On malignant disease (sarcoma and carcinoma) of the larynx / by Henry T. Butlin.

MALIGNANT DISEASE OF THE LARYNX

BUTLIN

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(SARCOMA AND CARCINOMA)

OF

THE LARYNX

BY THE SAME AUTHOR,

SARCOMA AND CARCINOMA: THEIR PATHOLOGY, DIAGNOSIS, AND TREATMENT.

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MALIGNANT DISEASE

(SARCOMA AND CARCINOMA)

OF

THE LARYNX

BY

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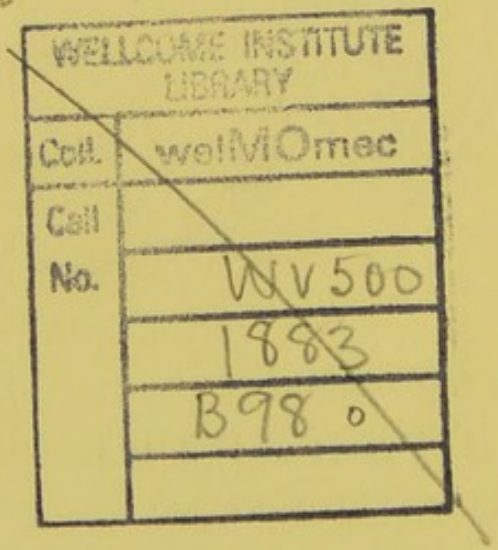


ON

MALIGNANT DISEASE (SARCOMA AND CARCINOMA) OF THE LARYNX

The subject of the present essay was selected partly to continue the work already done on 'Sarcoma and Carcinoma,' partly because the care of the department for diseases of the throat at St Bartholomew's Hospital has lately brought under my notice several cases of malignant disease of the larynx, and has thus given me special opportunities of study in this direction.

This essay is published separately in order that I may take an early opportunity of correcting some misapprehensions regarding a book I published last year,* and may draw attention much more pointedly than I have yet done to certain conditions which appear to exercise a powerful influence on both sarcoma and carcinoma, and to which sufficient weight has not, up to this time, been attached. Although the notices of my book were, with scarcely an exception, most kind and courteous, it was evident that several of the reviewers had misapprehended

* 'Sarcoma and Carcinoma,' 1882.

the scope of the work. This was in great measure my own fault in not explaining much more fully and clearly than I did the conditions under which it was written, and the circumstances which led to its publication. During the six or seven years in which I held the office of Surgical Registrar to St Bartholomew's Hospital, I had the opportunity of examining and recording a large number of cases of tumour. Partly by virtue of my office, partly because the subject was congenial to me, I took special notes of these cases, and made microscopical examinations and drawings of a very large number of the growths, particularly of those which were malignant. I then studied the literature of tumours, and found that, although the general accounts of each variety of tumour accorded in the main with what I had observed, there were some singular discrepancies, that the relations between sarcoma and carcinoma especially were ill-defined. Indeed, how could it be otherwise, when most of the accounts were written at least fifteen years ago? Sufficient time had not then elapsed since the formation of the class sarcoma for the collection of trustworthy material on which to found a life-history of the disease; the origin of carcinoma from epithelium had not been established. I thought that the time had now arrived when a tolerably complete life-history of sarcoma and carcinoma might be written, assuming as a basis of distinction between the two diseases that one is of connective-tissue, the other of epithelial, origin. In

order that the account might be more perfect, it was necessary to add to my own cases all which I could collect from medical literature, English and foreign. In order to ensure accuracy in the diagnosis it was essential that every tumour should have been examined with the microscope, and this restriction seriously lessened the number of cases which could be used for purposes of analysis. The comparatively small number of cases collected, which seems to have struck at least one of my reviewers, is to be ascribed to this cause.

Again, in order to limit, in some degree, the large scope of the work, to enable me to perform it piecemeal and yet to furnish each separate fragment in a complete form, I deemed it best to select one particular organ or tissue and to work out the life history of the malignant tumours of that organ or tissue before proceeding to another. The testis, the bones, the tongue, œsophagus, and tonsil were the organs and tissues which were first selected. The results of the inquiry were communicated in the 'Erasmus Wilson Lectures on Pathology' delivered at the Royal College of Surgeons in 1880 and 1881. Last year I thought I might venture to publish them in the form of a small book, to which, somewhat unfortunately and because I scarcely knew what else to call it, I gave the name 'Sarcoma and Carcinoma,' and did not take sufficient care to explain its scope and purport. It appeared therefore to some persons to be intended for a complete work on sarcoma and carcinoma, and must

naturally have seemed to them defective in many important points. In truth it was only the commencement of the foundation of such a work; the cases were not intended as examples of sarcoma and carcinoma, to be applied equally to all parts of the body, but were all the cases which could be collected of sarcoma and carcinoma of each of the parts selected; no large speculations were indulged in, because none were warranted on the facts which were assembled: the book was little more, indeed, than a statement and analysis of facts with explanations and comments where these seemed justified or called for.

The most important outcome of the inquiry thus far is the discovery of the influence which is exercised over the whole course of a malignant tumour by its origin. It has long been recognised that the mother tissue exerts an influence on the structure and general characters of a tumour: that, for instance, subperiosteal sarcomas are frequently calcified or ossified, that sarcomas of the fasciæ and aponeuroses are usually spindle-celled and very fibrous. It has also been recognised that these characters, which are impressed by the mother tissue on the primary disease, are usually transmitted to the secondary tumours. But I am not aware that any author has ascribed to the mother tissue a greater influence than this, or that anyone has suggested *that the mother tissue largely influences the degree and kind of malignancy presented by a tumour.*

Yet this is a fact, and any person may convince himself of it by comparing the course of central with subperiosteal sarcoma of bone, of sarcoma of the breast with sarcoma of the tonsil, of squamous carcinoma (epithelioma) of the lip with squamous carcinoma of the tongue. I have no notion why the difference should be so great, I only see plainly that it is so, and, seeing this, see also that the study of sarcoma and carcinoma of the immediate future must be local, and that it is quite impossible to formulate any great general laws which shall apply to these diseases until the local study has been made on a much larger scale than heretofore.

This essay is a further contribution to the local study of malignant tumours. It shows, what did not appear in the sections already published, the wide difference which may exist in the course pursued by sarcoma and carcinoma of the same organ, and how even carcinomas arising from different parts of the same organ pursue habitually a very different course, even when the structure of the tumour is the same. Precisely the same method has been adopted as in the consideration of the tumours of the testis, the tonsil, &c., the same classification and nomenclature* has been employed, the same care has been taken to use only those cases of which a microscopical examination has been made. The number

* Carcinoma is divided into spheroidal-celled or glandular-celled (hard and soft cancer), squamous-celled (epithelioma), cylindrical-celled or columnar-celled. Sarcoma is divided into round-celled, spindle-celled, mixed-celled, and giant-celled.

of cases is not so large, therefore, as I could wish, but they are all which I could gather from the English, American, French, German, and Italian periodicals and books at my disposal.

I have not published a complete table of cases, such as was appended to each of the previous chapters, chiefly on account of the expense attendant on the printing of such tables. References will be found, however, to many of the cases, to all, I think, of those which illustrate an important point, or which contain statements which appear open to question.

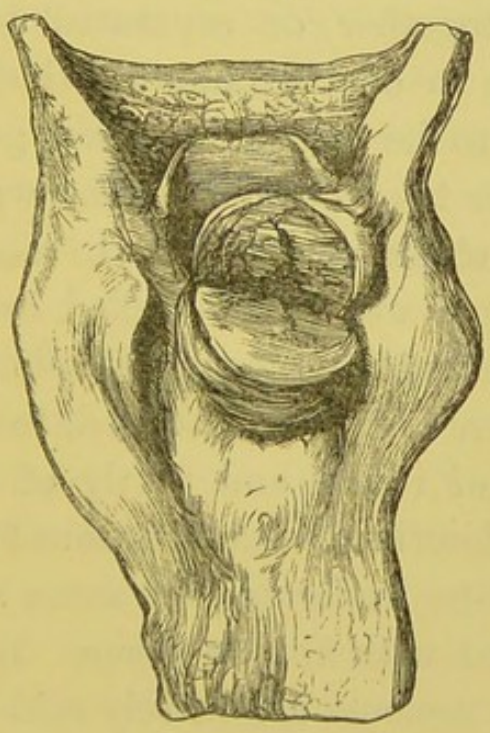
In considering both sarcoma and carcinoma, the division suggested by Krishaber,* into intrinsic and extrinsic,† has been adopted, for it appears to be not merely convenient for purposes of classification, but is valuable for other reasons which will presently appear. The number of cases of sarcoma collected from various sources is twenty-three; of these seventeen were intrinsic, three were extrinsic, and three were of uncertain origin. In some of the cases the whole of the interior of the larynx was occupied by the disease, but where the seat of origin could be distinguished it was, for the large majority of the intrinsic sarcomas, either the vocal cord or ventricular band. In two of the three cases of ex-

* 'Gazette Hebdom.,' 11e sér., tome xvi, p. 518 (1879).

