MORGAN. (E.C.)

Carcinoma of larynx.

upon, the means and method require consideration. Practically, there is but little difference of opinion. The laryngeal forceps (Mackenzie-Gottstein) are commonly employed by the majority of operators, and certainly subserve the best purpose in the largest number of cases. Well warmed, they are introduced by the trained hand, under the guidance afforded by the laryngoscopic mirror and artificial illumination, into the larynx, which has been thoroughly anæsthetized by the use of a solution of cocaine. The growth being seized, it is torn, in whole or piecemeal, or crushed, from its base, and removed within the blades of the forceps. Several sittings may be necessary to effect the removal of a large growth. Complete, thorough extirpation should always be aimed at, and effected if possible.

Under certain circumstances, as has been stated, *i.e.*, in small children, such an operation is impracticable, and the larynx must be opened from without, to permit of the thorough removal of the neoplasm. The latter course is also necessary in cases where the growth in adults is located below the vocal cords, and is thus inaccessible by the mouth; and again, in cases where it is of great size and springs from many points within the laryngeal cavity, besides being firmly attached with a broad base to the underlying tissues, and cannot thus be removed by the natural passages without great laceration and damage to the laryngeal structures.

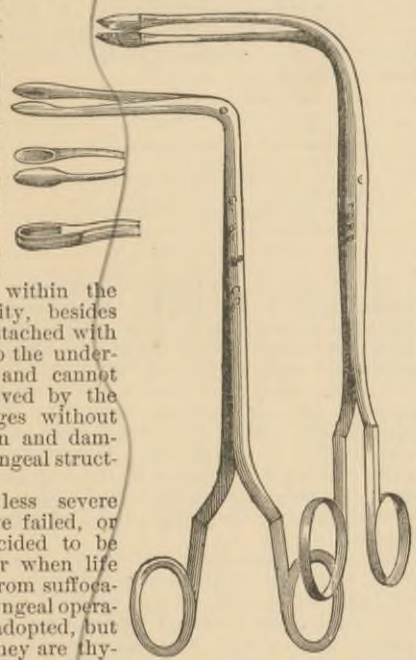

FIG. 2039.—Laryngeal Cutting Forceps. (Mackenzie.)

When the less severe operations have failed, or have been decided to be inapplicable, or when life is in danger from suffocation, extra-laryngeal operations may be adopted, but then only. They are thyrotomy, or division of the thyroid cartilage alone; complete laryngotomy, or division of the thyro-hyoid membrane and thyroid and cricoid cartilages, even the upper rings of the trachea; sub-hyoidean pharyngotomy, *i.e.*, transverse section of the thyro-hyoid membrane; and, finally, section of the middle crico-thyroid ligament. Of these, the ones commonly employed are the first two, the choice between which will depend upon the size and particular location within the larynx of the growth to be removed, and the amount of space required for manipulation. Sub-hyoidean pharyngotomy affords only limited space, and is rarely indicated. Mesochondric laryngotomy, the last procedure alluded to, may be employed for the removal of small tumors located below the vocal cords, and sometimes subserves a good purpose.

The details of the surgical steps involved in these procedures will be found in the works on General Surgery.

NOTE.—Drawings Nos. 2030, 2031, 2032, 2033, 2034, and 2038 are original, and taken from life sketches by the author.

George M. Lefferts.

LARYNX, BURNS, SCALDS, AND INJURIES OF. 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 first three accidents above named is, practically, acute laryngeal œdema; and, although from the youth of the patient, the hyperæsthesia of the parts, or the urgency of the symptoms, a laryngoscopic examination will often be impracticable, the congestion of the fauces, on the other hand, the rapidly increasing dyspnœa, and occasionally the tumefied margin of the epiglottis visible above the tongue, will plainly indicate the nature and seat of the difficulty. Mackenzie suggests that the tumefaction which follows the impaction of a foreign body partakes of the character of venous obstruction, since its occurrence is too rapid to be accounted for by inflammatory action.

The prognosis in these cases is very serious, and great promptness of action may be required. The sucking of cracked ice, the administration of a non-depressant emetic, and thorough scarification of the œdematous tissue as described under the title Glottis, Œdema of the, are highly recommended. 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 Larynx, Intubation of).

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, Stenosis of).

D. Bryson Delavan.

LARYNX, CARCINOMA OF. By this term is understood a carcinomatous affection, originating in, and most frequently limited to, the larynx, causing hoarseness, dyspnœa, odynphagia, dysphagia, ulceration and necrosis of tissue, lancinating pains in the ears, orbit, and head, hæmorrhages, and, finally, death from apnœa or exhaustion. This description applies with equal exactitude to the epithelial and encephaloid varieties of carcinoma, which differ microscopically, but possess, with the exception of differences to be hereafter mentioned, essentially the same clinical history, progress, duration, and termination.

Krishaber divides primary cancers of the larynx into intrinsic and extrinsic, the former division including growths of the vocal and ventricular bands, ventricles, etc.; the latter those of the epiglottis, ary-epiglottic folds, and interarytenoid region. This division, in my opinion, has an important clinical foundation, and will be adopted throughout this article.

