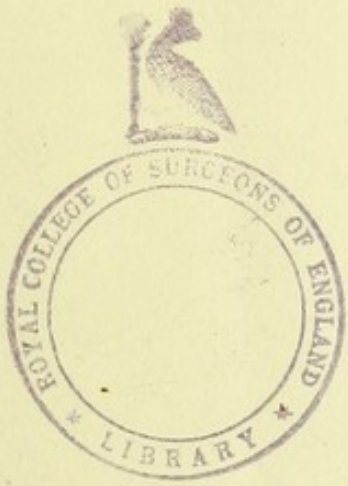
Notes on operations in syphilitic strictures of the larynx : with an account of two cases operated upon by means of a new cutting dilator / by W. Macneill Whistler.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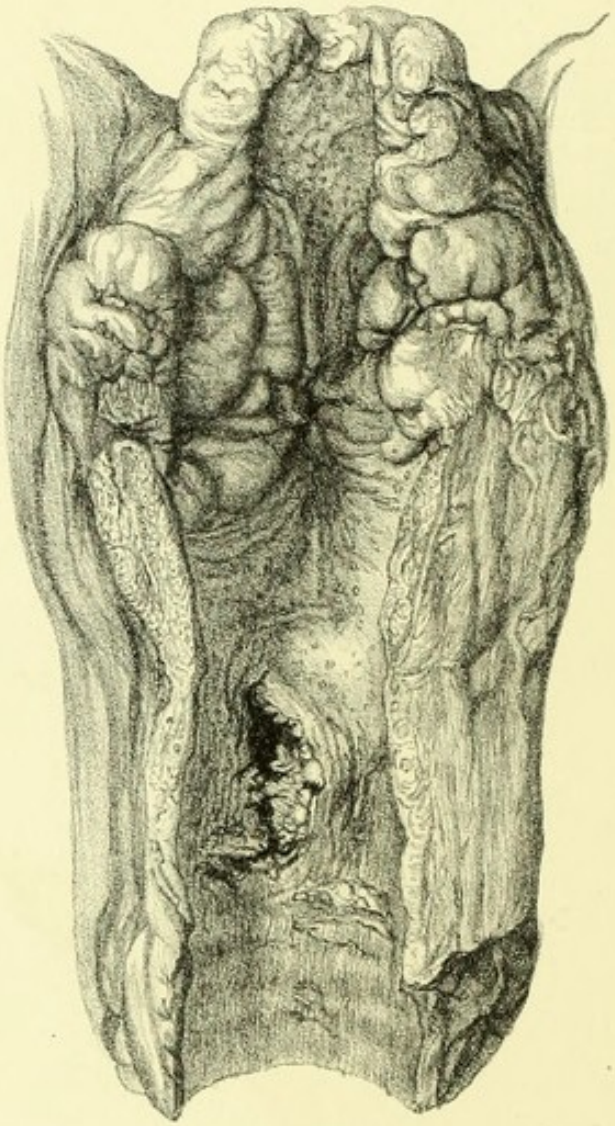

E. Burgess, del.

T. Way, lith.

CHRONIC SYPHILITIC FIBROID OF THE LARYNX

occuring thirteen years after infection.

NOTES ON OPERATIONS

IN

SYPHILITIC STRICTURES

OF THE

LARYNX

WITH AN ACCOUNT OF TWO CASES OPERATED UPON BY MEANS OF A NEW CUTTING DILATOR

BY

W. MACNEILL WHISTLER, M.D., M.R.C.P.

PHYSICIAN TO THE HOSPITAL FOR DISEASES OF THE THROAT AND CHEST, LONDON;
HONORARY PHYSICIAN TO THE NATIONAL TRAINING SCHOOL FOR MUSIC;
CORRESPONDING FELLOW OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION

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SYPHILITIC STRICTURES OF THE LARYNX.

IN this paper, which refers more especially to operative measures for the permanent cure of syphilitic stenosis, it is not my purpose to go very much in detail into the history of catheterization of the larynx.

Much has been said on this subject in such able monographs as those published by Professor Labus* and Dr. Hack.† Suffice it to say, that the results of the experiments made by Desault,‡ one of them dating as far back as 1793, and pursued by his contemporaries, were such as to lead him to the conclusion that the introduction of catheters, though sometimes possible in laryngeal and tracheal inflammations, was not indicated often, and that bronchotomy was preferable. He advocated catheterization of the air-passages in cases of dyspnœa consequent upon the lodging of foreign bodies in the œsophagus; also where the trachea was compressed by tumours, and in wounds of the neck. In caries of the larynx he found it of uncertain benefit. From those days to the present time it has had many advocates, and

* "*Il cateterismo e la dilatazione mecanica nelle stenosi della laringe.*" *Annali Universali de Medicina e Chirurgia.* Vol. ccxxxvii. Fasc. 710. 1876.