† The term intrinsic is applied to tumours which arise in connection with the vocal cords, the ventricles, the false cords, and the parts immediately below the true cords. The term extrinsic to those tumours which grow from the epiglottis, the ary-epiglottic, the inter-arytenoid fold, &c.

trinsic tumour the epiglottis was the part attacked; in the third the tumour was seated on the back wall of the larynx over the opening of the œsophagus. The disease in some instances presented a papillary aspect, and in one case is described as mammillated, but in the large majority of cases the surface of the growth was smooth or slightly lobulated. It always formed a definite tumour, and thus the papillary variety was distinguished from the common papillomas which are found upon the vocal cords. The tumour was more often sessile than polypoid, and seldom grew to a large size, the largest examples

FIG. 1.*



* FIG. 1.—Extrinsic round-celled sarcoma of the larynx to show the bulky tumour surrounded by a thick capsule. The tumour has been divided by a horizontal incision. The drawing was made by Mr. Godart from a specimen (No. 1653) in St. Bartholomew's Hospital Museum, of which there is no history.

only attaining the size of a small walnut or a little larger. The mucous membrane covering the tumour was generally discoloured, but the character of the discoloration varied considerably, some of the tumours being much paler than the normal mucous membrane, others much darker, either deep red or livid, and traversed by large, full vessels. Ulceration was an exception, and when ulcers were observed they were generally small and superficial. Most of the tumours felt firm or hard when examined with the laryngeal probe. In most instances the disease took the form of a single mass, but in more than one case two or more growths were present, either close together or separated by a narrow interval, while in one instance in which the disease was thought to be congenital two growths were attached to the two vocal cords, and were separated by a narrow chink of glottis. In nearly half the cases the tumour was spindle-celled or composed of cells closely resembling the typical spindle-cell; four of the tumours were round-celled, four were composed partly of round and partly of spindle cells, and two are described as sarcomatous fibroids, which may probably be understood to mean spindle-celled tumours mixed with fibrous tissue. In the remaining cases the tumours are merely said to have been "sarcomas."

The following is a table of the ages of the patients:

7 years	1
24 to 30 „	3

31 to 40	6
41 to 50	5
51 to 60	4
61 to 70	1
74	1
Uncertain	2

The youngest of the patients was seven years old, the oldest seventy-four, but in the first case the disease was believed to be congenital. Between this child and the next patient there was a long interval of nearly twenty years. From twenty-four to sixty the disease was tolerably equally distributed. About four fifths of the patients were males; in this respect the disease corresponds with carcinoma of the same and neighbouring parts. Occupation does not seem to have exercised a marked influence in the production of the tumours, but the great preponderance of males among the patients may suggest that strong and over-use of the voice, with perhaps tobacco-smoke and other irritants, play a part in the etiology of sarcoma. In two instances the tumours were attributed to severe colds. The course of the disease was for the most part slow. The cases are few in number in which the symptoms had not existed for at least a year before any attempt was made to remove the tumour; in more than one case this period was extended to three or four or more years. The progress was not, however, invariably thus rapid. Dr Burow* has recorded an example

* Langenbeck's 'Archiv,' xviii, 249, obs. vi, 1875.

in which the tumour, which grew from the posterior aspect of the epiglottis, was as large as a small walnut when an attempt was made to remove it six weeks after the symptoms first were noticed. It was a spindle-celled sarcoma.

Six deaths are recorded, and one patient was dying from recurrence two years and a half after removal of the growth, the exact nature of which admits of grave doubt. The case is recorded by Fauvel.* The tumour, about the size of a large haricot, grew from the free border of the left vocal cord and looked so much like a papilloma, that when Dr Lœvemberg stated from an examination of a fragment that it was a "sarcoma," Fauvel would not credit the diagnosis. Between two and three years later the patient returned to Fauvel, after symptoms of eleven months' duration. There was then a small polypoid tumour of the right vocal cord, and a similar tumour to that which had been removed on the left vocal cord. The glands of the neck were much enlarged and the patient emaciated. Operation was again proposed, but the grave political events by which France was at that period (1870) disturbed, prevented this advice from being followed, and the patient was lost sight of. Even if Lœvemberg's microscopical examination be accepted—there are no details of it—it does not follow that the recurrent tumours, the first symptoms of which commenced eighteen months or more

* 'Mal. du Larynx,' 1876, p. 414, obs. 80.

after the first operation, were tumours of the same kind.

The fatal issue in two of the six fatal cases was from pulmonary disease, a year and eighteen months after removal of the larynx.* In the other four cases death occurred at one year from asphyxia,† at three years from bronchitis and clogging of the bronchial tubes,‡ at three years from asthenia§ (six months after extirpation of the larynx), and at five years as the result of operation.‖ (Attempts at removal and destruction of the growth were followed by hæmorrhages which, in the weakened condition of the patient, speedily proved fatal.)

It is a somewhat singular circumstance that the only cases in which lymphatic glandular affection appeared to depend upon sarcoma of the larynx are both recorded by Fauvel.¶ The unsatisfactory character of one of these has been already indicated; the other is scarcely more satisfactory. The patient was a lady forty-three years old, who had suffered from hoarseness during seven years. In two years the hoarseness had much increased, and in five years the voice was lost. A year before she consulted Dr. Fauvel, she began to be conscious of discomfort and burning in the throat, the submaxillary glands became enlarged and the respiration was impeded. Fauvel

* 'Lancet,' 1877, ii, 530, and 1879, i, 436; 'Arch. Laryn.,' i, 124, 1881.
† 'Mal. du Larynx,' 1876, 576, obs. 214.
‡ 'Amer. J. Med. Sci.,' n. s., cxxxviii, 394.
§ 'Archiv Laryngology,' i, 36, 1880.
‖ 'Cancer prim. du Larynx,' 1872, p. 52, obs. iii. Blanc.
¶ L. c., cases 80 and 211.

found the glands of the neck much enlarged, the laryngeal vestibule sound, but the glottis obstructed by two grey, granular masses which sprung from the true cords. He tore away some fragments from the surface of the tumour, and thus afforded the patient temporary relief. A microscopic examination of the portions removed is said to have demonstrated the "sarcomatous nature" of the tumour. It cannot of course be maintained that the growth in this instance was not sarcomatous, but it is very unfortunate, both in this case and the last, in view of the atypical course of the disease, that a very thorough examination of the tumours was not made and reported.

In one other instance glandular enlargement is recorded, but the enlargement was of long standing and evidently had no connection with the laryngeal growth.*

The absence of glandular affection, so clearly recognised by most of those who have written on sarcoma of the larynx (Eppinger,† M. Mackenzie,‡ &c.), is of the greatest importance both from a pathological and from a clinical point of view. In the presence of those admirable plates, on which the fine network of lymphatics of the larynx is delineated by Sappey§ and Luschka,‖ it can scarcely

* Victor v. Bruns, 'Polypen des Kehlkopfes,' 1868, p. 131.
† Klebs, 'Handbuch Path. Anat.,' Lief 7, Berlin, 1880.
‡ 'Diseases of Throat and Nose,' vol. i, 1880.
§ 'Anat., &c., des Vaisseaux Lymphat.,' 1874.
‖ 'Kehlkopf des Menschen,' 1871.

be maintained that the absence of lymphatic vessels is the reason why sarcomas do not affect the lymphatic glands. Even if one were disposed to doubt the accuracy of Sappey's and Luschka's observations, it can scarcely be questioned that the extrinsic parts, at least, of the larynx are amply provided with lymphatics, for it will presently be shown that carcinoma of these parts affects the lymphatic glands at an early period. In those parts of the body of which the sarcomas and carcinomas have already been considered, it was found that where the part was attacked by both diseases, the relation of both diseases to the lymphatic glands was the same.* In the testis and the tonsil, for example, parts affected by sarcoma even more frequently than by carcinoma, the lymphatic glands were affected in an equal measure by both diseases, and the period at which the affection was manifest was as early for sarcoma as for carcinoma. The rule was the same for every variety of sarcoma and did not depend on whether the disease was round, or spindle, or mixed celled. But here the rule is different. The sarcomas do not affect the glands although they grow in parts which are richly provided with lymphatics. Yet they give evidence of their malignant properties in the manner in which they infiltrate the tissues, and in the obstinacy with which some of them recur after what appears to be complete removal and cauterisation. It can scarcely be conceived that the

* 'Sarcoma and Carcinoma,' 1882.

glands are spared in consequence of a peculiarity in the composition or structural arrangement of the elements of the tumour. For the microscopical and general characters of the sarcomas of the larynx closely resemble those of the sarcomas of other parts with which glandular affection is naturally associated. The solution of the problem must be such that it may be applied to other parts as well as to the larynx; to the breast, for example, the sarcomas of which, as Dr Gross* has shown, habitually spare the lymphatic glands, while the carcinomas as certainly affect them. I cannot but think that the obstacle to glandular affection in these cases is mechanical, and that the glands are not affected simply because the elements of the tumour cannot obtain access to them. This can scarcely be by any other means than by such an origin and growth of the tumour as will serve to close the lymphatic radicals and capillaries. Therefore I suggest that the sarcomas of these parts arise by the proliferation of the cellular elements of the solid structures of the connective-tissues. As the cells proliferate the solid structures gradually swell and the lymphatic vessels suffer a diminution of their calibre, which proceeds to their complete obliteration, and renders them incapable of transmitting the infecting material of the tumour. So far from accepting Dr Gross's view of the endothelial origin of the sarcomas of such parts as the breast

* 'Tumours of the Mammary Gland,' 1880.

and larynx, I hold that the course of the disease in both situations is strongly opposed to this view. For, origin from endothelial elements is practically, so far as our present knowledge teaches, origin in the interior of the lymphatic system, an origin therefore, which would almost of necessity lead to affection of the glands. Unless the lymphatic capillaries of the part in which the sarcoma grows are practically closed and inaccessible to its elements, it is difficult to understand why the glands should escape infection.

It seems doubtful whether all the tumours, even when the diagnosis is said to have been made by microscopical examination, were really instances of sarcoma. One or two of them presented merely the external characters of a small polypoid growth of the vocal cord or neighbouring parts, did not appear to infiltrate deeply the substance of the cord or part from which they grew. In the large majority of instances, however, infiltration did occur, sometimes to a considerable extent. In the worst cases the tumour grew from the extrinsic parts of the larynx into the base of the tongue or wall of the pharynx; or from the intrinsic parts through the membranes or the thyroid cartilage into the hyoid muscles. These conditions were generally visible with the laryngoscope or were discovered after extirpation of the larynx. The number of complete autopsies was only two; in neither of them were secondary tumours found, nor were there any signs

which denoted the formation of secondary tumours in any of the patients before death. A more extended series of observations may show that secondary growths are not uncommon, but the evidence at present before us seems to prove that sarcoma of the larynx neither affects the lymphatic glands nor produces secondary growths, and that its malignant properties are limited to infiltration of adjoining parts.