Intrinsic cancers have, as early symptoms, dysphonia or dyspnœa, while the extrinsic variety, on the other hand, is marked by dysphagia and odynphagia.

ETIOLOGY.—The influence of heredity as a cause of cancerous disease of the larynx is not positively established, and those instances tending to strengthen a belief in an hereditary predisposition are few. The abuse of tobacco and strong alcoholic liquors, prolonged residence in humid cold climates, as well as the respiration of gases or vapors of an irritating nature, all undoubtedly predispose to the development of carcinoma of the larynx, especially in those who make violent use of the voice.

Traumatism is regarded by Blanc and Démarquay as an occasional cause, and Fauvel cites a case due to an external wound of the neck.

Oft-repeated attempts at extraction of benign intra-laryngeal growths by means of forceps, etc., are by a few writers held to occasionally terminate in the conversion of an otherwise benign tumor into one of a malignant nature.

The writer, in a considerable experience with benign tumors of the larynx, has never observed any but the happiest results follow their extraction *per vias naturales*, and is inclined to believe that the malignancy claimed to result from evulsion in reality existed *ab initio*.

HISTORICAL.—Prior to the invention and general employment of the laryngoscope, carcinoma of the larynx,

as a primary disease, was considered extremely rare, and only what were improperly denominated secondary carcinomata claimed attention from medical authors.

The laryngoscope has not only aided in the early recognition of this disease, but has enabled the physician to more closely observe its development and progress day by day.

The detection of approaching stenosis, the results of medical and surgical treatment, and, finally, the determination of the time when a tracheotomy should be done, are a few of the advantages derived from an intelligent use of this instrument. Delavan's case well illustrates the force of the above remarks. (See bibliography at end of article.)

In 1837 an instructive case of primary cancer of the larynx was reported by Trousseau. Louis and Barth each report a case, the date of the latter's being 1854.

A number of so-called secondary carcinomata, extending from the œsophagus, tongue, tonsils, or pharynx, to the larynx, were reported at an early date, but Fauvel considers these to be "cancers of vicinity," and not, properly speaking, consecutive (or secondary), and remarks that "cancer which takes its origin at a distance from the vocal organ, and which in time may be developed in other regions, always respects the larynx."

In the past ten years numbers of primary laryngeal carcinomata have been reported, and have generally received a conscientious and satisfactory histological examination.

Recently the case of General U. S. Grant has served to direct universal attention to cancer of the throat. His was an epithelioma of the squamous variety, and attacked primarily the pillars of the fauces, base of the tongue and palate of the right side. The inestimable value of the microscope and laryngoscope as instruments of diagnosis, and the utility of cocaine as a therapeutic agent, were demonstrated to the public mind during the progress of this case.

Frequency.—Primary carcinoma of the larynx is not a rare disease, as some writers have stated, and an examination of the literature of the subject will demonstrate the truth of this assertion.

In early days the records of malignant laryngeal growths were unaccompanied by satisfactory histological data, and hence several systematic writers have been forced to exclude numerous imperfect cases from their writings, thus seemingly reducing the aggregate.

Butlin, for example, in his monograph has collected only fifty authentic cases, having found it essential for purposes of analysis to admit only tumors examined with the microscope. It is a settled fact that males are more liable to cancer of the larynx than females, and of Butlin's fifty cases forty occurred in males. Whether this greater liability in the male is due to habits, exposure, and occupation is unknown; but Fauvel suggests that the larynx is more liable to malignant growths in men than in women, because these diseases find in the latter a soil prepared for them in the mamma and uterus.

Profession or occupation does not appear to exercise a marked influence in causing this disease, although alcoholic liquors and shouting may invite its development in those having a predisposition.

The following table from Butlin shows the ages of his fifty collected cases:

3 years	1
28 to 30 "	4
31 " 40 "	6
41 " 50 "	8
51 " 60 "	15
61 " 70 "	10
71 " 76 "	2
Uncertain	4
Total	50

Seat.—The site of the cancer is variable, and it becomes difficult after it has encroached upon other parts to positively determine the point primarily invaded.

The entire larynx is occasionally covered by the growth, or the epiglottis may be so swollen as to obscure the interior of the larynx.

Ziemssen claims that the vocal bands or ventricles of Morgagni are the elective points from which these tumors originate. In Fauvel's 37 cases 26 were of the left side, and of these 16 were of the ventricular band. M. Mackenzie in 53 cases of primary laryngeal cancer met with 18 on the left, and 17 on the right side—15 of the right and 13 of the left ventricular band—thus giving 56.7 to 43.3 as the relative frequency with which the two ventricular bands are attacked.

From the above it is apparent that the middle and upper portions of the larynx are the favorite starting-points for cancer of this organ, the ary-epiglottic folds and epiglottis being finally involved by a spreading of the growth.

Fauvel has seen the epiglottis invaded primarily only once in thirty-seven cases, M. Mackenzie six times in fifty-three cases, and Ziemssen mentions it thirteen times in ninety-six collected cases.