† "*Ueber die Mechanische Behandlung der Larynx-stenosen.*" *Sammlung Klinischer Vorträge.* No. 152. Vol. ii. series 6. Leipzig, 1878.

‡ Desault: *Œuvres chirurgicales, par Xav. Bichat.* Vol. ii.

although this process has not fulfilled all that it was hoped it would do in superseding the more serious operation of tracheotomy, the fact is now well established that the introduction of tubes through the glottis is not only feasible, but comparatively easy, and a valuable remedial agent to have recourse to in certain cases of stenosis of the larynx and trachea. Bouchut's experiments* were disappointing in their results, and the retention of tubes for any long period has been shown to be badly borne in an acutely inflamed larynx. We have also, since the days of laryngoscopy, more easy and efficient means of making topical applications to the larynx and trachea than were those carried out by Dieffenbach and Loiseau†; but their operations are none the less interesting as showing the tolerance of the air-passages to the introduction of instruments. It is, however, as an additional means of averting suffocation in sudden emergencies, that catheterization of the larynx has given the most brilliant results, and as such it is regarded with favour in present times. By means also of special tubes catheterization is now one of the recognized methods of progressive dilatation in chronic stricture of the larynx subsequent to tracheotomy. Other demands may yet possibly be met by this means; in fact, a case has been published only recently by Dr. Macewen,‡ of Glasgow, in which a very important end was served by introducing a tube into the glottis, viz., the prevention of an escape of blood into the air-passages during the removal of an epithelioma from the pharynx and base of the tongue. In no class of cases has the introduction of catheters been sometimes more beneficial than in those of syphilitic origin, and many are the records of success in that form of

* "*Tubage de la glotte.*" *Bulletin de l'Académie de Médecine.* Vol. xxiii. 1858.

† *Bulletin de l'Académie de Médecine.* Vol. xxii. 1857.

‡ *British Medical Journal.* July, 1880.

laryngitis, when acute œdema, supervening upon a pre-existing stenosis, has threatened the patient with immediate death. In some of these instances the thickening of tissue has been reduced by the presence of the tube, and the stricture has, at least for a time, disappeared. Yet catheterization must, in great measure, be regarded as a palliative rather than a curative treatment in a large proportion of these cases; tracheotomy still remains the sole means of relief for a great number.

The temptation to push internal treatment to its utmost limit is, of course, great in syphilitic stenosis when we remember the apparently hopeless cases that are every day rescued from asphyxia by mercury and iodide of potassium. When, however, the stricture is very narrow; if it be chronic, and especially if it be associated with much fibrous growth, these remedies fail sometimes to give relief, and we wait in vain for the good effects obtained in other specific lesions.

Doubtless deficient aëration of the blood interferes with the action of the medicines, and, by impeding repair, gives rise to those irremediable deformities which baffle our subsequent efforts to remove the tube.

The question of having to wear a tracheal canula permanently is, naturally, one of very serious import. The interference with speech, the wearer's somewhat singular appearance, the danger of bronchial and pulmonary inflammation, the risk of tracheal disease and secondary narrowing of this air-tube are reasons which alone have influenced many a patient against submitting to tracheotomy.

Fortunately, the more serious results do not so often occur; yet, when they arise, no cases are more wearying to the patient, or more perplexing to the surgeon. It is not surprising, then, that this subject of being eventually able to dispense with the tracheal tube has occupied the

attention of surgeons for a long period. So we find that more than fifty years ago Liston was giving his serious thought to this matter. He reports * a case under his care in 1827, in which he succeeded in dilating a strictured larynx and removing the tracheal tube. The patient was a young woman, who, in attempting suicide, had made an incision through the crico-thyroid membrane. A silver tube was introduced through this wound, and after several months' treatment she was discharged with loss of voice and wearing this tube. Some months after this she consulted Mr. Liston, who found the larynx greatly contracted, the stricture only admitting a very fine probe. This was dilated by bougies introduced through the wound in the neck until the normal diameter was restored. Mr. Liston subsequently dilated a stricture which was found also in the trachea. A long tube was introduced by the wound up into the mouth; there laid hold of and pushed down into the trachea. This tube, which was nine inches long and equal in diameter to the largest œsophageal tube, was retained in the windpipe for fifteen days. Then, as it caused great irritation, it was withdrawn, and the wound was closed. The patient breathed well at first, then dyspnœa came on, and tracheotomy below the thyroid isthmus was performed. A few weeks after this the canula was removed and the wound closed. The woman continued to breathe well, and slowly recovered her voice. She was in very good health some years after the restoration of the air-tube. No more thorough work has been done or more perfect result been obtained in similar cases since that date, and I have ventured, therefore, to relate the case somewhat at length. Mr. Liston, in his article on tracheotomy,† in speaking of certain cases where the tube may not subsequently be

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* *Elements of Surgery.* Liston. London, 1831.