Under these circumstances it is extremely interesting to note the results of treatment and to observe how far they confirm the impression of the very modified malignancy of laryngeal sarcoma. If mere removal with the forceps and galvano-cautery be considered, very few if any complete recoveries can be claimed. One patient,* whose tumour, a mixed-celled sarcoma growing from the posterior wall of the larynx, was treated thus, suffered from recurrence, and in three months the operation had to be repeated. Several months later this person was known to be quite free from recurrence. In another case recorded by Fauvel† the tumour grew from the left cord of a woman thirty-two years old. It was removed with the forceps, and the author reports that she was quite well long after the operation; but it is uncertain whether he means months or years. In the section of his recent work which is devoted to sarcoma,‡ Morell Mackenzie speaks

* 'Deut. Arch. f. klin. Med.,' xvi, 236, 1875.
† 'Maladies du Larynx,' p. 551, obs. 190. ‡ L. c., p. 350.

more hopefully of the operation *per vias naturales*. He says: "In one case I succeeded in permanently removing the growth *per vias naturales*, and Navratil, Gottstein, Türck, and others have effected cures in this way. I have examined the references to the cases of which Mackenzie speaks, and am afraid, unless he has received some further information than that which is given in the published records, he takes too favorable a view of the results. No doubt he is informed of the stability of the cure in the case in which he himself removed a spindle-celled sarcoma from the ventricular band of a woman forty-three years old, but the further history of the patient is not recorded.* Nor is there any evidence to show that the patients treated by Gottstein† and Türck,‡ were permanently cured or even that the relief afforded by the operation was of many months duration. Navratil's§ diagnosis was not verified by microscopical examination.

Thyrotomy and sublingual pharyngotomy yield on the whole, as might be expected, better results than the forceps and the wire-loop. A woman mentioned by Laroyenne,‖ had a spindle-celled sarcoma of the right vocal cord, which had been growing for about twelve months, removed after division of the thyroid cartilage. Eight months after the

* 'On Growths of the Larynx,' 1871, p. 193, Case 95.
† 'Wien. Med. Wochsft.,' 1868, s. 1696.
‡ 'Krankhtn. des Kehlkopfes,' 1866, 577, Case 237.
§ 'Berlin Klin. Wochensft.,' 1868, p. 501.
‖ 'Gaz. Hebdom.,' 1873, p. 780.

operation she was free from disease. Dr Burow* has described the case of a man, thirty years old, who suffered from a spindle-celled sarcoma of the epiglottis. It was removed with the forceps and cautery, a little later with the loop, and a few days later again with the sharp spoon and scissors after a free incision had been made in the sublingual region. Eighteen months after the last operation the patient was quite well. This is the more remarkable because the original tumour had grown very rapidly, and recurrence had taken place almost immediately.

But the most brilliant results were those derived from removal of the larynx or of that part of the larynx which was the seat of the disease. The operation was performed in four cases: in all the disease was extensive, and in one of the four it had been removed by thyrotomy several months previously. This is the well-known case operated on by Dr Foulis, of which it is not necessary to give a full account, for it is thoroughly recorded in the 'Lancet' for 1877 and 1879.† The growth at first appeared to be papillomatous and grew from the anterior portion of the left vocal cord. Cricotomy was performed, the tumour was removed, and the place touched with nitrate of silver. Within five months the disease had returned, and a year after the first operation thyrotomy was performed, the tumour was removed, and the actual cautery applied.

* L. c. † 1877, ii, 530, and 1879, i, 436.

It still presented a papillary surface, but the interior of the papillæ was composed almost entirely of round-celled tissue. About five months later there was again recurrence, and now the tumour grew down into the trachea and up above the vocal cord. Dr Foulis therefore removed the entire larynx, and with it swept away the whole of the disease. The patient made a good recovery and was able to resume his employment, but a year and a half later he died of tracheal and pulmonary phthisis. An examination of the body showed that the disease had not recurred, and there was no sarcomatous affection of the glands or other organs.

Dr Lange* removed the larynx, the hyoid bone, and part of the œsophagus of a gentleman, seventy-four years old, who had suffered for two years from a tumour of the right ventricle which involved the whole of the right side of the larynx, pushed up the base of the epiglottis, and grew into the muscles outside the larynx (sterno-hyoid and sterno-thyroid). This gentleman had been strongly advised by one of his medical attendants, by whom tracheotomy had already been performed, not to submit to any operation for the removal of the disease, partly on account of its extent and infiltrating character, partly on account of his advanced age. He insisted, however, that an attempt should be made to remove the disease, and placed himself under Dr Lange's care. In spite of the disadvantageous circumstances he made

* 'Archiv of Laryngology,' i, 36, 1880.

a good recovery and returned to his home at some distance from the town in which the operation was performed. The removal of the larynx did not afford him the relief he had expected: he could not swallow with comfort, and at length almost refused the nourishment which was offered him. Six months after the operation he died, emaciated and worn out by fatigue and disappointment. At that time it was thought that a small nodule which was visible in the œsophagus was a recurrence of the disease, but the proof of this has never been forthcoming. The unfortunate issue of this case has been greatly exaggerated, and has been made use of by those who are opposed to extirpation of the larynx. Fortunately, however, an independent witness, Dr Lefferts, has told us* that the patient's condition was not so bad as has been represented. He lived cheerfully for some months, naturally, however, discouraged by a result (in deglutition) which he had hoped would be better.

Another American case is that recorded by Dr Arpad Gerster,† under whose care a robust man of fifty years, a barber, placed himself on account of laryngeal trouble and dysphagia of about a year's duration. The disease presented as an ulcer of the size of half-a-dollar in the right sinus pyriformis, but really consisted of an oval tumour the size of a pigeon's egg, which occupied the substance of the

* 'Trans. Internat. Med. Congress,' London, 1881, vol. iii, 266.

† 'Archives of Laryngology,' i, 124, 1880.

ventricular band. He was treated for a couple of months with various medicaments, then tracheotomy was performed. Six weeks later the right half of the larynx and the adjoining structures were freely removed. The patient recovered quickly, and a little more than a year later died of an acute attack of pleurisy. There had been no recurrence of the tumour.

Bottini, of Turin, removed the entire larynx of a young man, twenty-four years old, on the 6th of February, 1875. It was filled with sarcomatous tumour which consisted partly of round- and partly of spindle-cells. The young man made a good recovery, and in May, 1878, was working in the fields and acting as postman between Miazzina and Trabaro. Later accounts state that he was still well, and able to undergo considerable bodily labour, in April, 1881, more than six years therefore after the operation.*

Dr Foulis, in his paper before the International Medical Congress, 1881, had collected six cases of sarcoma for which partial or complete removal of the larynx had been performed. I have not, unfortunately, been able to obtain access to the original memoirs of all these cases, and therefore have not been able to include them all. Czerny's and Caselli's cases, for example, are not included in my list. Of the former case we learn that the disease lay in and under the vocal cords, perforated the

* 'Trans. Internat. Med. Congress,' London, 1881, vol. iii, 255.

thyroid cartilage, and involved the neighbouring glands; the larynx and the glands were removed, but repeated recurrences took place which rendered further operations necessary, and fifteen months after the great operation the patient died. Azzio Caselli removed from his patient, a girl of nineteen years of age, the larynx, pharynx, base of the tongue and tonsils. Remarkable to relate, the girl recovered, and was fit for work twenty months after the operation.

These results will compare favorably with the operative treatment of sarcoma in almost any portion of the body; nay, I am not sure that surgery can offer better examples of the success of operations for removal of sarcomatous disease than these. For it must be recollected that the operation of removal of the larynx for a sarcoma, even in its cavity, cannot fairly be compared with the amputation of a limb for a central sarcoma of a bone. Compared with the mere removal by dissection of a tumour of the soft parts, extirpation of the larynx for intrinsic tumours is, of course, a much more complete operation. But all these cases were not examples of intrinsic tumours; in more than one of them the tumour was from the first extrinsic, and in several had extended into the surrounding structures, so that these cases afforded examples of some of the most unfavorable conditions which can posposibly be expected in a sarcoma of the larynx.

The treatment of sarcoma of the larynx is thus,

in most instances, very clear. When the disease is in an early stage and limited to a small area of the larynx it may suffice to remove the affected region. When, for example, the disease is limited to the epiglottis it may be sufficient to remove the epiglottis, either with the galvano-caustic loop or by an incision immediately below the hyoid bone. And when the disease is limited to one cord, or to one ventricular band, removal of the cord or band by splitting the thyroid cartilage may be sufficient to prevent recurrence. But it must be clearly recognised that a sarcoma is an infiltrating tumour, and that it is totally useless merely to remove the tumours which project from the epiglottis, the vocal cord, or ventricular band. The seat of attachment of the growth must be removed or freely cauterised, and no considerations of the utility of the part affected should be permitted to interfere with the completeness of the treatment. In most instances it is necessary to do more than this, and to remove a tolerably wide area of the surrounding parts, even when these present a perfectly healthy aspect. The more complete the first operation the less is the probability that a second and much larger operation will be necessary. The forceps and such snares as are employed for the removal of papillary and fibrous growths are quite unsuited for the treatment of sarcoma. When the disease recurs and exhibits signs of more extensive infiltration, or when from the first it presents a much more formid-

able appearance, in those instances, for example, where the entire larynx seems filled by a sarcomatous tumour, the attachments of which are evidently deep seated and widely extended, the question of removal of the larynx, either partial or complete, will naturally be raised. If the patient be not too old or weak for so severe an operation, and if it be certain that the disease can be entirely removed, especially if it be limited to the interior of the larynx, extirpation of the organ is clearly indicated. Singular to relate, when the records of the operation for all causes are considered, and the great mortality which follows it is appreciated, no patient appears thus far to have died from the result of the operation when undertaken for sarcoma. Certainly this may be merely due to good fortune in each of the few cases in which it has been performed, and too much confidence must not be placed on such a small table of statistics. On the other hand, although the immediate results of the operation have been almost invariably good it must be observed that only two of the six patients in Dr Foulis' table were alive more than eighteen months after the larynx had been extirpated. One, an old man of more than seventy, died, as has been shown, six months later of asthenia. Czerny's patient died of recurrence of the tumour; Gerster's patient died of pleurisy within thirteen months, and Foulis' own patient died of pulmonary disease in about eighteen months. The question very naturally

arises how far the removal of the larynx contributed in the last two cases to the pulmonary disease which eventually proved fatal. The total number of successful cases of extirpation of the larynx for all causes is still far too few to afford a satisfactory answer to this question, but there can scarcely be a doubt that the removal of the larynx must increase the liability to pulmonary affections. This should not, however, deter us from performing the operation whenever it is clearly indicated in cases of sarcoma. For death from an acute or even tolerably chronic pulmonary disease is in most instances preferable to death from obstruction of the larynx, and its attendant evils when the obstruction is due to a sarcomatous tumour.