Various theories have been advanced to explain why cancer of the larynx should, in the large majority of instances, involve the left side, but they are, in the estimation of the writer, unsatisfactory. M. Mackenzie has observed that in his fifty-three cases the various portions of the larynx were attacked with the relative frequency below mentioned:

Right ventricular band	15
Left ventricular band	13
Left vocal cord	3
Left vocal cord and subglottic region	2
Right vocal cord	2
Anterior commissure of the vocal bands	2
Epiglottis	6
Posterior surface of cricoid cartilage	1
Whole larynx	9
	53

Pathological Anatomy.—Carcinoma assumes two leading types in the larynx, the epithelial and the encephaloid or medullary. The histological characters of these two varieties, when found in the larynx, are identical with those distinguishing like growths in other organs. Carcinoma, as is well known, embraces four principal varieties, viz., epithelioma, medullary or encephaloid, scirrhus, and colloid; the two former will alone receive consideration in this article. A great deal of the uncertainty existing in reference to the histogenesis of carcinoma is attributable to the complex character of its anatomical structure (see article on Carcinoma, Pathological Anatomy of).

By far the most common form of tumor is the epithelioma, forty-five of Mackenzie's fifty-three cases of cancer being of this nature and only six encephaloid. In sixty-eight cases collected by Ziemssen, fifty-seven were epitheliomatous and nine encephaloid. Seventeen of Schroetter's twenty cases were epitheliomata. In Fauvel's experience, however, the relative frequency of the two forms was almost identical.

Symptoms.—The symptoms presented by primary carcinoma of the larynx may be divided, for convenience of discussion, into those of a *functional*, a *laryngoscopic*, and a *general nature*. These symptoms, except as regards the laryngoscopic appearances, are the same whether the disease be of the epithelial or the encephaloid variety. Functional symptoms may proceed from the organs of phonation, respiration, or deglutition, and their severity is in direct proportion to the malignancy of the disease and the extent of laryngeal tissue attacked. The very first noticeable symptom in the vast majority of cases of carcinomata is a huskiness or enfeeblement of the voice, at first transient, but later permanent in character. A prodromal hoarseness may exist for from one to five years prior to the appearance of the disease. When the ventricular or vocal bands are affected (intrinsic cancer) the voice rapidly becomes hoarse; but involvement of the epiglottis, posterior laryngeal wall, or œsophagus (extrinsic cancer), may result in no alteration of voice, although causing more or less odynphagia and pain of a darting, cutting character.

The *voice* is never entirely lost, as it is in tuberculosis of the larynx, and the patient can make himself heard by violent effort, even in the advanced stage of the disease. The patient generally attributes his huskiness to a simple

catarrhal inflammation, and does not concern himself greatly until after several months, or even a year, when the voice has become harsh and progressively weaker. He then seeks medical advice.

Hoarseness in the earlier stages of laryngeal carcinoma is often due to implication of the inferior or recurrent laryngeal nerve; but when the ulcerative process has commenced depends upon an alteration of structure, or the presence of buds and vegetations within the vocal organ. When these vegetations are expelled spontaneously, extracted by the forceps, or destroyed by chemical caustics, the voice may be partially regained, only to be again impaired by the unceasing progress of the disease. Fauvel states that rest to the larynx, following a tracheotomy, lessens congestion and tumefaction of the parts, and frequently in ten days the voice is so improved as to lead the patient into a deceptive hope of recovery.

Gradual and progressive *embarrassment of respiration* supervenes early in the course of this disease, and assumes all degrees of gravity from slight dyspnœa to fatal asphyxia. Respiratory disturbances vary much, but depend in a great measure upon the amount of carcinomatous mass obstructing the glottic orifice, the degree of subglottic œdema, the existence of arytenoid ankylosis, perichondritis, the paralysis of intra-laryngeal muscles, etc. The patient first becomes conscious of dyspnœa upon making slight physical exertion: running, going up the steps briskly, lifting, etc. Later a rough laryngeal sound, of a harsh piping character, known as "cornage," is developed, and is considered by Fauvel as characteristic. Suffocative spasm and cyanosis frequently occur at this period of the disease, and the life of the patient is thus threatened. The attacks are usually nocturnal, and in many cases they have been followed by sudden death. Enlarged cervical or bronchial glands may cause asphyxia by direct pressure on the trachea or recurrent nerve; in the latter instance a paralysis of the intrinsic muscles results.

In speaking of impaired vocalization, resulting from obstruction of the glottic orifice by cancerous masses, it was mentioned that the expulsion or extraction of such masses was often followed by improvement of voice. In like manner, respiration is rendered temporarily less distressing when dependent upon similar obstructions.

The exact period at which *interference with deglutition* takes place depends greatly upon the location or seat of the carcinoma, as well as upon the rapidity of ulcerative changes. When the epiglottis, ary-epiglottic folds, or the arytenoid region are the seat of disease (extrinsic cancer) deglutition is soon affected, either as odynphagia or dysphagia; but when the primary seat of disease involves a ventricular band (intrinsic cancer), these symptoms are postponed. The odynphagia and dysphagia are well-nigh constant accompaniments of carcinoma of the larynx, and increase *pari passu* with the disease, until finally the patient can only with the greatest care swallow liquids or mucilaginous substances without causing violent cough and suffocative spasm. Inability to swallow, either from mechanical obstruction or pain, occasionally terminates in the escape of food into the air-passages, a dangerous and sometimes fatal accident. The pain extends to the ears, orbits, jaws, and entire head, and is of a shooting, cutting character. Pressure over the larynx is usually painful, even in the earlier period of the disease, and copious salivation is quite a frequent symptom. The saliva is rarely swallowed, and escapes from the corners of the patient's mouth.

