EXPLANATION OF PLATE XL.

FIG. 1.—Encephaloid Carcinoma, Originating from Left Ventricle, Vocal and Ventricular Bands. Male patient of fifty-five years. Eleventh month of the disease. Death from exhaustion during twenty-ninth month of disease and one month after tracheotomy. (Case of Dr. Ethelbert Carroll Morgan, and analogous to one recorded by Fauvel.)

FIG. 2.—Encephaloid Carcinoma, Forming a Large Tumor Covering the Superior Laryngeal Orifice. (After Fauvel.)

FIG. 3.—The Same Larynx after Extraction and Destruction of the Tumor by the Galvano-cautery. The ventricular bands and left arytenoid are much swollen. (After Fauvel.)

FIG. 4.—Encephaloid Carcinoma. (After Browne.)

FIG. 5.—Encephaloid Carcinoma, Involving Larynx and Œsophagus. (After Fauvel.)

FIG. 6.—A third Instance of Encephaloid Carcinoma. (After Fauvel.)

FIG. 7.—Epithelial Carcinoma, Right Side of Larynx. (Patient examined by Dr. Morgan.)

FIG. 8.—Round-celled Sarcoma of Right Vocal Band. Patient aged forty; male. (Case of Dr. Morgan.)

FIG. 9.—Spindle-celled Sarcoma of Left Ventricular Band and Arytenoid. (After Poyet.)

FIG. 10.—Round-celled Sarcoma, Sixteenth Month, Destroying Epiglottis and the Adjacent Tissues.

FIG. 11.—Encephaloid Carcinoma, Involving Posterior Laryngeal Wall, Left Arytenoid, Aryepiglottic Fold, and Œsophageal Entrance.

FIG. 12.—Myxosarcoma, Originating from the Anterior Commissure of the Vocal Bands, Causing Great Dysphonia and Orthopnœa.

CARCINOMA AND SARCOMA OF THE LARYNX.

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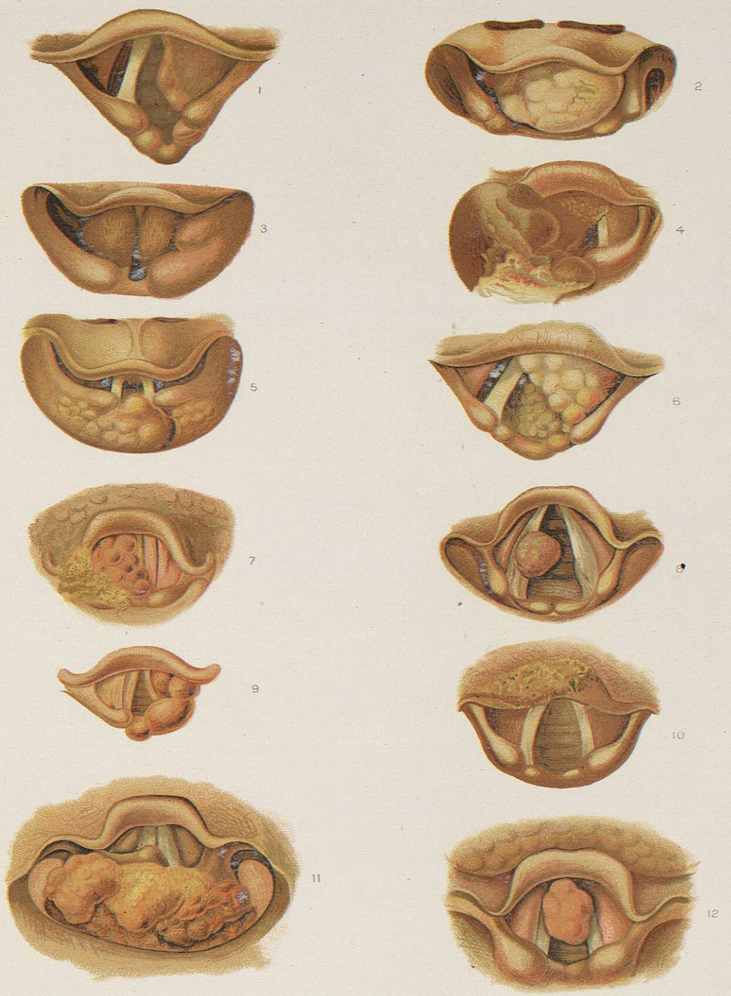