Before a course of treatment which may be deemed suitable to any given case can be pursued, a correct diagnosis of the nature of the tumour must be made. In some instances it may be easy to decide that a certain tumour is sarcomatous, but this is not at all the rule. It is usually very difficult to distinguish from the objective symptoms or from the external characters of the tumour between sarcoma and carcinoma on the one hand, between sarcoma and innocent tumours on the other hand. One of the earliest symptoms of sarcoma is hoarseness or some slight affection of the voice. Cough is rather a rare than frequent symptom. Dysphagia is observed in some of the cases of extrinsic sarcoma, and expectoration tinged with blood occurs

occasionally, but not often, in connection with both extrinsic and intrinsic tumours. In many instances there is absolutely no pain at any period of the disease, but spontaneous pain may be present from the first or, and this is more usual, may be produced by speaking or by swallowing. As the disease advances the hoarseness may gradually pass into complete aphonia, and slight difficulty of breathing may become intense dyspnœa. But these symptoms are not distinctive of sarcoma; they may be observed in connection with tumours which are not sarcomas and even with diseases which are not tumours.

Again, the external characters of the tumour, although they may lead to the suspicion that the disease is malignant and yet not carcinoma, can seldom be implicitly relied on. The absence of ulceration has already been alluded to, but ulceration may be absent in carcinoma and is generally absent in non-malignant tumours. Fortunately, however, the diagnosis, which might seem from what has just been said to be so difficult, may easily be made in almost every case by comparatively simple means. A portion of the tumour may be removed with the cutting laryngeal forceps and be subjected to microscopic examination. Tumours of the epiglottis and extrinsic portions of the larynx may be treated in this way with scarcely any difficulty; tumours of the ventricular bands and vocal cords with greater difficulty of course, but with a difficulty which depends largely on the size and exact situation of

the tumour. It must be understood that the fragment thus removed must be subjected to the same kind of examination as is necessary to discover the exact nature of almost all tumours except squamous-celled carcinoma (epithelioma), that is, it must be hardened and cut in fine sections. The mere examination of the fragment, as it comes from the tumour, or of a scraping seldom suffices, and may even be misleading. In many of the cases here collected this method of diagnosis was employed. Sometimes the fragment was removed solely for the purpose of discovering the nature of the tumour, sometimes it was removed in an attempt to cure the disease. The removal of even a large fragment in this fashion is productive of scarcely any pain, and so far from being dangerous, has often afforded marked temporary relief. The delay necessary to ensure a thorough examination of the piece is comparatively unimportant, for in several cases the disease has been thought to have existed several years before any operation was performed, and in more than one case in which complete removal was effected with success, operations of a less formidable character had been previously performed.

The number of cases of Carcinoma of the larynx which have been under my own care or which have been collected from various sources is fifty, rather more than double the number of the sarcomas. But this difference does not exhibit the true numerical

relation which exists between sarcoma and carcinoma of the larynx for, while the former disease almost invariably excites especial attention and almost every case of the rare malady is carefully recorded, carcinoma is, on the other hand, so common a disease that individual cases are not usually published unless they differ in some respect from the typical form, or unless they have been made the objects of some unusual mode of treatment. Many of the tumours too are not examined microscopically or, if a microscopical examination has been made, the result is not recorded.

Twenty years ago carcinoma of the larynx was still described as a rare disease, for at that time the laryngoscope was only comparatively seldom employed and the diagnosis could not be surely made unless by post-mortem examination. Even as lately as 1876 MM. Cornil and Ranvier* describe carcinoma of the larynx proper as a rare disease, and state that it usually extends from the surrounding parts—the pharynx, the œsophagus, and tongue—into the larynx. Karl Stoerk† in 1880 remarks to the same effect that carcinoma is rarely limited to the larynx, but most frequently arises in the mucous folds between the epiglottis and the tongue or the epiglottis and the œsophagus, and thence extends into the larynx. Von Ziemssen‡ at an earlier date

* 'Manuel d'Histologie Pathologique,' 1876, p. 668.

† 'Krankheiten des Kehlkopfs,' Stuttgart, 1880.

‡ 'Handbuch der speciel. Pathologie,' Bd. iv, Heft 1, 1875.

than either Stoerk or Cornil and Ranvier maintains the correct and generally accepted view of the present day that carcinoma of the larynx is tolerably frequent, and that it is most frequently primary and limited to the larynx. There can of course be no question that carcinoma may and does arise in parts adjoining the larynx, and spreads from these into the larynx. Hans Eppinger* has described two forms of this disease under the name "übergreifenden carcinome;" one, commencing in the root of the tongue, the other attacking the larynx from the thyroid body. One of the cases which came under my care rather more than a year ago was, I suspect, an instance of the former variety of attacking cancer. It occurred in the person of a potman, thirty-five years old, a pale and delicate man, who for rather more than two months had been distressed by choking at night, with which cough and the spitting up of bloody matter was associated. He complained of severe pain on the left side of the neck which was greatly increased by the act of swallowing and which often extended from the neck up into the ear. Laryngoscopic examination discovered that the epiglottis was split as it were into two unequal halves, of which the left was the smaller, by a foul and unhealthy cleft continuous with ulceration in a furrow between the epiglottis and the tongue. The larynx was not at

* 'Handbuch der pathol. Anatomie,' Klebs, Lf. 7, Berlin, 1880, s. 213.

all invaded. The cervical glands on the left side behind the sterno-mastoid were enlarged and hard. It was not of course possible to say with certainty whether the disease had commenced in the tongue or the epiglottis, both of them common seats of epithelioma, but the progress of the ulceration was more marked in the base of the tongue than towards the larynx.

In this case the treatment was from the first palliative, for the extensive and early affection of the lymphatic glands precluded an attempt to remove the disease by operation. The man was taken into the hospital some three or four months before he died, and, both before and after his admission, was attacked by severe and repeated hæmorrhages, each one of which threatened to prove fatal. The glands on the right side of the neck became enlarged, and even those which lie in the floor of the mouth on either side the symphysis of the lower jaw. Within a few weeks of his death some of these glands suppurated and broke, and for a time a sinus discharged, and there appeared a likelihood that a fungous protrusion would take place, but, to our surprise, the sinus closed, and did not open again till a few days before his death. The autopsy was made during my absence from town with great care by Mr. Gill, who found that the disease was limited to the left half of the epiglottis and adjacent portions of the tongue and ary-epiglottic fold. The lymphatic glands of the

neck were the only other structures which were cancerous, but the lungs contained miliary tubercles. The disease was an ordinary specimen of squamous-celled carcinoma (epithelioma).

The much greater liability of males than females to cancer of the larynx has been noticed by most writers. Of these fifty patients, forty were males and ten were females. The same reasons which were mentioned in the section on sarcoma may be employed to explain the greater number of males affected by carcinoma.* In considering the occupations and habits of the patients, however, there is nothing which leads one to suppose either that occupation or habit predisposed to the disease in many of the cases. Two or three of the patients attributed their laryngeal trouble to excessive use of the voice; one man in particular ascribed his malady to loud shouting in a saw-mill of which he was the manager. Many of the patients believed that a severe cold was the cause of the formation of tumour, for in many cases the first symptoms of

* Fauvel suggests that the larynx is much more liable to innocent and malignant tumours in men than women because these diseases find in women a soil, as it were, prepared for them in the breasts and uterus. Schiffers ('Rev. Mens. de Laryngol.,' iv, 16, 1883) has developed Fauvel's idea to the point of absurdity by supposing that cancer plays to the larynx in the male the rôle which it plays to the uterus in the female. He speaks of the sympathy which exists between the larynx and the uterus at puberty, and of their reciprocal influence. Dr Schiffers seems to be totally unaware of the fact that the lower lip, the tongue, and the œsophagus are all more frequently attacked by cancer in men than women, and that the disproportion is greatest in cancer of the lower lip.

disease were hoarseness and slight cough. But it is quite possible that these symptoms of laryngeal irritation were the early symptoms of the tumour: they did not pass off or generally become less marked even for a time, but in most instances persisted and gradually became more urgent. A few of the patients, however, appear really to have suffered from a severe cold, for they were able to assign the precise date of its occurrence, and the symptoms of the tumour commenced during the period of chronic catarrh. The following table contains the ages of the fifty patients:

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

It will be seen that there is only one patient under twenty-eight years old, and that patient, strange to say, was a boy of three years, whose case is recorded by Dr Rehn.* The disease began with symptoms of hoarseness, which passed on to loss of voice, and later produced attacks of suffocation. It

* 'Virchow's Archiv,' Bd. 43, s. 129, 1868.

was thought to have existed for at least two years. During one of the attacks of suffocation the patient died, although tracheotomy was performed for his relief. Both cords, the ventricles and ventricular bands, and the epiglottis, were the seat of a whitish-red, warty, cauliflower mass, which appeared to have originated in the ventricles. Thus far the disease might be regarded rather as a papilloma than an epithelioma, but the diagnosis rested on the three following circumstances: the tumour grew almost down to the perichondrium of the thyroid cartilage; the microscopical examination, made by Virchow, discovered the ordinary structure of epithelioma, with solid plugs of epithelium dipping down into the muscles and other deeply-seated tissues; and there was one enlarged lymphatic gland at the inner border of the sterno-mastoid muscle. In the face of these conditions the disease can scarcely be considered other than epithelioma occurring at a marvellously early age. With this exception the table of ages corresponds with that of epithelioma of the tongue, the lip, and other parts, save that the number of cases (between twenty-eight and thirty) is unusually large.