In patients who have been tracheotomized there is a marked amelioration of the symptoms above noted, as referable to phonation, respiration, and deglutition. The voice is improved, suffocative attacks prevented, and swallowing becomes easier, especially if there was previous mechanical obstruction from arytenoid engorgement. Tracheotomy is urged by Fauvel as a method of relief.

Laryngoscopic Symptoms.—The first signs of cancerous disease of the larynx are by no means pronounced, and consist of simple hyperæmia and hypertrophy; symptoms alike common to catarrhal, syphilitic, or tubercular laryngitis in their incipiency. Later the tumor gradually forms; at first it is of a dirty, reddish-brown color, with a smooth, broad base, which steadily increases in dimensions until just prior to ulceration, when the entire mass may assume a purple hue. Ulceration is always preceded by infiltration, and the disfigurement of the larynx early in the course of this disease may be enormous, furnishing a strong point for its differentiation from syphilis. The mucosa in the vicinity of the tumor is of a deep red hue, but becomes studded with vegetations and anæmic as the disease advances. The cancer may be single or multiple, is of variable size, and is frequently bathed in a purulent secretion or ichorous muco-pus. The general symptoms now become marked, and at this period a clear diagnosis becomes possible. In the encephaloid variety of the disease the tumor appears in single nodules and ulcerates early. As soon as ulceration is established, a process of sprouting commences, and, as Fauvel has well pointed out, the vegetations issue from the ulcerated surface, and do not attack the surrounding mucous membrane, which remains more or less intact for some time, being but slowly eaten away by the spreading of the primary ulcer. On the other hand, in epithelioma, as soon as an ulcer has formed, a series of vegetations spring up about its margins, and these new growths, by ulcerating in their turn, rapidly increase the original loss of substance. The exact color of the vegetations, in both the epithelioma and encephaloid, is difficult to determine, as their surface is unequal, suppurating, bleeding, or covered with grayish mucus or blood-clots.

Hard œdema is apt to occur, and the surface adjacent to the ulcers becomes red and glazed in aspect. As different parts of the larynx are invaded, new tumors form and undergo ulceration.

Curious as it appears, only one side of the larynx is generally attacked, and, as before stated, preferably the left.

The papillary vegetations in the encephaloid cancer become fungous, cause stenosis, and require the performance of tracheotomy oftener than the vegetations of epitheliomata. In short, in a well-defined case of carcinoma of the larynx the appearance may be that of one sloughing mass, whose parts are absolutely unrecognizable, and Blanc has well said, "At a comparatively early epoch of the malady the alterations of the larynx take forms so diverse that not only does one cancerous larynx not resemble others, but even the same larynx, examined at different periods, will often present widely different aspects."

General Symptoms.—*Pain.*—Dull in the earlier stages, later sharp, cutting, constant in character. During the ulcerative period these pains assume an excruciating severity, and are reflected from the larynx to the ears, orbits, forehead, and jaws. The pain developed by digital pressure over the larynx is rarely of a serious nature, and is attributable to tumefaction and tenderness of the cervical and sub-maxillary glands. As before stated, when the œsophagus is concerned in the destructive process, pain is an early, constant, and grave symptom.

Cough.—This is by no means a common symptom, although the sensation of irritation and fulness about the larynx may cause expulsive attempts at cough.

Expectoration.—The sputum in advanced cases is purulent, occasionally fetid, and mixed with blood as well as disintegrated portions of the cancerous mass. Especially is this the case in epithelioma, and as a very small piece will suffice to determine the exact histological nature of the tumor, an examination in this direction should always be made.

Salivation.—The secretion of saliva is greatly augmented with the progress of cancer, and, owing to painful deglutition or dysphagia, this fluid flows from the mouth night and day, often reaching several quarts during a period of twenty-four hours. Sleep is obtained with difficulty, and the bed-linen is usually saturated with the salivary secretion.

Odor.—The breath becomes foul with the commence-

ment of ulceration, but the patient is unconscious of the odor, from its constant presence blunting olfactory sensibility.

Hæmorrhage.—A frequent and pathognomonic symptom, varying in degree from slight tinging of the expectoration with blood to a copious and more or less constant flow. The sputum is occasionally mixed with large black coagula, showing signs of a protracted stay in the larynx (ventricles of Morgagni) prior to expulsion. Discharges of pure blood are not accompanied by clots, as the frequent cough excited by the flow prevents their formation. In tracheotomatized patients blood may escape through the cannula.