CARCINOMA AND SARCOMA OF THE LARYNX.

phlegmonous laryngitis, abscess of the larynx, and suppurative inflammation in the cervical glands and tissues. It may be due, in either an acute or a chronic form, to rheumatism, gout, or the condition termed arthritis deformans, eventuating then especially in crico-arytenoid arthritis which is unlikely to suppurate.

Acute traumatic perichondritis may be occasioned by blows, wounds, throttling, bruising by high collars, the impaction of foreign bodies in the larynx or œsophagus, or the unskilful passage of intubation tubes and œsophageal bougies. A prolonged recumbent position, especially in old and poorly nourished persons, occasionally results in decubitus by pressure of the cricoid cartilage upon the spinal column. The aged are also subject to a sort of spontaneous perichondritis in connection with calcareous changes in the cartilages.

Secondary perichondritis is more frequent. It occurs in an acute form during the course of septic and continued fevers, especially typhoid fever, smallpox, and diphtheria. It may either be preceded by ulceration, through which infection by pyogenic germs occurs, or it may represent a metastasis of the specific infecting organism. Typhoid bacilli are usually found in the necrotic cartilage in typhoid-fever cases, and it has been shown that they alone are capable of producing suppuration, but it is probable that they act usually in conjunction with pyococci.

The most frequent of all forms of perichondritis are those which are secondary to syphilis, tuberculosis, and carcinoma. Though often commencing in an acute manner they usually eventuate in a chronic process. The infiltration of syphilis may attack directly the cartilages and perichondrium, and tuberculous arthritis analogous to the white swellings of the larger joints is a possibility, but usually ulceration of the soft parts serves as an intermediate cause, providing an opening through which infection by pyococci takes place.

Pathology.—In acute perichondritis there occurs a purulent infiltration of the perichondrium whereby it is separated from the underlying cartilage; and this, involving also the overlying soft parts, constitutes a perichondritic abscess or swelling, which according to the layer affected may project externally or into the lumen of the larynx. The abscess may reach considerable dimensions before rupturing provided its discharge has not been facilitated by previous ulceration. Necrosis of the underlying cartilage and exfoliation of small or large sloughs may eventually ensue. If the perichondrium and part of the cartilage remain reproduction may take place. A fistula is apt to persist. In rheumatic cases the exudation usually proceeds to resolution and absorption without suppuration. The author has observed the same fortunate termination in syphilitic cases under vigorous antisyphilitic treatment. In typhoid fever and other cases extensive ulceration may follow the rupture of the abscess. Œdema is a prominent feature of tuberculous perichondritis as well as of the syphilitic form of the disease. It helps to impede the movements of the larynx, and is liable to culminate suddenly in dangerous occlusion of the rima glottidis. The cricoid cartilage is the one attacked in about two-thirds of the cases, and the arytenoid, usually affected on one side only, comes next in order. In the former case the abscess points either into the lumen of the larynx or into the œsophagus or pyriform sinus; in the latter, the opening is seen near the position of the vocal process. Instead of one there may be several openings, all discharging pus. When the thyroid is affected, the involvement is more often unilateral and internal. Extensive necrosis of this cartilage is less likely to occur because of a richer blood supply. The epiglottis being a fibrocartilage is affected only by an ulcerative action. The tracheal rings sometimes become involved.