† *Op. cit.*

removed, says : "The box of the larynx has fallen in, as it were, in consequence of having been long disused, and is unable to resume its functions to their full extent. Besides, great, though gradual, change of structure has in all probability taken place. In several such cases I have attempted to restore the natural dimensions of the passage by the occasional introduction of bougies, gradually increased in size; but in none have I completely succeeded, excepting in the case of suicide, which has already been detailed shortly. In all, my attempts were at first followed by encouraging amelioration, but untoward symptoms occurring, forced me to abandon them, though repeatedly persevered in. In one man I succeeded in restoring natural respiration, but it was not of long continuance; a fresh accession of œdema glottidis made renewal of the artificial opening absolutely necessary. Still, the results are not such as to forbid further trials; and at any rate, it is now well understood that much greater freedom may be safely used with the air-tube than was formerly imagined." These are interesting records of a pre-laryngoscopic period, and the views entertained by Mr. Liston are, in many respects, singularly in accordance with the conclusions arrived at by later operators.

No serious attempts appear to have been made for some time after this to push these investigations further, and it is only of late years, and when the introduction of the laryngoscope afforded more opportunity for accurate study of these lesions, that systematic dilatation of laryngeal strictures has been carried out fully, and in not a few cases with excellent results. I will not here enter into the description of all the operations which, beginning with Czermak's case in 1858, have been so fully discussed in well-known treatises, and notably in that published by Professor Schrötter, of Vienna.* In the earlier operations

* *Beitrag zur Behandlung der Larynx-stenosen.* Wien, 1876.

carried out for strictures of varied origin, there was not sufficient improvement to admit of the canula being removed, although in several of them benefit was derived. Most of these dilatations were made through the tracheal wound from below upwards; some of them by bougies, and a few by ingeniously devised tracheal canulæ.

Some of the operations which gave hope of success at first, owed their failure either to too early cessation of treatment, or to the intolerance of the parts to the instruments. I must not here omit to note a successful operation by M. Delore,* performed in 1864, in a case of syphilitic stenosis of the larynx in a woman. This stricture was seen with the laryngoscope, and added to it the epiglottis was much destroyed and bound down by cicatricial bands. Tracheotomy was done, as suffocation was imminent. Later, M. Delore, by the aid of the laryngoscope, split the stricture with a lithotome, and it was subsequently enlarged by two more incisions. The passage was dilated as well, by an œsophageal forceps, and so free breathing was restored. Professor Schrötter, who instituted a process of systematic dilatation of the larynx by operating from above, and through the mouth, gave a new impetus to these procedures, and his results, and others since his experiments, have been more encouraging. His operations, begun in 1872, were practised upon cases in which, as the result of perichondritis, there was more or less alteration in the cartilages; immobility of one or of both arytænoids; thickening of sub-mucous tissue, or of the mucous membrane, with cicatrices. The perichondritis was most frequently the result of typhus, variola, or syphilis. His process of dilatation may be divided into three stages, the first of which consists in establishing a tolerance to instruments by the introduction of elastic catheters into the larynx. After this object is attained, a catheter of requisite size is

* *Traité des Maladies Vénériennes.* Rollet, p. 871. Paris, 1865.

introduced daily through the stricture, and when, after a few days, the patients are able to bear the retention of the catheter for a period varying from five to thirty minutes, the third stage commences. This consists in progressive dilatation by metallic bougies, which are fixed in the stricture. They are introduced by means of a hollow staff through which passes a cord, one end of which is attached to the handle and the other to the bougie. When once in place, the bougie is fastened in the tracheal canula, either by means of small forceps introduced into the canula, or by a projection from the inner canula, which passes through a hole in the point of the bougie. The staff is then detached and withdrawn while the cord is drawn out of the mouth and attached to the band of the canula. In the work referred to, Professor Schrötter gives a report of eleven cases so treated. In seven of these the stenosis was cured, many retaining a fairly good voice ; and all were reported to be capable of doing without the canula, though, so far as I can see, the tubes had not yet been removed in most of the cases at the time of publication. Two others, when almost well, were obliged to leave Vienna, and two were still under treatment, progressing favourably. The period of treatment varied from three months to three years. Three of these cases were due to syphilis, and were associated with perichondritis. In the first one the dilatation was undertaken two years after tracheotomy. He was discharged cured at the end of two years. One year after this he was breathing well through the dilated glottis, following his occupation as a coachman, and having a good though somewhat rough voice. In the second case, dilatation was commenced fifteen months after tracheotomy, and the stricture then admitted a No. 8 English catheter. This patient remained only four months under treatment, and left uncured ; still, at the end of this time the stricture admitted No. 50 bougie. Œdema of the left arytænoid came on during treatment,