It is scarcely correct, however, to speak of all the cases as cases of epithelioma, for only thirty-eight of them were epitheliomas or squamous-celled carcinomas, six were cases of spheroidal-celled carcinoma (two scirrhus and four medullary), one was a cylindrical-celled carcinoma, and three were described

as "carcinoma," but the variety of carcinoma was not stated. Cylindrical or columnar-celled carcinoma appears to be exceedingly rare. Émile Blanc* speaks of it as a disease which occasionally occurs, but Eppinger† says that he is not acquainted with any instance of it. The solitary case which is mentioned above is described by Professor Kosinski in the 'Centralblatt für Chirurgie' for 1877.‡ The patient was a lady, thirty-six years old, and there seems to be no question of the malignant character of the tumour, which grew at the anterior angle of the vocal cords and completely filled this portion of the larynx. Extirpation of the larynx was performed, and it was found necessary to remove portions of the hyoid and thyroid muscles which were invaded by the tumour. Ten months later the patient was dying from recurrence. The description of the microscopical appearances is scarcely satisfactory if the rarity of the disease be taken into account, for Kosinski merely states that it consisted chiefly of cylindrical epithelial cells. It is surprising that columnar-celled carcinoma is not more common in the larynx, for the origin of the disease is by no means limited to those tracts of the mucous membrane which are covered with squamous epithelium. Apparently the influence which suffices during health to maintain the normal relation between the two varieties of epithelium, confining each variety to

* 'Cancer prim. du Larynx,' Thèse de Paris, 1872.
† L. c. ‡ 'Jahrgang,' iv, S. 401.

its particular areas and suffering neither to intrude upon the other, disappears under the pressure of disease, and the squamous epithelium being, as it were, the stronger and more enduring variety, impresses its form upon the elements of the cancer, which thus becomes a squamous-celled carcinoma (or epithelioma). A complete substitution of squamous for columnar epithelium may sometimes be observed in the galactophorous ducts under the influence of long-continued irritation or inflammation in what may be termed pre-cancerous conditions.

Intrinsic carcinomas appear to be much more frequent than extrinsic carcinomas. In a certain number of instances the disease is described as affecting the whole larynx, or the right or left side of the larynx as the case may be. But in many of these the origin of the tumour could nevertheless be almost certainly defined, and it was generally not difficult to say whether the disease was intrinsic or extrinsic. The following table gives the various situations in which tumours have been observed, with the number of cases assigned to each situation :

Epiglottis	6
Ary-epiglottic fold	3
Arytenoid	2
Sinus pyriformis	1
Thyroid angle	3
False cord	1

Ventricle	2
True cord	8
Infra-glottic	5
Whole larynx	10
Half larynx	9
Total	50

Of those which are said to have affected the entire larynx three appear to have been extrinsic and seven to have been intrinsic. Of those which affected half the larynx two were apparently extrinsic and seven intrinsic. It will be seen that, of the extrinsic parts, the epiglottis was most frequently attacked, a circumstance which may perhaps be accounted for by its prominence and exposed situation. Of the intrinsic parts, the true cords were most frequently the seat of disease, a fact not so easy of explanation, unless it be that the cords are more subject to attacks of chronic inflammation than the ventricular bands (false cords) and other neighbouring parts. Even this statement may, however, be contested. Again, it will be noticed that five of the tumours were infra-glottic, in every case situated immediately below the vocal cord. A case of this kind was published in the 'New York Medical Record' for 1881 by Dr Delavan,* who regarded the situation of the tumour as unique. But a similar case is recorded by Émile Blanc,† a

* 'New York Med. Record,' xx, 625, 1881.

† L. c., p. 46, obs. 2.

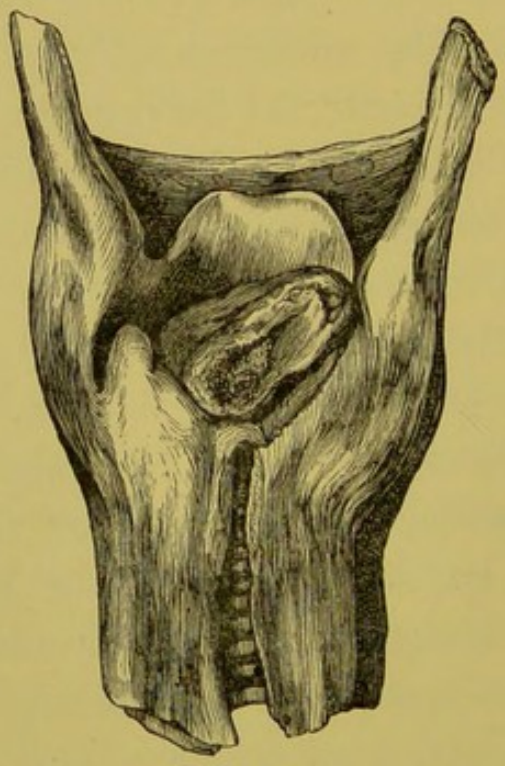
third case by Krishaber,* and a fourth case by Norton†. The fifth of the series occurred in St Bartholomew's Hospital, three years ago, in a man fifty-six years old, who had suffered from laryngeal trouble—slight hoarseness and cough, with occasional severe attacks of dyspnœa—for several months. One of the vocal cords was observed to be paralysed, but no tumour could be discerned. His symptoms were ascribed to various causes, amongst others to aneurism of the aorta, and to affection of the recurrent laryngeal nerve; and it was not until after his death, which took place from apnœa, that the real nature of the malady was made apparent. A tumour the size of a hazel-nut lay immediately below the right vocal cord, partly embedded in the wall of the larynx. It had perforated the ala of the thyroid cartilage and produced a very small collection of matter on the outer surface of the larynx. The swelling had not been perceptible through the tissues over the thyroid cartilages, nor was there any enlargement of the lymphatic glands, from which a clue to the nature of the disease might have been derived. The tumour was an admirable specimen of squamous-celled carcinoma. The close resemblance of this case to that recorded by Dr Delavan is very striking. In neither was there a visible tumour, in both the vocal cord was paralysed and a little thrust up by the tumour; in neither was there any affection of the glands or of

* 'Gaz. Hebdom.,' 1879, 540. † 'Path. Trans.,' xxiii, 43, 1872.

any of the other organs or tissues. In Blanc's case the tumour was visible between the vocal cords; the tumours could also easily be seen in the cases related by Krishaber and Norton.

The appearance of the disease as seen by the laryngoscope varies somewhat according to its situation. Carcinoma of the epiglottis sometimes appears

FIG. 2.*

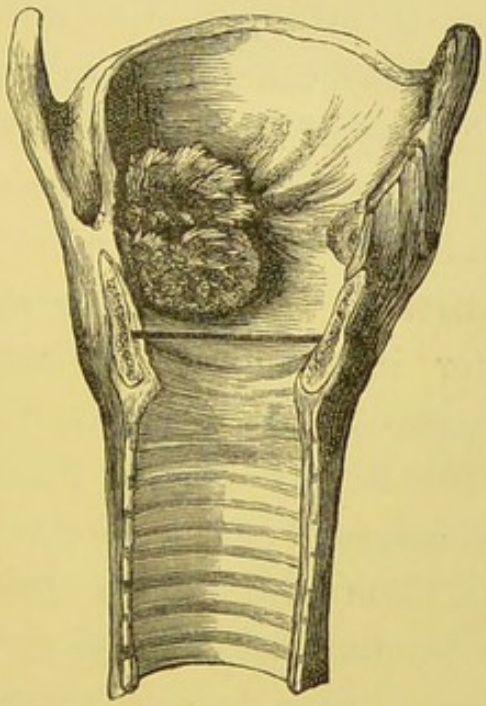


as a destructive ulceration, as in the case which has been recorded, but more often as a distinct and nodular tumour, which may be limited to the epiglottis or may extend to the ary-epiglottic fold or the adjacent

* FIG. 2.—Epithelioma of the larynx, from a sketch by Mr Godart, to show how epithelioma sometimes forms a tumour of considerable size. The surface of this tumour had a peculiar spongy aspect.

parts. The primary tumours of the arytenoids and the ary-epiglottic folds are also usually masses, sometimes of considerable size, and present the same outward characters whether they are squamous-celled or spheroidal-celled carcinomas. Carcinomas of the ventricular bands and the true cords may

Fig. 3.*



appear as distinct and prominent rounded tumours, but they are more often papillary, like the non-malignant warty growths, or foul and fungating; in some instances they present the appearance of a coarsely granular ulcer. Even when the disease

* Fig. 3.—Epithelioma of the vocal cord, from a drawing by Mr Godart, to show the warty and almost fringed aspect of the surface. The tumour, too, had a constricted neck, in which it resembled papilloma rather than epithelioma.

forms a mass as large as a nut or larger, it may be so situated that only its upper surface is visible on laryngoscopic inspection. Disease commencing on one of the true or false cords is prone to spread to the fellow cord of the opposite side. Whether the disease is squamous or spheroidal-celled it generally presents the same outward characters, so that it is rarely possible to tell from the macroscopic characters to which variety it belongs. Ulceration is exceedingly common, almost as much so perhaps of the spheroidal-celled as of the squamous-celled carcinomas. Ofttimes the destruction produced by it is very great, and constitutes the most striking character of the disease. In the later stages of carcinoma, whether intrinsic or extrinsic, the entire larynx is frequently involved; the tumours which arise within the larynx occupy the whole of the cavity, and sometimes perforate the cartilages or pass between them and invade the surrounding muscles; the tumours which arise in the outer portions of the organ pass down the sides and into the cavity, and destroy large pieces of the cartilage and mucous membrane.