Symptoms.—The acute type is ushered in by febrile symptoms and local pain or discomfort, followed by dysphagia, dyspnœa, tenderness on pressure, and impairment of the voice, all varying in degree according to the cartilage and surface involved.

In the chronic type the tumefaction, though usually less, occasions similar functional disabilities, and is subject to acute exacerbation. Seated in the *cricoid*, when the sides of the cartilage are affected, the swelling projects into the lumen of the larynx, thus obstructing respiration; when the rear plate is involved the tumefaction is toward the œsophagus, then impeding deglutition. When the *arytenoid* is the seat of the disease it is liable to impede both respiration and deglutition. The crico-arytenoid joint becomes ankylosed and the vocal cord fixed, hoarseness of the voice resulting. Fixation of the cord in the median line would contribute to dyspnœa.

Affection of the *thyroid* on the inner face leads to dyspnœa but may or may not impair the voice. The most dangerous dyspnœa results from collapse of the laryngeal framework after the expulsion of the greater part of the cricoid cartilage. Wherever seated, the pus is liable to burrow, discharging through fistulæ which may open either within the throat or upon the neck. The sequestrum serves to maintain suppuration until exfoliation occurs, a process which unassisted may require months or years, depending upon the size and position of the sequestrum.

In *typhoid fever* the onset is usually rapid, although slight hoarseness and dysphagia may have been perceived for some days. The suffocative attacks once commenced recur at shorter intervals and are more and more terrible until tracheotomy becomes necessary to prevent a fatal termination.

Laryngeal Image.—Arytenoid perichondritis causes a unilateral pyriform swelling, or even if it is bilateral the tumefaction is not exactly symmetrical. There is immobility of the cartilage and the œdema extends along the aryepiglottic fold. The necrotic cartilage will sometimes be seen to project from the abscess opening. After exfoliation there is a corresponding depression of the part. When the inner surface of one side of the cricoid cartilage is affected there will be a bulging beneath the vocal cord, perhaps extending around the posterior laryngeal wall, and this condition is often combined with tumefaction of the arytenoid. A swelling in the pyriform sinus or in the laryngo-pharynx indicates involvement of the outer surface of the cricoid. The appearance of an abscess under the anterior commissure indicates a perichondritis of the inner surface of one or both plates of the thyroid cartilage, in which position tuberculous ulceration is the usual cause.

Diagnosis.—In the acute type the diagnosis is based upon the laryngeal aspect and the exclusion of other acute inflammatory affections of the larynx. The tumefaction of perichondritis is unilateral or at least is not equally bilateral, and is irregular and asymmetrical in outline. In œdema of the larynx and acute phlegmonous laryngitis the puffiness of the parts is usually symmetrical, and in laryngeal diphtheria there is an exudate.

In chronic cases, especially those secondary to syphilis, tuberculosis, and carcinoma, the perichondritis is apt to be obscured by the infiltration and ulceration incident to the primary disease. A fistula discharging pus, a swelling corresponding in location to the cartilages affected, and ankylosis of the crico-arytenoid joint, are indications of perichondritis. Ankylosis resulting in a fixed position of the vocal cord is distinguished, by arytenoid swelling, from abductor paralysis of the cord. The presence of swellin gand the absence of "falling in" of the arytenoid distinguish it from complete recurrent-nerve paralysis. Additional details are given under the title, "Arthritis and Ankylosis of the Crico-arytenoid Articulation."

Prognosis.—In acute cases the danger to life from dyspnœa may require a prompt tracheotomy, without which the gravity cannot be overestimated. In typhoid-fever cases, when necrosis of cartilage ensues, the mortality is very high. The prognosis is favorable in traumatic, rheumatic, and syphilitic cases provided the nature of the disease is recognized and appropriate treatment instituted. Among these there are many mild cases in which recovery takes place without difficulty, and in the majority of severe ones the patients survive, but with

more or less damage to the larynx. The disease may run a course of several years, for exfoliation is a slow process, and meanwhile the patient is liable to exhaustion by cough, dysphagia, and general distress, so that surgical assistance may improve his chances. Naturally, the tuberculous and carcinomatous conditions are most unfavorable.