with fetor of breath; the treatment was not discontinued, and the œdema subsided. The third case presented more difficulties. The lesions in the larynx were thickening of the epiglottis and ary-epiglottic folds, with perichondritis and caries of the cartilages. Dilatation with bougies began three months after laryngotomy. Iodide of potassium was given at the same time. This patient did very well at first, being very tolerant of the bougies, eating well and sleeping comfortably with them. Subsequently he coughed up a piece of necrosed cartilage. After three months a full-size laryngeal catheter could be passed, and the tracheal tube was removed, but was replaced owing to the dyspnœa. Stenosis of the canal below the tracheal wound was found, and a membranous web was destroyed by galvano-cautery. After dilating the trachea, both laryngeal and tracheal stenosis were completely cured. This patient was discharged after nine months' treatment, to await the re-opening of the clinique for the removal of the tracheotomy tube.

Dr. Trendelenburg, operating about the same year as Professor Schrötter, has added another to the list of remarkable cases of this nature,* and it would be difficult to find one which more clearly illustrates the many complications which may arise. The stricture was due to syphilis, involving the larynx and trachea, causing aphonia and dyspnœa. The epiglottis was deeply ulcerated, thickened, and tightly bound down over the larynx. Tracheotomy was performed twice within a few months; the second time on account of tracheal ulceration. In this way a cicatricial web was found blocking up the trachea behind the thyroid isthmus. The web was cut down upon through the trachea and divided, the tracheal stricture being dilated by metallic bougies for three weeks. The patient's voice was restored, but the breathing was

* Langenbeck's *Archiv für Klin. Chirurgie.* Vol. xiii. 1872, p. 335.

as bad as ever when the canula was removed. As Dr. Trendelenburg thought that the dyspnœa was now due to falling in of the tracheal wall during inspiration, he introduced into this tube an artificial segment of trachea, as it were, made of a spiral spring covered by india-rubber, to keep the walls apart. Still the canula could not be removed. It was concluded next that the epiglottis, which was still pressed tightly over the larynx, was the cause of the dyspnœa. To verify this the epiglottis was raised by a ligature, and the patient at once breathed better. The epiglottis was cut away, but the patient could not dispense with the tube. Paralysis of the abductors of the vocal cords was discovered now, for which both Faradization and dilatation were carried on. The glottis, after one year's time, was widened, and breathing was easy with the tube corked up. The canula was removed, but had to be replaced in a few hours. The idea of dispensing with the tube was at last abandoned. Still, neither the glottis nor the trachea contracted; the patient could pass full-sized bougies, and she breathed fairly with the canula permanently stopped, although no air passed by the side of the tube. Speculation upon the seemingly unaccountable obstruction to breathing here would be difficult. Possibly some hidden thickening of the trachea still remained, which, being only pushed aside by the dilating tubes, gradually encroached upon the lumen of the trachea on their withdrawal until the space was obliterated. This, combined with the paralysis of abduction, which seems not to have been thoroughly cured, though greatly relieved, and possibly also some spasm of adduction on inspiration, might be the cause. These are only some of the hindrances to a cure which arise from having worn a tracheal canula for a long time. I can call to mind in my own practice more than one case where, after tracheotomy, one or more of these causes have proved impediments to perfect breathing.

This much may be said for causes arising from morbid processes in the upper air-passages; but even slight emphysema of the lungs, so apt to be found in these cases of stenosis, though less troublesome under other circumstances, would be no small factor in increasing the dyspnœa when added to the changes just mentioned. Dr. Trendelenburg calls attention to the liability there is to impaired power in the abductors of the vocal cords in those patients who have long breathed through a tracheal tube. He accounts for this by the fact that while these muscles are at rest the adductors are called upon to close the glottis during every act of swallowing. In the second of my cases to be reported in this paper, there remains certainly a slight amount of this paresis, though not enough to cause dyspnœa. Dr. Trendelenburg makes a valuable suggestion to prevent this consequence, namely, that the orifice of the tube should be partially blocked up by a perforated plug as soon after tracheotomy as is practicable. By this means the patient will be induced to breathe to a certain extent through the mouth in order to compensate for the diminished column of air below. This means might be resorted to without distressing the patient, and would assist in a measure in dilating the stricture, as was done by Professor Gerhardt,* who, in 1869, effected dilatation of a tight stricture of the larynx entirely by the stream of air, the patient having been instructed to cork up the tube for hours together as the glottis increased in width.