Lymphatics.—The external condition of the neck seldom affords any positive evidence as regards laryngeal cancer. Occasionally, as the disease advances (after from ten to twelve months), the sub-maxillary and cervical glands are enlarged and the thyroid cartilage may be pressed outward, so that, as Isambert has well said, the cartilage feels much like a "crustacean carapace." The connection between the lymphatics of the larynx and the glandular system is not so intimate as in the pharynx, and hence we notice involvement of the glands more in the so-called extrinsic than in the intrinsic laryngeal cancer. The lymphatics of the larynx are, according to Sappey and Luschka, abundant; but they are peculiarly arranged and form a network of their own without anastomosing with the lymphatics of neighboring parts. Enlarged peritracheal and peribronchial glands may, by direct pressure upon the trachea, cause stenosis and diminished respiratory murmur.

General State of the Patient.—The subject shows evidence of a malignant cachexia aggravated by the particular location of the cancer and the degree of its interference with vital functions. The usual victims of cancerous disease of the larynx are those in robust health, and their functions remain normal until ulceration, pain, dyspnœa, dysphagia, and gastric disturbances begin, when emaciation rapidly appears. The patient now has a pale yellow, or "waxy" complexion, which is well marked in those upon whom tracheotomy has been performed and in whom an earlier death from asphyxia has thereby been averted. It must be here stated, however, that in very rare instances of primary intrinsic carcinoma of the larynx the development of the cachectic facies does not occur until toward the end of the disease.

Diagnosis.—Prior to ulceration, cancer may be confounded with hypertrophic inflammation of the larynx, but this disease is usually bilateral, while cancer is nearly always unilateral, limited to the left side, and at first to one cord. A red color is indicative of simple inflammation, whereas a dirty, reddish-brown hue would suggest cancer. In laryngitis the dull pain of cancer is wanting.

Papillomata often invade the entire larynx or any part of it, and simulate epithelioma. Here, also, both sides of the larynx may be covered; there is aphonia, no dysphagia, no lancinating pain, no bleeding, and no lymphatic enlargement or other symptom of malignancy.

Gummatous tumors previous to ulceration might be mistaken for cancer, but the history of the patient, the rarity of such tumors, and the effects of anti-syphilitic medication should solve this question.

Subsequent to ulceration cancer might be taken for tuberculous, scrofulous, or syphilitic disease of the larynx.

Tubercular ulcers generally develop in the posterior portion of the larynx, rarely vegetate, produce caries and necrosis of cartilage, pale œdema, and the discharge of abundant pus. The ulcers are nearly always secondary to pulmonary tuberculosis. Tuberculosis occurs at all ages and in both sexes alike, the hæmorrhage is bronchial, and the pain is not lancinating, as in carcinoma.

Scrofulous ulceration is very rare, and takes place at an age when cancer does not occur, is indolent, free from œdema, granulating, not fungous, and is habitually accompanied by the general manifestations of scrofula.

Syphilitic ulcers are usually found upon the epiglottis or in the anterior portion of the larynx; they have raised edges and indurated borders, around which is a membrane, carmine in color, and not reddish-brown or purple. As there may be salivation, acute pain, glandular enlargement, and dysphagia, the diagnosis should be guarded. Antisyphilitic remedies constitute the test in doubtful cases. Fauvel subjects all his cancerous patients to a mixed treatment for syphilis. The differential diagnosis of cancer, which, as remarked, is difficult at the outset, becomes, after a few weeks' observation of the patient, confirmed, owing to the constant progress of the disease, the absence of all efforts at cicatrization, and the inutility of syphilitic treatment.

Prognosis.—Always fatal, whether the cancer is epithelial or encephaloid. Tracheotomy undoubtedly prolongs life and holds out all the comfort and hope which is claimed for the more radical and heroic operation of laryngectomy.

Whether a laryngectomy in the very incipiency of primary intrinsic carcinoma of the larynx will effect a permanent cure the future can alone determine. The tendency of operators now is to laryngectomatize only commencing cases.

The most favorable results in complete laryngectomy for carcinoma have perhaps been obtained in the following cases especially selected by the writer. Thiersch's and Winiwarter's patients were living three years and six months after operation, while Novaro's, Hahn's, and Gussenbauer's were living two years afterward. Some twenty cases have lived for periods varying from six to fifteen months.

According to Hahn recurrence is no more frequent in half-sections of the larynx than after total extirpation.

Progress, Duration, Termination.—*The progress* does not differ materially for epithelioma or encephaloid cancer of the larynx; the alterations of voice usually precede dysphagia, or they may have an identical cause and be simultaneous. The peculiar "cornage" is coincident with hard œdema and ulceration. In very rare cases of intrinsic cancers of the larynx, the dysphagia may not appear until even after it has been necessary to perform tracheotomy. The pain becomes almost intolerable the moment the arytenoid region is attacked. Submaxillary enlargement always accompanies, and sometimes precedes, ulceration.

The duration of the disease depends upon the form of cancer, and whether or not tracheotomy has been performed.