Treatment.—In the very early stage of acute perichondritis, cold in the form of ice slowly swallowed and a Leiter coil spread over the larynx externally, supplemented by an ichthyol ointment, tends to abort the disease. Hot sedative vapors and steam inhalants allay the pain, but are indicated only when the tumefaction is insufficient to cause dyspnœa and after tracheotomy has been performed, because, while allaying pain, they are liable to intensify the dyspnœa by increasing the swelling. Alkaline and emollient sprays serve to clear the throat of mucus. Cocaine in two- to five-per-cent. solution is of value in causing temporary retraction of the swelling, but its powers are limited. An accessible abscess may be opened by a laryngeal lancet, but if the pus collection is large and points within the larynx, care should be taken to evacuate it slowly unless a tracheotomy tube is in place. Measures which are appropriate in the treatment of the primary diseases are serviceable for secondary perichondritis, *e.g.*, potassium iodide and mercury in syphilitic cases. On the appearance of severe dyspnœa a low tracheotomy should be promptly performed. Delay involves the risk of pulmonary œdema. After exfoliation and cicatrization, the resulting stenosis of the larynx will require dilatation in the same manner as syphilitic stenosis of the larynx, or else the tracheotomy tube will need to be indefinitely retained.

W. E. Casselberry.

LARYNX, DISEASES OF: PROLAPSE OF THE VENTRICLES.—Prolapse, eventration, or hernia of the ventricles of the larynx occurs as a result of chronic inflammation of the mucosa and submucous tissue lining the ventricles of Morgagni, and is, in the majority of cases, a local manifestation, in this region, of a general chronic laryngitis. The condition is not, therefore, one of true hernia, but is rather the protrusion of inflammatory hyperplastic tissue. Such tissue cannot as a rule be replaced, and the term hernia or prolapse is a misnomer.

The first case of this kind was described by Lefferts,[1] in 1875. Following this, Zawerthl[2] published a case before the Medical Congress in Geneva, Switzerland, in 1878. Solis Cohen[3] described a case in 1882, and McKenzie and Morton[4] two other cases. Gougenheim[5] described five cases of hernia ventriculi, four of which accompanied tuberculosis. Schroeder[6] describes an interesting and instructive case and Massei[7] describes one. Since then numerous other cases have been reported, but the condition cannot be regarded as of frequent occurrence.

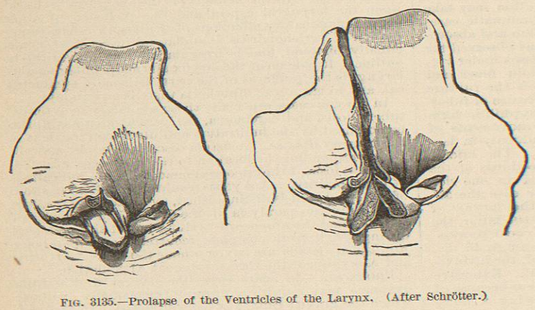

Fig. 3135.—Prolapse of the Ventricles of the Larynx. (After Schrötter.)