Another well-known operator is Professor Navratil, of Pesth, who was conducting experiments about the same time as Schrötter and Trendelenburg. He invented a dilator with which he obtained good results. He reports† among his later operations a case of syphilitic stenosis of

* *Archiv für Klinische Medicin.* Vol. xi. 1873.

† *Annales des Maladies de l'Oreille et du Larynx.* Vol. iv. Paris, 1878.

the larynx, treated by him in 1875, and resulting from an ulcerating laryngitis with perichondritis. The dilatation was made four months after laryngo-tracheotomy, at which time the active disease in the larynx had been arrested, and there remained a cicatricial narrowing below the cords, reducing the glottic opening to three millimetres. There was also complete destruction of the left cord, and partial destruction of the right one. The dilatation was effected by means of an improved dilator of Professor Navratil's design, consisting of four diverging branches, and at the end of four months the tracheal canula was permanently removed, at which date the glottis had reached nearly its normal dimensions. There was plenty of breathing space, and the muscles of the larynx acted well.

Many more important cases might be cited by me did time allow, but I must stop. I am well aware that in the sketch I have given I have omitted to mention several cases of successful dilatations of laryngeal strictures; such, for instance, as the cures obtained by Professor Labus.* I have, however, sought to confine my descriptions more especially to strictures of the larynx of syphilitic origin. Even of these I have not touched on all. Among the other interesting operations, not least are the membraniform occlusions of the glottis removed by Professor Elsberg, described by him in 1874, and recently in the "Archives of Laryngology"; also a case of dilatation by Dr. Asch, reported in the same journal.

I will now add the following cases which have been under my care. They are types of an interesting class in which the narrowing is associated with cicatricial adhesion. Although they were operated upon by me over two years ago, I have purposely deferred publishing them until a sufficient time had elapsed to warrant the cure being considered a permanent one.

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* *Op. cit.*

CASE I.—*Tertiary syphilitic ulceration of the pharynx, followed by perichondritis and ulceration of the larynx; stenosis from adhesion between the ventricular bands. Division of the laryngeal adhesions and dilatation of the stricture.*

M. A. D., æt. 31, married, applied at my clinique at the Hospital for Diseases of the Throat, on March 8th, 1876, suffering from a severe sore throat. The patient, who was very weak, and with a worn appearance, gave the following history :— She had been married eight years, and had had four children. She had always been well up to the birth of the third child. At that time, in 1874, she suffered from pain in the forehead, on the left side. She described it as having been red and swollen, after which it "broke into a sore." There remain two white depressed cicatrices, each about the size of a sixpence, over the frontal eminence on the left side. Shortly after this her throat became sore, and she had suffered from it ever since. She seems to have noticed no primary lesion, and never had any general eruptions. On examining her throat I found deep destructive ulceration. The posterior wall of the pharynx was converted into a large serpiginous ulcer, extending upwards to the posterior nares, and downwards to a level with the centre of the epiglottis. The edges of the ulcer were ragged; the surface was uneven, and covered with a dirty, yellowish grey, tenacious, purulent *débris*. The surrounding mucous membrane was livid and much swollen. There were cicatrices about the fauces with contractions, almost total loss of the soft palate, and adhesions between the remainder and the posterior wall of the pharynx. Laryngoscopic examination showed the larynx to be healthy, with the exception of slight swelling of the left arytænoid. The posterior part of the larynx was seen to be bathed with pus, which trickled downwards from the pharyngeal ulcer. Mrs. D. had a slight cough, but no dyspnœa or aphonia, though her voice was necessarily nasal in tone. The treatment that was instituted was iodide of potassium, twelve grains three times daily, and vapour of carbolic acid In one week there was a marked improvement. The iodide of potassium was continued to the end of April, when the ulceration was healed. The larynx remained quite healthy. The patient had gained flesh and strength, and she was out of all pain. The treatment was kept up for another month, and