The epitheliomas arise, as in other parts, from the epidermis of the mucous membrane, and are characterised by similar in-growths of cylinders or plugs of cells, in which cell-nests may usually be observed. The spheroidal-celled tumours probably arise from the mucous glands of the submucous tissue. Knoll*

* 'Virchow's Archiv,' 54, 378, 1872.

has described the development of a carcinomatous tumour of the vocal cord from the acinous glands of the submucous tissue; from his description of the tumour and the presence in it of cell-nests, it might have been an epithelioma, but the sketches by which his article is accompanied lead one to believe that the disease was really spheroidal-celled carcinoma.

The symptoms of carcinoma of the larynx, especially in the earlier stages, depend to a certain extent, as might be expected, on the situation of the tumour. The intrinsic growths usually commence with hoarseness, and sometimes slight cough—symptoms which indicate a laryngeal catarrh rather than a more serious affection. As the disease advances the hoarseness increases and the voice is usually lost. Occasional attacks of dyspnœa show that the gravity of the affection has been underrated. The extrinsic tumours, especially those of the epiglottis and arytenoids, more often produce dysphagia than hoarseness, and it is not until the disease is far advanced that vocal and respiratory troubles are observed. Again, pain is a symptom which belongs especially to extrinsic tumours, although it is by no means unknown in cases of intrinsic tumour. It is sometimes peculiarly severe, and is not limited to the larynx or even to the parts around, but radiates over the whole of the neck on the affected side, and is frequently complained of in the ear, resembling in these respects the referred pain in cases of toothache and of hip-disease. In

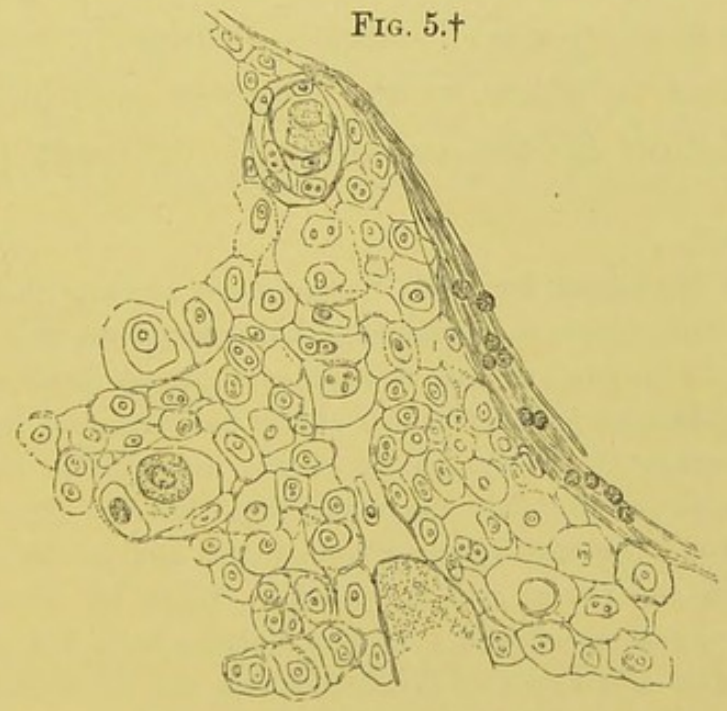
some of the cases of intrinsic carcinoma no pain is experienced during the whole course of the disease; in other cases, although the pain is not spontaneous, it is produced by swallowing or speaking. The radiating pains to the ear are very characteristic of malignant disease, and are very seldom noted in other affections of the larynx. Expectoration is in some cases very abundant, but is rarely so unless the disease is deeply ulcerated or extensive. The sputa are at first usually frothy, but later become purulent and may be stained or streaked with blood. Hæmorrhage is, however, an unusual symptom and scarcely ever occurs unless the disease has extended to the tongue. Only one death is recorded as actually resulting from hæmorrhage; in that case the base of the tongue was extensively affected. In four or five other cases repeated bleedings hastened, although they did not actually produce, the fatal result.

The diagnosis of an advanced carcinoma is, in most instances, very easy. The extensive ulceration, the implication of several structures, the destruction wrought by the disease, the steady progress of the symptoms, the radiating pain and pain in the ear, and (in cases of extrinsic cancer) the enlargement of the lymphatic glands, exclude all doubt of the malignant nature of the malady. But in the earlier stages the diagnosis is often beset with difficulties and may be impossible. And in some cases, throughout, the differential diagnosis between car-

cinoma and sarcoma may be impossible without a microscopical examination. Here, then, as for sarcoma, a fragment must be removed with forceps, sections must be cut and carefully examined. For squamous carcinoma (epithelioma) a mere scraping of the fragment will suffice, but in the event of the tumour being a spheroidal-celled carcinoma (hard or soft) a scraping is apt to be misleading. It is surprising how small a fragment can be prepared and cut in sections large enough for the purpose of diagnosis. Its removal from the larynx is not usually attended with any pain or inconvenience.

FIG. 4.*

FIG. 5.†



* FIG. 4.—Outline of a fragment of a carcinoma of the larynx removed for examination with Mackenzie's cutting forceps. Life size, to show how small a fragment suffices for microscopic examination.

† FIG. 5.—From a section of a fragment of a carcinoma, removed with Mackenzie's cutting forceps for the purpose of diagnosis. Squamous-celled carcinoma or epithelioma. × 260.

The question of affection of the lymphatic glands is one whose importance it is difficult to overestimate. Krishaber* has laid down the general rule that the extrinsic cancers affect the glands at an early period, and that the intrinsic cancers, so long as they are limited to the cavity of the larynx, do not affect the glands. No other author, so far as I am aware, has made a similar observation.† Krishaber's law, if it be true, is a law of the greatest importance, not merely from a pathological but from a clinical point of view. Although, from a careful analysis of the cases at my disposal, I am quite prepared to admit that it is founded on good grounds, I am sorry that I cannot absolutely confirm it. In order to show in the clearest possible manner the relation of the tumours of different parts of the

* L. c.

† My friend, Dr. Felix Semon, most accomplished and learned in all that relates to laryngology, has pointed out that primary cancer of the larynx has a much slighter tendency to affect the lymphatic glands than primary cancer of the pharynx, and that the early implication of the lymphatic glands in a certain case of laryngeal cancer was probably due to the fact that the growth spread soon beyond the cartilaginous framework, and so into communication with the pharyngeal lymphatics. What Dr. Semon terms endolaryngeal carcinoma evidently includes both the intrinsic and extrinsic carcinoma of Krishaber, and the carcinoma "per contiguitatem" of Semon corresponds with the "Uebergreifenden Carcinome" of Eppinger. Semon's remarks, therefore, on the implication of the lymphatic glands by endolaryngeal cancer, although correct as far as they go, have not the same signification as the statement of Krishaber ('Brit. Med. Journ.,' 1880, i, 281, and 'Path. Trans.,' vol. xxxi, 55).

larynx to affection of the glands, I will give the results of analysis as they relate to the tumours of each separate part.

Of the extrinsic tumours :

Tumours of the epiglottis :

Glands affected . . .	4 cases.
Not affected	1 „
Not mentioned . . .	1 „
Total	6

The case in which the glands are stated to have been healthy is one recorded by Perrin.* The epiglottis was removed when the disease appeared to have existed for about four months. The patient recovered from the operation, and at that point the record ceases.

Tumours of the ary-epiglottic fold :

Glands affected . . .	2 cases.
Uncertain	1 „
Total	3

In the "uncertain" case recorded by Billroth,† the larynx was extirpated when the disease had existed about a year. The patient died four days after the operation, and at the post-mortem exami-

* 'Annales des Mal. de l'oreille,' &c., viii, 75, 1882.

† 'Chir. Klinik,' Wien, 1871-76, p. 187.

nation the lateral lobes of the thyroid body had upon them nodules nearly the size of an egg. No mention is made of the lymphatic glands, and it is of course uncertain whether these nodules were affections of the thyroid body or of lymphatic glands in its immediate neighbourhood.

Tumours of the arytenoid :

Glands affected . . .	1 case.
Not affected	1 „
Total	2

In the second of these cases, which was under the care of Dr Pollock,* the tumour was thought to arise from the anterior wall of the arytenoid cartilages, probably from what we should now call the inter-arytenoid fold. The case ought, therefore, more properly to be classed as one of intrinsic tumour.

Tumours of the sinus pyriformis :

Glands affected . . .	1 case.
Total	1

Of the intrinsic tumours :

Tumours of the thyroid angle :

Not mentioned . . .	3 cases.
Total	3

* 'Path. Trans.,' ix, 36, 1858.

Tumours of the false cord :

Glands not affected . .	1 case.
Total	1

Tumours of the ventricle :

Glands not affected . .	1 case.
Not mentioned . . .	1 ,,
Total	2

Tumours of the vocal cords :

Glands affected . . .	2 cases.
Not affected	4 ,,
Not mentioned . . .	2 ,,
Total	8

The first of the two cases in which the glands are said to have been affected is one recorded by Zeissl.* The tumour, an epithelioma of a year's duration, was the size of a nut, and was attached to the right vocal cord. The larynx and two enlarged cervical glands in its immediate neighbourhood were removed by operation. Death occurred from hæmorrhage eight days later, when the lymphatic glands at the back of the œsophagus were found to be also diseased. The second case is related by von Ziemssen.† The tumour, an epithelioma as in the last case, grew from the right vocal cord. Several attempts were

* 'Weiner Med. Presse,' xxii, 1373, 1881.

† 'Ziemssen's Handbuch,' vi, Heft i, 405.

made to remove it, but it speedily recurred, and with the last recurrence the cervical glands became affected.

