea, primary bronchi, and smaller bronchi. As the membrane extends toward the finer tubes, it becomes less fibrillary and more cellular, until at length it is a mere muco-purulent fluid. The lungs are affected by emphysema, and here and there atelectasis, the result of the inspiratory obstruction and the tenacity of the exudation blocking some of the finer tubes.

Symptoms.—The attack of croup usually but not invariably begins as an acute catarrh of the larynx; there is a feeling of heat and irritation in the organ, and the voice is a little husky; there is cough with something of stridor about it, and fever, restlessness, thirst, anorexia, and disturbed sleep, accompany the evidences of laryngeal mischief. When the fauces are inspected, more or less redness, sometimes dusky redness, will be observed, and also small patches of a thin, pellicular exudation of a grayish-yellow color, studded over the palate, tonsils, and pharynx. These patches presently coalesce and then form a denser membrane several lines in thickness, of a yellowish-gray or ash color. As huskiness of voice was one of the initial symptoms, the same patches of pellicular exudation are forming in the larynx. Although it is affirmed of croup that the exudation spreads sometimes over the tongue, cheeks, lips, into the nose, ears, etc., these cases so behaving are examples of diphtheria, it is most probable, for true croup does not extend beyond the pharynx and soft palate. The submaxillary glands become somewhat tumid and swollen, but not the chain of cervical glands extending under the sterno-cleido-mastoid muscles, which are enlarged in diphtheria. Usually from one to two days are occupied with the development of the catarrhal form, but other and rare cases commence with abruptness in the night, as an ordinary spasm of the glottis. In what mode soever developed, there now