There are two varieties—the soft and the hard, or pachydermatous. They may be pedunculated or broad-based; they may extend but partially over the vocal cords, or may reach so great a size as to project between their free edges, and thus interfere with respiration as well as phonation. The soft variety is dependent upon stasis as the result of chronic inflammation and is, therefore, more readily influenced by treatment other than surgical. The hard variety is rarely reduced by local applications and almost invariably necessitates amputation. It is not impossible, however, for the latter variety to undergo spontaneous atrophy, but this result is by no means to be depended on if either the voice or the respiration furnishes indications for removing the mass. With the soft variety we may have considerable change in the laryngoscopic picture from time to time; the size of the tumor may also vary greatly, thus causing the symptoms to change. Thus, for example, extreme hernias are present when the tumor is enlarged from an acute exacerbation of the chronic inflammation, and there will be pronounced hoarseness. Then again, at other times, the prolapsus may be less in size, and the voice will then be scarcely roughened. This is not altogether true of the hard variety in which submucous connective tissue is greatly increased. We then have a tumor that may at times be with difficulty differentiated from a true neoplasm of the cord, of the ventricle, or of the false vocal cords. In the soft variety, again, it is not impossible to behold the prolapsed tissue disappear or diminish in size on phonation, to reappear on inspiration. This is explained by the fact that during phonation the dimensions of the sinus are increased, and the rigidity of the musculature of the vocal apparatus renders the edges of the sinus as well as its walls tense. The prolapsed tissue is thus drawn and pushed back within the confines of the sinus. During inspiration the musculature is relaxed and the area of the sinus of Morgagni is decreased, and the redundant tissue again slips down into view. The laryngoscopic picture shows a prolapse of the mucous membrane which may occupy the entire length of the ventricles, or, approaching the polypoid form, may cover a portion of the true vocal cords. The surface is smooth and of a dark red color. The disease may be bilateral or unilateral. The subjective symptoms are those of chronic laryngitis. The condition may be differentiated from true polypus, infiltration, etc., by the use of the sound; when touched with this instrument a prolapse conveys the impression of a hyperplastic or turgescent turbinated body.

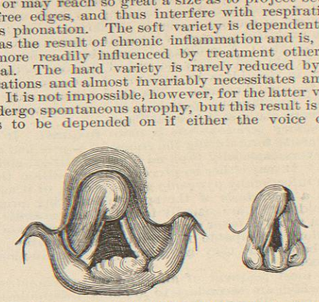

Fig. 3136.—Prolapse of the Ventricles of the Larynx. (From Heyman's "Handbuch.")

Treatment.—Astringents and stimulants are of little use except in rare cases of the soft variety. Destruction with the galvano-cautery is a slow and tedious process, while the resulting scar may produce changes in the larynx which may not be without danger to the voice or to respiration. Much more rational, as Massei[7] says, is the use of either the cold or the hot snare in removing this redundant tissue. These instruments are to be used, however, by none but the most dextrous. The usual treatment for the chronic catarrh must be instituted and attention must be directed to the hygienic conditions surrounding the individual. Solis Cohen[3] reports good results following insufflation of sulphate of copper, and other astringents. In Lefferts' case, the performance of thyrotomy became imperative.

Norval H. Pierce.

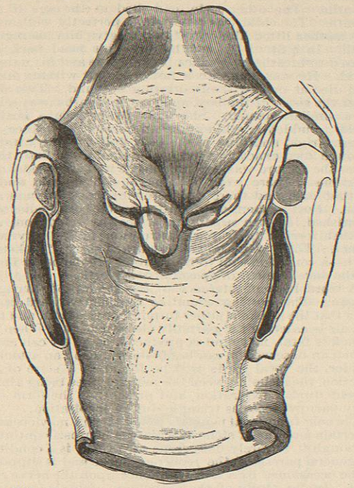

Fig. 3137.—Prolapse of the Ventricles of the Larynx. (After Schrötter.)

References.

[1] Lefferts: Medical Record, June 3, 1875.
[2] Zawerthl: Med. Congress, Geneva, Switzerland, 1878.
[3] Solis Cohen: Annals of Laryngology, 1882.
[4] McKenzie and Morton: Jacksonian Prize Essay, Libr. Roy. Coll. Surg.
[5] Gougenheim: Compte rendu du Congrès International d'Otologie et de Laryngologie, 1889.
[6] Schroeder: Krankheiten des Kehlkopfs.
[7] Massei: Lezioni cliniche, 1882.