Fauvel found that seven cases of encephaloid in which tracheotomy was not performed lived three years on an average, while eight cases tracheotomatized lived three years and nine months. Six cases of epithelioma not tracheotomatized averaged one year eleven months, while seven cases tracheotomatized averaged four years. Thus the progress of encephaloid where tracheotomy has not been performed is slower than epithelioma. Where tracheotomy is done in epithelioma life is prolonged two years and one month, and where it is done in encephaloid a prolongation of nine months is obtained. Tracheotomy always extends life and is both useful and necessary. The course of laryngeal carcinoma is, in general, very slow. In twenty-seven cases in which accurate information was given with regard to the duration of the entire disease, Ziemssen found it lasted—

	Patients.
From three to six months	4
Nine months	2
Twelve months	3
Eighteen months	7
Over twenty-four months	2
Over three years	3
Over four years	3
Over six years	1
Over ten years	1
Over fifteen years	1
Total	27

Termination.—Always fatal, by either cachexia, apnœa, or inanition. Sometimes sudden death results from passage of secretions into the bronchial tubes and pulmonary vesicles. Abscesses occasionally form during the disease and may rupture externally in the anterior cervical region, or into the œsophagus. Portions of disinte-

grated cartilage may escape through fistulous openings, or be expectorated during coughing.

TREATMENT.—With the best directed medical and surgical therapeusis we can only expect to prolong life or afford our patient comparative ease during the progress of this painful disease.

Tonics and alteratives should be persistently administered, and the usual systemic management of carcinomatous disease intelligently employed. An important rule, however, always to be borne in mind, is to employ no medication which interferes with the processes of assimilation.

Fauvel subjects all his cases of carcinoma of the larynx to a preliminary antisyphilitic course of medication, experience demonstrating the value of this method. Inunctions over the larynx of the oleates of morphine, cocaine, or mercury, as well as opium, belladonna, and chloral hydrate, when combined with simple ointment, give much comfort in the advanced stages, and render deglutition possible. Hypodermatic injections of morphia or cocaine in the vicinity of the larynx should be employed when necessary to control pain.

Endo-laryngeal treatment consists first in the topical medication of affected parts by means of solutions, sprays, powders, or vapors, and second, in the extraction of portions of the cancerous mass (for the relief of urgent respiratory and vocal embarrassment, resulting from laryngeal stenosis). Solutions are employed principally to lessen pain or for cauterization, the most valuable being: Morphine sulphate, gr. iv.–viij. to f ℥ j. of water; cocaine hydrochlorate, gr. v.–xxv. to f ℥ j. of water; lactic acid, ʒ j.–ij. to f ℥ j. of water; ext. opium aq., gr. x.–xv. to f ℥ j. of water. A solution of iodoform, ʒ ss. to f ℥ j. of ether, acts well when cautiously used, and the writer has obtained excellent results from the oleate of cocaine, of five per cent. strength.

The ordinary chemical caustics consist of chromic acid, nitric acid, acid nitrate of mercury, and mono-chlor-acetic acid, either pure or diluted with water. The above solutions should be accurately applied to the diseased parts of the larynx, by means of a properly curved laryngeal brush or on a sound armed with absorbent cotton.

Sprays.—Antiseptic and detergent sprays of carbolic acid, creasote, potassium permanganate, mercuric chloride, thymic acid, boracic acid, bromine, and solution of chlorinated soda, etc., become indispensable after ulceration is well established and the expectoration has become fetid.

The sprays, cold or warm, should be frequently employed, and aid in preventing early derangement of the digestive functions from the presence of offensive discharges in the air- or food-tracts. Sprays are also most serviceable in disguising the offensive and occasionally unbearable breath noticed in some cancerous patients.

Powders.—These preparations may be employed both as analgesics and antiseptics, and are to be be applied directly to the interior of the larynx by means of one of the various forms of insufflator designed for the purpose. Insufflations consisting of morphine, cocaine hydrochlorate, or iodoform, mixed with starch, sugar-of-milk, or lycopodium, will be found among the most valuable. Among the antiseptic insufflations boracic acid and resorcin may be mentioned.

In spite of the theoretical objections urged against the employment of powders within the larynx, upon the ground of their non-absorption, the fact remains that pain may be assuaged by such preparations.

Vapors.—The inhalation of the vapors of cannabis indica, conium, opium, belladonna, tr. benzoin co., and other anodyne and sedative drugs, will be found to afford great relief to those patients who are capable of active inhalation.

From ♏ xx. to f ʒ ij. of the medicament is to be added to ℥ ss. of water heated to 190° or 200° F. and inhaled from a Mudge or Wolfe bottle, a Mackenzie inhaler, a tin cup, or a tea-pot.

Endo-laryngeal Operation.—Little can be accomplished in the direction of complete removal of an ill-defined malignant growth *per vias naturales*, although a few fortunate results of this nature are on record. The writer ventures to express his doubts as to the possibility of such cures. A precept of first importance for our guidance in resorting to endo-laryngeal interference of a surgical nature, is never to meddle unnecessarily, and then only for the relief of urgent symptoms. That tearing, scraping, and imperfect cauterization of laryngeal carcinomata may occasionally add fuel to the flame, will, I think, be admitted by every experienced laryngologist. The maxim "Never interfere actively without a distinct object," is in every sense appropriate and worthy of consideration here.

When, however, a laryngeal carcinoma ulcerates, and the swollen mass is so voluminous as to prevent phonation or respiration, it is justifiable to destroy the mass by extraction, by chemical caustics, or by the galvano-cautery.