she then ceased to attend. On June 14th she came again with a return of the pharyngeal ulceration, which, under a renewal of the iodide of potassium in fifteen-grain doses three times daily, was cicatrized in a week. The iodide of potassium was reduced to twelve grains, combined with half a drachm of syrup of iodide of iron, and this, with small doses of cod-liver oil, was administered until July 5th, when the iodide of potassium was again increased to fifteen grains, owing to a node which was forming on the sternum. This lesion was very persistent, and, although the iodide of potassium was continued and even raised to one scruple three times daily, it was only by September 11th that the node was disappearing. There had been no return of the pharyngeal ulceration since June 21st, but on making a laryngoscopic examination now I found an irregular globular swelling, projecting over the left arytænoid cartilage, and hiding about one-third of the left vocal cord. At first sight it seemed to be a swelling of the tissue over the arytænoid, but on closer inspection the arytænoid could be seen moving out from beneath the tumour towards the median line, as the vocal cords approximated in phonation. It was evidently an outgrowth from the pharyngeal wall, at the junction of the posterior and lateral portions, springing from below the lower border of the ulcer. In colour it was pale red, a little lighter than the surrounding mucous membrane; it was firm in consistence, and the portion seen in the mirror was about the size of a bean. The larynx

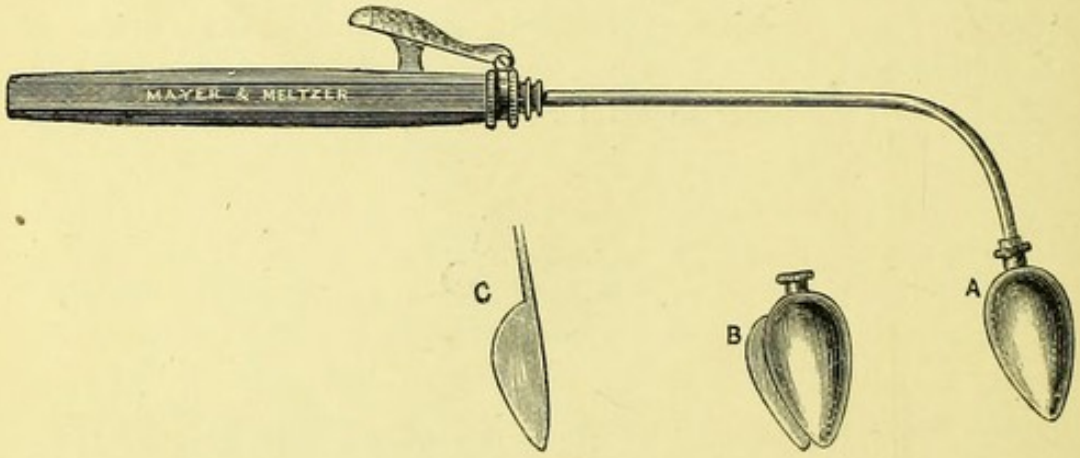
itself was healthy, and the patient complained of no dyspnœa, which, from the position of the growth, was somewhat remarkable. The treatment was persevered in, and under this the supra-laryngeal growth became gradually, though slowly, smaller, so that by November 8th it was about one-third its original size. The sternal node, which had almost entirely disappeared by the end of October, now suddenly was more inflamed again. One drachm of liquor hydrargyri perchloridi was given in conjunction with fifteen grains of iodide of potassium three times daily, and to

this the lesions quickly yielded. From December 6th she ceased to attend, until February 21st, 1877, when she returned, on account of a serious relapse involving now principally the larynx, and producing great dyspnœa. She told me, in a very husky voice, that the attack had come on by her being exposed and catching cold. She had been in great distress for a fortnight. The mucous membrane of the pharynx was swollen and livid, but no ulcerations were present. The laryngoscope showed deep redness and swelling of the epiglottis, swelling and intense inflammation of the ventricular bands, with serpiginous ulceration at their anterior part, and redness, thickening, and immobility of the vocal cords, with marked narrowing of the glottis. The tumour just above the left arytænoid had increased, and it covered that side of the larynx posteriorly. She was put upon fifteen grains of iodide of potassium and one drachm of liquor hydrargyri perchloridi, as before, with inhalations of vapor benzoini. For the first two weeks she improved materially; then she fell back again, and the iodide was increased to one scruple for each dose. By May 23rd the swelling in the larynx was much diminished, and her breathing was tolerably comfortable. The ulcers at the anterior portion of the ventricular bands were healing under an application of nitrate of silver in solution (one drachm to the ounce of water), which had been made once a week from the end of April. On May 30th she came suffering intensely from another relapse. The whole larynx was deep red, and the ventricular bands were so swollen that they completely closed over the anterior half of the glottis. There was also some œdema of both arytænoids The dyspnœa was distressing, and I urged her to enter the hospital, but she would not. The iodide of potassium was increased to twenty-five grains three times daily; but as the gums were a little spongy, the liquor hydrargyri perchloridi was reduced to half-drachm doses. All local applications were stopped; but she was ordered to inhale the benzoin vapour every three hours. From this date her condition did not materially improve, and at last she entered the hospital, on June 11th, 1877. The same treatment was continued, together with milk diet, soup, and wine, while absolute rest in bed was enjoined. For a few days she did better, but on the 16th her breathing became more embarrassed. Mercurial inunctions were now substituted for the