LARYNX, DISEASES OF: STENOSIS.—Stenosis, as a medical term, means constriction or narrowing of an opening or tube. It may exist in all degrees, from a mere diminution of the natural calibre of an organ to complete closure. When applied to the larynx, the term implies an amount of constriction within the cavity itself sufficient to interfere with respiration. This interference may or may not be sufficient to endanger life. A very large majority of the cases of laryngeal stenosis which occur are due to conditions arising within the larynx; while the small minority owe their origin to pressure from without occasioned by external pathological conditions. The stenosis may not only be variable in degree, but variable in duration likewise; the condition being in some cases temporary, in others permanent, or at all events continuing until relieved by medical or surgical measures.

Stenosis of the larynx may be either *congenital* or *acquired*. The large majority of cases are of the latter character; while the former, or pre-natal stenosis, is so rare as to have been considered by some writers as non-existent. In the museum of the Royal College of Surgeons, London, no specimen can be found; and no less an authority than Mr. Bland Sutton asserts that: "The larynx is, of all organs, the least liable to malformation."

Congenital Stenosis.—Nevertheless, cases do occasionally occur. They may be divided into the following:

Syphilitic Stenosis.—A case has been reported by Fraenkel, in which a child three months old died of syphilitic laryngeal stenosis. Post-mortem examination revealed necrosis of the cricoid and arytenoid cartilages and the presence of intralaryngeal abscess. J. N. Mackenzie also describes a form of congenital syphilis characterized by interstitial laryngeal inflammation, and the gradual deposit of fibrous material within the organ, resulting in stenosis. This writer says that laryngeal lesions in congenital syphilis in infants are not rare, and that they have not been found more frequently, simply because they have not been sought for.

Vestibular Stenosis (Lennox Browne), caused by the presence of limp and collapsible vestibular walls. It is characterized by an approximation of the aryepiglottic folds and an excessive curling in of the epiglottis, producing more or less narrowing of the passage.

Diaphragmatic or Web Stenosis.—The most pronounced case of this class on record was reported by Sir Felix Semon some years ago. At birth the infant's cry was weak and hoarse and attended by stridor. At the age of seven years the stridor, although still present, had improved somewhat. Later on, the stridor increased again. At the age of sixteen years the larynx was examined. The movement of the vocal cords was perfect, but between the anterior three-fourths of the cords was a perfectly symmetrical, somewhat transparent, slightly reddish, triangular membrane. The free border was crescentic, considerably thicker than the rest of the web, and white in color. The remaining opening was laterally oval and less than one-third the normal size. The borders of the membrane were attached to the cords, the latter being distinguished from the diaphragm by their greater bulk and rounded form. On attempted phonation the vocal cords came almost together, and the web appeared to form a fold below their level. The voice was hoarse, almost aphonic. As the dyspnœa was increasing, operative treatment became imperative.

As a rule, pre-natal web formation is of a less formidable character, being confined to the extension of a band between the anterior portions of the vocal cords. Seifert has observed and reported a remarkable series of four of these cases which occurred in one family. In the father, aged forty-eight, healthy, a membrane supposed to be congenital was found at the anterior commissure. It was between 3 and 4 mm. in width from back to front and did not interfere with either vocalization or respiration. In one of the daughters a very large diaphragm existed, occasioning stenosis, and similar in form to the one reported by Semon. Two other daughters each had a web at the anterior commissure, though of smaller dimensions. The mother and son were both free. McKee and Lennox Browne have each reported a similar case. Chiari's case appears to be the only one recorded out of a total number of about twenty, in which the web had formed between the posterior ends of the cords.

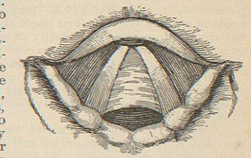

Fig. 3138.—Congenital Web Stenosis. (Sir Felix Semon.)

The congenital deformities of the posterior commissure are usually in the form of bifurcations or dilatations. Morell Mackenzie reported one in which, associated with