Tumours below the glottis :

Glands affected . . .	1 case.
Not affected	4 ,,
Total	5

The one case in which the glands were enlarged is recorded by Norton.* The disease appeared as a white patch, slightly elevated and granular, immediately below the right true cord, but not involving the tissue of the cord. The patient refused to submit to any operation, and fourteen months after the first onset of the symptoms died asphyxiated. After death the tumour was found to have destroyed the true cord and to have grown upwards almost to the false cord, but it was still completely retained within the cavity of the larynx. The lymphatic glands in the neighbourhood of the carotid artery were enlarged and indurated.

The remaining cases are those in which either the whole larynx or one half of it is said to have been affected by the disease. The tumours of the whole larynx were ten in number. In three of these, which were decidedly intrinsic, the glands were not affected. In another case, also intrinsic, recorded

* L c.

by Rehn,* the disease was very extensive and had existed for a long time, certainly more than two years, but it was still confined to the cavity of the larynx. There was one enlarged gland at the inner border of the sterno-mastoid muscle. In the fifth case, in which the disease appeared to have an extrinsic origin, and in four other cases where there was general infiltration of the larynx and of the neighbouring parts, the glands were affected. In the tenth case the condition of the glands was not announced.

In four of the nine cases in which one half of the larynx was diseased the condition of the glands is not recorded. In three cases, two of which were clearly of extrinsic, the third of doubtful origin, the cervical glands were enlarged. In the last two cases, one of which was certainly intrinsic, the glands were not diseased.

From the foregoing analysis it is clear that Krishaber's statement is not far from the truth. It is also equally clear that it is not absolutely true. The extrinsic tumours apparently all affect the lymphatic glands, most of them at an early date; the intrinsic tumours may leave the glands unaffected or may produce disease in them under certain favouring conditions, but those conditions do not necessarily include an extension of the disease through or beyond the larynx. Thus, in the two cases of carcinoma of the vocal cords in which there was affection of the

* 'Virchow's Archiv,' 43, 129, 1868.

neighbouring lymphatic glands, the disease was said to have been strictly limited to the interior of the larynx. In the infra-glottic tumour, with which enlargement and induration of the lymphatic glands was associated, the disease was not extensive and was well contained within the cavity of the larynx. And in one of the cases in which glandular disease existed in connection with general affection of the interior of the larynx, the latter did not extend above the base of the epiglottis or through the hard boundaries of the larynx. It is evident from these cases that glandular affection secondary to intrinsic carcinoma of the larynx does not necessarily depend on the growth of the primary disease into the extrinsic or surrounding parts. On what, then, does it depend? And why do the intrinsic carcinomas so frequently pursue their course during many months or years, even to a fatal termination, without producing glandular disease? Must we assume for these tumours such an origin as was assumed for the sarcomas of the larynx, and imagine that they grow from elements which lie between the lymphatic channels, and that as the tumour increases in size it closes the lymphatics? Such a theory can scarcely be maintained in the presence of the comparatively large percentage of cases in which intrinsic tumours produced affection of lymphatic glands. It is probable, nay, almost certain, that the relation of the intrinsic tumours to the lymphatic radicles is precisely similar to that of the extrinsic tumours to the

radicles, for their origin is almost certainly the same. Sappey and Luschka depict a lymphatic network in the submucous tissue of the intrinsic parts, scarcely, if at all, less closely meshed than that of the extrinsic parts. And Luschka* tells us that the lymphatics from all the parts of the larynx above the true cords unite to form a trunk on each side, which passes beneath the ary-epiglottic ligament outwards between the great cornu of the hyoid bone and the upper border of the thyroid cartilage, and empties itself into a lymphatic gland; the lymphatics from the parts below the true cords form one or two chief trunks which empty themselves into the lymphatic glands situated on both sides of the membranous portion of the trachea. According to these authors, the connection between the lymphatic glands and the intrinsic parts of the larynx is nearly as close as that between the glands and the extrinsic parts. But pathology leads us to suspect that this is not the case, and that, although the intrinsic parts are provided with lymphatics, perhaps, indeed, abundantly, their lymphatics do not pass so directly or so invariably through the lymphatic glands as those of the extrinsic parts. The cancer material, therefore, instead of immediately entering the glands reaches them only by a long and devious route, and perhaps loses its developing or infecting power; or may miss them altogether and pass into the blood without the interposition of the

* L. c., S. 156.

glands. The latter explanation has been applied by V. Ziemssen * to those cases of œsophageal cancer in which the glands are apparently not affected. I was not inclined to accept the suggestion for œsophageal cancer, but readily apply it to intrinsic laryngeal cancer; for the conditions of the two diseases differ in many important respects, and I am more disposed to believe that the glandular affection is overlooked in many cases of œsophageal cancer, or that the disease has not yet had time to affect the glands than that the glands have actually escaped.

Although death resulted in a large proportion of the fifty cases, although in many of these cases the disease had existed for a considerable period, and although post-mortem examinations were performed on at least eighteen or nineteen bodies, dissemination of the disease is recorded only in three instances. One of these is reported by Sands,† in the 'New York Medical Journal;' another by Desnos,‡ in the 'Bulletin de la Société Anatomique;' the third by Schiffers,§ in the 'Révue Mensuelle de Laryngologie.'

In the first case, that of a woman aged thirty, the tumour was confined to the left vocal cord. The symptoms commenced in September, 1862: laryngotomy was performed in January, 1865, more than two years and a quarter, therefore, after the commencement of the disease. There was no affec-

* 'Ziemssen's Handbuch,' vii, Hft. 1, 1874-77.
† 'New York Med. Journ.,' 1865, p. 110.
‡ 'Bull. Soc. Anat.,' 4e sér., iii, 398, 1878.
§ 'Rév. Mens. de Laryngologie,' 1883, p. 1.

tion of the glands of the neck, but the lumbar glands were enlarged, and the left supra-renal capsule, the left kidney and ureter, were extensively diseased. In the second case, that of a man whose age is not recorded, the tumour arose in the left ary-epiglottic fold and extended down to the ventricular band. There was a large glandular tumour at the base of the neck occupying the sheath of the sterno-mastoid muscle, and one small mass of cancer was embedded in the middle of the right lobe of the liver. It is difficult to calculate the exact duration of the disease from the report, but it had probably existed for more than one and for less than two years. The third patient was a man fifty-three years old, who was first attacked with hoarseness during March, 1881, and who died a few days before Christmas. The entire left half of the larynx was diseased, but the tumour was thought to have taken its origin in the false cord. The glands along the course of the jugular vein were extensively affected, and the lungs contained many secondary nodules, varying in size from a pin's head to a nut. No operation had been performed. It is well worthy of note that the tumour in all these cases was a well-marked specimen of squamous-celled carcinoma (epithelioma).

It is surely a remarkable circumstance that dissemination should occur so rarely of a disease which in many instances produces death slowly, and has, therefore, ample time to become generalised; and it is still more remarkable that in

two of the instances in which dissemination is actually known to have occurred the abdominal viscera and not the lungs were affected. It has been elsewhere pointed out * that carcinoma of the œsophagus apparently only affects the lungs under what may be termed very favorable conditions, when, for example, fragments of a tumour which has penetrated into the air-passages are carried into the terminal or almost terminal bronchial tubes. Here, however, is a disease situated generally immediately over or within the entrance to the air-passages, therefore, as one might suppose, constantly furnishing fragments which are carried into the lungs with the inspired air, yet scarcely under any conditions obtaining a hold upon them. The rule is the same, not only for the squamous-celled carcinomas, which we are most of us inclined to regard as little liable to dissemination, but alos for the spheroidal-celled carcinomas, which in the larynx, as in other parts, are sometimes very soft and cellular, and therefore of the kind most given to dissemination.

There are, of course, some conditions which may be regarded as modifying the conclusions which have been drawn from these post-mortem examinations. In the first place, death resulted directly from operation in four, if not five, cases, and although the disease in some of these lasted for a long time, it may fairly be said that its natural course was cut

* Sarcoma and Carcinoma.

short. In the second place, although the disease was situated over the entrance to the air-passages, and fragments were liable to be sucked in during inspiration, tracheotomy was performed in several instances, and this danger, therefore, was averted. In eight cases, however, in which an autopsy was made no operation had been performed. And even in those cases in which the trachea had been opened, there was nothing to prevent dissemination through the circulation, probably by far the most frequent medium for the dissemination of malignant disease generally. It is certainly most difficult to understand why a malignant disease situated in so important an organ should be so little given to dissemination. It is the more difficult to understand because experience shows that carcinoma of the larynx is in other respects a very malignant disease, and has been hitherto very little amenable to radical treatment.

Attempts have been made to cure the disease with the galvano-cautery, the knife, and sharp spoon. The galvano-cautery was employed in two instances:* in one the right half of the larynx was cancerous; it was found impossible to complete the operation. In the other the use of the cautery caused such urgent symptoms as to necessitate tracheotomy, which was quickly followed by death. The galvano-cautery was employed in several cases as an adjunct to other

* 'Anz. d. k. k. Gesellschaft d. Aerzte in Wien,' Oct., 1878, p. 85. 'Gaz. Hebdom.,' 1879, 540.

methods of treatment. The knife and spoon were employed either through a sub-hyoid incision or after division of the larynx. It is not necessary to deal separately with the cases in which each instrument was used; they may be considered collectively. They are nine in number, and, fortunately, only in one of the nine was the patient lost sight of so soon after the operation that the result could not be told: in that case the epiglottis was removed through the sub-hyoid incision.* In two of the cases† it was found impossible to complete the operation; in one of the two thyrotomy was performed for an epithelioma of the vocal cord, in the other the epiglottis was removed through the sub-hyoid incision; but in both instances the disease was too extensive to be removed. In the remaining six cases‡ recurrence of the disease rapidly took place, and all the patients at the time of the last report were either dead or dying. The tumour was situated in the first of these cases at the angle of the thyroid, in the second and third on the vocal cords, in the fourth on the ary-epiglottic ligament, in the fifth on the epiglottis, and in the sixth case it occupied the right wall of the larynx. Not the slightest en-

* 'Annal. de Mal. de l'oreille,' &c., viii, 75, 1882.