bichloride of mercury, the iodide of potassium being administered as before. This treatment was kept up for three days, but failed to arrest the laryngeal inflammation. On the 19th she had several distressing paroxysms of dyspnœa. The laryngoscope showed almost complete occlusion of the glottis by the overlying ventricular bands, which were so swollen as to meet in the median line. The left arytænoid was very œdematous, and encroached upon the glottic space behind, leaving only a small chink for the passage of air. As the patient was in imminent danger of suffocation I performed tracheotomy without further delay. She was at once relieved by the introduction of the canula, and from this date her condition steadily improved. The mercurial frictions were carried out until June 27th, when she was slightly ptyalized. They were therefore stopped for a few days, and renewed on July 2nd with ten-grain doses of iodide of potassium and cod-liver oil. On July 10th she was able to go out for a walk; she had been up and about the ward for a week. The swelling in the larynx had been constantly decreasing. The ventricular bands were sufficiently reduced in size to show the vocal cords at their posterior third, the left one being still, to a certain extent, overlapped by the growth which I have spoken of before. The breathing was still painful when the mouth of the canula was stopped. The frictions were reduced to one every other day, and these, with the other treatment, were kept up for another fortnight. By then a freer view of the larynx was obtained, when the ventricular bands were found adherent to each other in front for about one half of their length.

The mercury was stopped as the gums were a little tender. The iodide of potassium was kept up, with local applications of a solution of chloride of zinc sprayed into the larynx once a day. During the next three weeks the general thickening in the larynx continued to decrease, and the growth above the arytænoid was hardly to be seen at the end of that time. Whenever the canula was closed there remained still an amount of dyspnœa

which was oppressive under exertion, and as this could be clearly accounted for by the adhesion between the ventricular bands, I commenced to dilate this stricture on August 13th. The dilator that I first used consisted of three blades that were made to diverge from one another by turning a screw in the handle of the instrument. This was introduced into the larynx every day at first, and subsequently every third day. At the end of a fortnight I had succeeded in dilating the constriction sufficiently to bring the anterior third of the vocal cords into view, and as the dyspnœa was relieved, the patient returned to her home. The good result obtained was, however, not lasting, and in September the stricture was as narrow as before. The cicatrix was, in fact, so dense and resisting that it was impossible to tear through it by means of any mere dilating instrument. Being obliged to abandon this method, and finding the introduction of canulæ equally unsuccessful, I devised an instrument which should combine the properties of a knife and dilator in one. This laryngotome is composed of an almond-shaped dilator, within which is a concealed blade. This blade is reversible, so that it may divide a stricture either at the anterior or posterior commissure of the larynx, and it can be pushed forward, when required by means of a lever attached to the handle. The accompanying woodcuts explain the two conditions of the instrument.



I operated with it on October 3rd, 1877. The dilating extremity was pushed down until it fitted tightly in the stricture, and the knife was then protruded. After a gentle movement of the handle upwards and downwards I felt the resisting point in the larynx yield, and I passed the dilator easily into the glottis.

The almond-shaped wedge which I used on this occasion measured fourteen millimetres antero-posteriorly at its base, and eight millimetres in thickness. On withdrawing the instrument the linear incision could be plainly seen where the stricture had been divided. On the 6th I again introduced the dilator, of course without using the knife, repeating this process on the 10th, and subsequently only once a week, as Mrs. D. could not come to the hospital more often. These long intervals were rather a hindrance to the treatment, and some thickening and induration of the cicatrix took place which threatened fresh contraction. In order to arrest this I took her into the hospital again on November 14th, and made another and deeper incision with the instrument.