If a previous tracheotomy has been performed and the patient breathes below the obstructed point, evulsion by forceps or the burning out of the vegetating mass with the galvano-cautery is of comparatively easy performance for an expert. When the galvano-cautery knife is employed the cancer is to be deeply incised, and when crumbling, softening, and suppuration supervene, large portions of the tumor can be extracted by the aid of forceps, hæmorrhage rarely occurring. Concentrated solutions of chromic acid, varying in strength according to the sensibility of the patient, may be used to destroy the cancerous mass.

In very rare instances abscesses develop within the larynx in the course of cancer, and can be evacuated by means of the laryngeal bistoury, thus avoiding internal rupture and suffocation or external rupture and fistulous openings.

Surgical treatment proper may be either radical or palliative: the radical measures include extirpation of the larynx, sub-hyoidean pharyngotomy, and thyrotomy; the palliative, tracheotomy, laryngotomy, and laryngo-tracheotomy.

Laryngectomy.—This radical operation has been performed one hundred and six times, fifty odd of which were for carcinomatous disease of the larynx. M. Mackenzie, Burow, Blum, Cohen, Hahn, and Baratoux have prepared excellent tables of partial and complete laryngectomies. The justifiability of and advantage resulting from a laryngectomy may even to-day, twenty years after Watson's case, operated upon in 1866, be regarded as *sub judice*. The weight of evidence, in the writer's estimation, is against its performance in any but the most favorable subjects, and then, at an early period of the carcinomatous disease.

The longevity of patients, who have received only palliative treatment (medical and surgical), as compared with those laryngectomatized, is assuredly favorable to the adoption of palliative measures.

Death resulted within eight days in forty-two per cent. of the reported cases of extirpation of the larynx, usually from shock or pneumonia.

The operation requires from one to three hours, and is, *per se*, an undertaking of great difficulty, although the larynx is prominently situated, and its outlines plainly visible. The complications may be endless and insurmountable.

Sub-hyoidean Pharyngotomy.—This operation should, in the writer's opinion, never be relied upon for the radical cure of primary carcinoma.

Thyrotomy.—The results of this operation have been extremely unsatisfactory, immediate death, inability to complete the operation, or an early recurrence of the cancer appear to have usually followed thyrotomy. Bruns has shown that the functions of the larynx have often been seriously injured by thyrotomy, and this is apparent when we reflect that it is necessary to excise every particle of morbid growth, and apply either chemical caustics or the electric cautery to obtain even a chance of success.

The difficulty attending the positive recognition of primary carcinoma of the larynx in its incipiency has already been adverted to, and generally prevents a resort

to surgical interference at a period when it might be curative.

Tracheotomy.—The trachea should be opened early in the course of primary carcinoma of the larynx, and on the first appearance of serious respiratory disturbance. When dyspnœa and suffocative spasm occur, the postponement of tracheotomy may expose the patient to the danger of sudden death. Under no conditions should a high operation be performed, for the lower the tracheotomy the longer is the duration of life in those cases in which there is a tendency to dissemination of the tumor.

The advantages of the operation are manifold, and Dr. J. Solis-Cohen has truly said: "Of a number of cases of carcinoma of the larynx under my own care, who agreed to submit to exsection of the larynx, should I so determine, and in whom I performed tracheotomy in preference, one lived six months, two lived seven months, one lived thirteen months, and one eighteen months, respectively, after the tracheotomy. Had laryngectomy been practised in these five cases with equal tenure of existence, the result would have been accredited to the radical procedure."

According to Fauvel, whose experience has been extensive, "tracheotomy is the palliative surgical treatment *par excellence* of laryngeal cancer."

This operation, when done early and before the general health and strength of the patient are impaired, permits him to breathe, gives rest to the affected organ, arrests for a time the advance of the disease, and renders palliative operations through the natural passages much easier of performance.

Life is rarely sacrificed after tracheotomy, the shock being insignificant, the danger of pneumonia comparatively small, and sepsis infrequent.

A laryngectomatized patient, according to the most favorable reports, is one whose life is more than a misery, even when able to use an artificial larynx.

Laryngotomy, Laryngo-tracheotomy.—These operations should never be resorted to for the disease under consideration, as the cancerous vegetations will immediately attack the wound and render the retention of a cannula impossible.

Alimentation.—When swallowing becomes impossible, artificial feeding may be resorted to, either by means of an œsophageal tube or by rectal enemata.

Aliments should be introduced at a temperature of 90° to 100° F., and preferably by the stomach.

Beef-tea and brandy, or both, mixed with eggs, and administered not more than thrice daily by the stomach or rectum, constitute a serviceable aliment. Artificial feeding has recently been rendered more complete and less tedious by Delavan's apparatus, a simple, inexpensive, and effective device.

Artificial Vocal Apparatus.—When a partial or complete laryngectomy has been performed vocalization may be aided by the employment of Gussenbauer's apparatus.

Foulis and others have modified and improved Gussenbauer's original instrument (see Laryngectomy).

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Explanation of Plate.

Fig. I.—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. (Writer's case, and analogous to one recorded by Fauvel.)

Fig. II.—Encephaloid carcinoma, forming a large tumor covering the superior laryngeal orifice. (After Fauvel.)

Fig. III.—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. IV.—Encephaloid carcinoma. (After Browne.)