† 'Algem. Wien. med. Zeitg.,' xiv, 19, 1869; 'Phil. Med. Times,' viii, 280, 1878.

‡ 'Brit. Med. Jour.,' 1865, ii, 328 (Gibb); 'Amer. Jour. Med. Sci.,' 1878, 136 (Chapman); Blanc, l. c., p. 46, obs. 2; Blanc, l. c., p. 58, obs. 5 (Trimbach); 'Ziemssen's Handbuch,' vi, Hft. 1, 405 (Ziemssen); 'New York M. Record,' xix, 565, 1881.

couragement is afforded by these accounts to induce one to perform the operation of thyrotomy or the sub-hyoid incision for the removal of carcinoma, whether extrinsic or intrinsic. The disease is evidently far too deeply seated to admit of removal by so slight an operation. The futility of these and similar operations leads one to look for relief in extirpation of the larynx. This operation was performed on eight patients.* Six died within a few days of the extirpation ; two of septicæmia, three of pneumonia, and one of asthenia, but in the last case no post-mortem was performed. In the seventh case recurrence of the disease speedily took place and death occurred in six months; the eighth patient also suffered from recurrence and was dying ten months after the operation. These cases are of course very few in number when compared with the statistics of Foulis † and Burow,‡ but they are the only cases in which I could find a record of microscopical examination of the tumour. The largest statistics are, indeed, scarcely more encouraging when the operation is considered with reference to carcinoma. Thus in the table published by Foulis

* 'Wien. Med. Presse,' xxii, 1373 (Zeissl.); 'Clinical Trans.,' xiv, 163 (Pick); 'Centralbl. f. Chir.,' iv, 401 (Kosinski); 'Langenb. Archiv,' xxi, 473 (Gerdes); 'An. Mal. de l'oreille,' &c., iv, 182 (Bottini); 'Petersb. Med. Wochsft.,' 1877, 149 (Reyher); 'Chir. Klin. Wien,' 1871-76, 187 (Billroth); 'Langenbeck's Archiv,' xx, 535 (Maas).

† 'Trans. Internat. Med. Congress,' l. c.

‡ 'Archives of Laryngology,' iv, 97, 1883.

the operation of complete or partial extirpation of the larynx was performed for carcinoma in twenty-five instances, and only three of the patients were still alive when the paper was read. In these three cases the operation had been performed two months, three months, and seven months respectively.

The additional tables published by Burow are not thought by him to lend much greater encouragement to surgery, yet they contain two or three cases in which life was prolonged for many months after the operation. Unfortunately, the nature of the tumour in these cases was not proved by microscopical examination. Two of them were published by Landerer * during the course of last year. In one the patient, a male aged thirty-six, who had suffered from symptoms lasting over several years, but much more intense during the last six months, had a tumour seated on the posterior wall of the larynx, from the level of the cords down to the cricoid cartilage, which was perforated by it so that a swelling was evident in the neck; there was no enlargement of the lymphatic glands. Tracheotomy was performed on the 27th of September, 1879, partial extirpation of the larynx on the 3rd of February, 1880. At the time of the writing of the paper, nearly two years later, the patient was quite well and able to pursue his business. The second patient was also a male, but was fifty-two years old. For

* 'Deut. Zeitsft. f. Chirurg.,' xvi, 149, 1882.

five years he had suffered from cough and hoarseness, for two years from stenosis. The disease affected the true and false cords and the posterior wall of the larynx; there was no enlargement of the glands. Tracheotomy was performed on the 2nd of March, 1880, extirpation of the larynx on the 15th of April. The patient was quite well when last heard of in September, 1881.

Before a definite opinion can be formed as to whether extirpation of the larynx for carcinoma is ever a desirable, or even justifiable operation, it is necessary to study those cases in which no attempt was made to cure the disease by operation. They are thirty-one in number, and may be divided into two categories, those which were tracheotomised and those which were not. In the latter the duration of the symptoms was from seven months to five years and a half. Eight of the patients died within a year, two more within eighteen months; in one the duration is unknown and the remaining patients lived from two to four or more years. It is very interesting to note the cause of death in most of these cases. Of the patients who died within a year, four perished from exhaustion, induced in two of them by repeated hæmorrhages; one was the subject of pleuro-pneumonia, one died without any very evident cause, and only two of the eight died asphyxiated. Of the two who lived a few months longer than a year one gradually sank from dyspnœa and dysphagia, the other died asphyxiated. Of those who lived still longer,

three perished from marasmus and one of dyspnœa and exhaustion.

In the cases in which tracheotomy was performed life was prolonged, in all instances in which the operation was not too long deferred, for many weeks or months, and, in some instances, for as long as eighteen months or two years. The expression "life was prolonged" is employed because it may fairly be assumed that the operation was rendered absolutely necessary by increasing difficulty of respiration. The cause of death in fifteen cases in which tracheotomy was performed is shown in the following table:

Secondary tumours	1
Epistaxis	1
Dysphagia and exhaustion	1
Pneumonia and pleurisy	4
Apnœa	3
Collapse	1
Inanition	4
Total	15

Two of the patients who died from apnœa and the one who died from collapse died almost immediately after the operation, which appears to have been performed too late to afford relief. The third death from apnœa occurred in a case recorded by Fauvel.* The disease spread around and even into the

* L. c., p. 824, obs. xxxi.

tracheotomy tube, which became more and more occluded with new growth and viscid discharge, until one night the sick man, fearing to be suffocated, withdrew the tube to cleanse it and instantly fell dead. More than half the deaths were from exhaustion or pulmonary maladies, to which, of course, the opening in the trachea may have exposed the patients.

It appears, from a consideration of the cases which were only treated by palliative measures, that the life of a patient suffering from carcinoma of the larynx may last as long as two, three, and occasionally even more years; and life may often be prolonged and rendered far more comfortable, and the end more easy, by the timely performance of tracheotomy. In weighing the value of a radical operation all this, therefore, must duly be considered, and no operation can reasonably be recommended which does not hold out a prospect at least as good as that which can be claimed for palliation. Is this prospect offered by extirpation of the larynx? Assuredly not. Indeed, the inclination of almost all surgeons must be to say this operation for carcinoma is unjustifiable, for it is extremely dangerous to life and gives no hope of permanent relief. And such would be my own feeling did I not think that the experiment has not yet been conducted with sufficient care. The cases have not been selected with special reference to the origin and probable course of the disease. Until this has been done and

the precaution recommended by Landerer* has been adopted, I am not prepared to abandon the operation as hopeless. I would, therefore, suggest that in the immediate future extirpation of the larynx for carcinoma should be practised only for *intrinsic* carcinoma which is still limited to the larynx, and that tracheotomy should be performed at least a fortnight or three weeks before the extirpation, in order to give the patient a good opportunity of gaining strength to bear the larger operation.

It would be foreign to the purpose of this short work to enter into a detailed account of the palliative treatment of advanced cases of malignant disease. It may not be amiss, however, to confirm the observation of Morell Mackenzie† and other authors regarding the value of insufflations of a quarter to half grain of morphia mixed with starch or borax. The application should be made at least once every day, more often if need be. By means of it pain is allayed, swallowing is improved, and the quantity of discharge is often diminished.

It may perhaps be of service to the reader to recapitulate some of the chief points relating to the two diseases which this monograph treats of. The larynx is subject to sarcoma and carcinoma, to the latter far more than to the former. The origin of

* L. c. Landerer recommends that tracheotomy should be performed at least a fortnight before the larynx is extirpated, in order to improve as far as possible the patient's health before the major operation.

† 'Diseases of the Throat and Nose,' vol. i.

the disease in either case may be intrinsic or extrinsic. The precise origin is not so important in sarcoma as in carcinoma, for the properties of an intrinsic sarcoma are not widely different from those of an extrinsic sarcoma. The tumour infiltrates, but rarely, if ever, affects the lymphatic glands or is disseminated. It is, therefore, amenable to treatment by complete removal of the part from which it grows, which may necessitate partial or complete extirpation of the larynx, and, in some cases, a very wide removal of the surrounding structures. Even the worst cases of sarcoma are scarcely to be looked upon as hopeless.

Extrinsic carcinoma appears to be an incurable disease; it infiltates deeply, often spreads rapidly, and affects the lymphatic glands generally at an early date. Attempts at removal of the disease, even by extirpation of the larynx and the neighbouring lymphatic glands, afford not the slightest prospect of permanent success or even of temporary benefit.

Intrinsic carcinoma is a much less formidable malady; it does not appear to infiltrate so deeply or to spread so rapidly: it usually runs its course without affecting the lymphatic glands. In cases in which the disease is limited to the cavity of the larynx and the glands are not affected, partial or complete extirpation of the larynx may be performed. But, if the disease have spread beyond the larynx, or there is enlargement of the glands, the

prospect is almost as hopeless as in cases of extrinsic carcinoma.

Cases, whether of sarcoma or carcinoma, which appear unsuited for a radical operation, of whatever kind, may often be greatly benefited by an early tracheotomy.*

The diagnosis of malignant disease of the larynx is in many instances easy, but the differential diagnosis between sarcoma and carcinoma is often extremely difficult. In doubtful cases the diagnosis may be, nay, has been often, made by removing a fragment of the disease by the intra-laryngeal method with forceps and subjecting it to microscopical examination.

* Dr Solis-Cohen, in an excellent paper on excision of the larynx, of which he was good enough to send me a copy ('Does Excision of the Larynx tend to the Prolongation of Life?' Philadelphia, 1883), speaks thus of tracheotomy in carcinoma: "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." P. 18.

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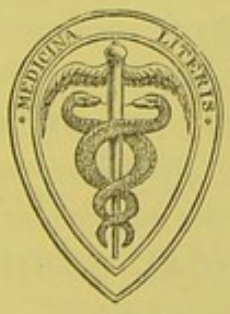

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