Fig. V.—Encephaloid carcinoma, involving larynx and œsophagus. (After Fauvel.)

Fig. VI.—Encephaloid carcinoma. (After Fauvel.)

Fig. VII.—Epithelial carcinoma, right side of larynx. (Patient examined by writer.)

Fig. VIII.—Round-celled sarcoma of right vocal band. Patient aged forty; male. (Writer's case.)

Fig. IX.—Spindle-celled sarcoma of left ventricular band and arytenoid. (After Poyet.)

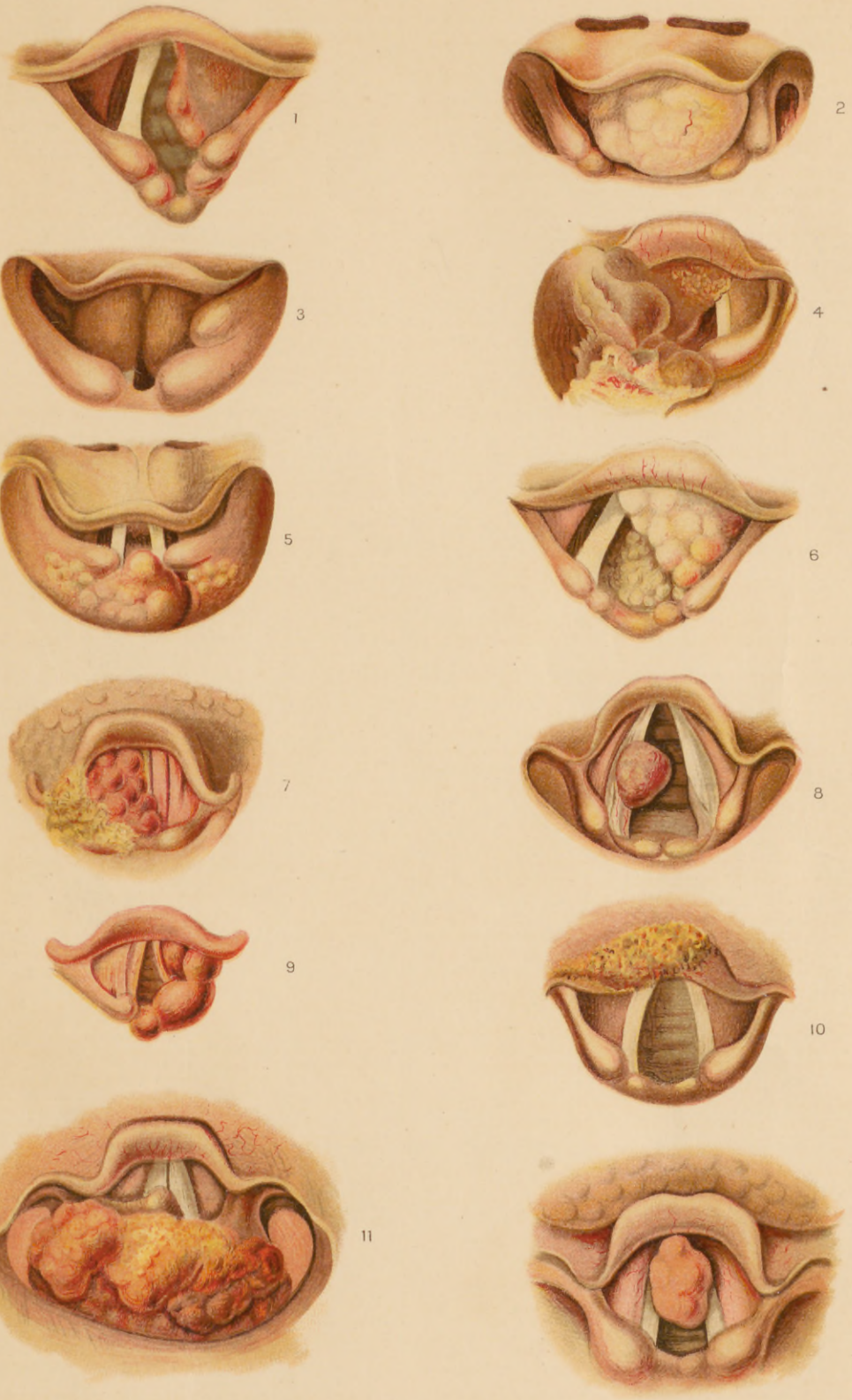
Fig. X.—Round-celled sarcoma, sixteenth month, destroying epiglottis and the adjacent tissues.

Fig. XI.—Encephaloid carcinoma, involving posterior laryngeal wall, left arytenoid, ary-epiglottic fold, and œsophageal entrance.

Fig. XII.—Myxo-sarcoma, originating from the anterior commissure of the vocal bands, causing great dysphonia and orthopnœa.

LARYNX, CATARRHAL AFFECTIONS OF THE.

General Observations on the Origin and Etiology of the Simple Inflammatory Affections of the Upper Air-passages.—In view of all that has been said and written concerning inflammatory conditions of the naso-laryngeal tract, it is amazing to find what little ad-



CARCINOMA AND SARCOMA OF THE LARYNX.

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