From this date everything progressed favourably. The incision healed without any farther contraction, and I was able soon to pass the largest sized dilator, measuring eighteen millimetres in width and ten millimetres in thickness, through the glottis. The instrument was passed every fourth day, and her larynx was sprayed every day with the chloride of zinc solution. By the middle of December the stricture remained completely dilated. There was still some slight thickening of the ventricular bands and redness of the vocal cords, otherwise the mucous membrane was quite pale. Mrs. D. could breathe with perfect ease with a cork in the tracheal canula for hours together. She was discharged on December 21st, 1877. This patient continued

to wear her tube for a year longer as she was pregnant, and I thought it safer to leave it in place until after her confinement. She remained under observation through the winter, and she continued well. Her child was born in June, but it was not until December, 1878, that she entered the hospital. No fresh contractions had taken place in the larynx. The vocal cords were congested and thickened, but they moved freely, and during a deep inspiration separated widely from each other, affording a free view of the trachea. There were no ulcera-

tions in the pharynx, and her general health was good. Her voice, of course, was hoarse, but it was distinct, and did not trouble her in talking. She had been wearing a cork in the tube at intervals for many months, and her breathing with this was easy and noiseless. I therefore removed the canula early in December, 1878.

I saw her again on March 19th, 1879. There was no return of the disease in the larynx. Her voice was rough, otherwise she was quite well, nor had she suffered at all since her discharge from the hospital, notwithstanding the severity of the winter.

I lost sight of her until January, 1880, at which date she continued quite well, and on examining her with the laryngoscope I found that no contraction had taken place in the larynx. The vocal cords were red and somewhat uneven, but their movements were perfect, and the glottis was widely open on deep inspiration. I discovered at this visit that there remained a narrow fistula from incomplete closure of the tracheal wound. It was no larger than would admit the introduction of a very small size probe, and as it was always covered over it did not serve as an aid to respiration.

She refused, however, to be operated upon any more, and so I have left it.

CASE II.—*Tertiary ulceration of the larynx, with subsequent cicatricial adhesion between the vocal cords.*

W. M. L., æt. 33, a house carpenter, formerly a seaman, applied at my clinique on October 6th, 1876, on account of sore throat, hoarseness, and a troublesome cough. The attack had existed some few weeks. On examination I found him suffering from granular pharyngitis, with an old perforation of the palate on the right side. There was general hyperæmia of the larynx, with highly red and swollen vocal cords. There was no ulceration either in the mouth, pharynx, or larynx. His chin, the sides of his face, and neck were freely covered with pustular acne, but the rest of his body was free from eruptions. There were some enlarged glands in the neck, and scars from others which had suppurated.

He gave the following history:—In 1869, up to which time he

had enjoyed fairly good health, he contracted syphilis. He went under a course of mercury for this, and so far as his statements are reliable, no general symptoms showed themselves until 1873, when he suffered from rheumatism, nodes on the tibiæ, inflammation of the eyes, and a troublesome sore throat. During the summer of 1874 he was under treatment at the Hospital for Diseases of the Throat for a deep ulcer of the palate. Since this date he had been subject to relapsing sore throat. He was ordered iodide of potassium in ten-grain doses three times daily, with two drachms of cod-liver oil morning and night. This, with applications to the larynx of a solution of chloride of zinc, constituted the treatment. His cough was soon relieved, and the condition of his larynx was much improved. In December he caught cold, and had a relapse. He now complained of pain in the larynx, with tenderness on pressure. The laryngoscopic appearances were bright redness and swelling of the epiglottis, with intense redness and thickening of the vocal cords. He was put upon a mixed treatment of iodide of potassium and mercury, and he inhaled vapor benzoini morning and night. In a week he was greatly relieved, and at the end of six weeks' treatment he was discharged cured. He resumed his work in February, and continued well until the end of April. Then he had a very bad attack, but it was not until a fortnight later that he came to me at the hospital. His voice was almost lost, his cough was incessant, and such distressing dyspnœa was superadded to these symptoms, that he was sent to the ward as an in-patient. The laryngoscope showed diffuse dusky redness of the whole larynx, swelling of the epiglottis and of the ventricular bands, which were ulcerated at their anterior part. The vocal cords were hidden, excepting just in front of the arytænoids; there they were seen to be much swollen and ulcerated. Their abduction was impaired, and the glottis was very narrow. In spite of absolute rest in bed, with large doses of iodide of potassium and mercury, and sedative inhalations, the dyspnœa grew more and more urgent, and on May 22nd, one week after his admission, I was obliged to perform tracheotomy. As I thought it probable that the tube would have to be worn for some time, I introduced it below the thyroid isthmus, in order to avoid pressure from it upon the larynx. The patient had a short and full neck, and the thyroid gland extended very low down, so that the trachea was opened only a little space above the sternum. For the first

two days after the operation his temperature was raised to 101° in the morning, and 102° to 102·5° in the evening, while he suffered a good deal at times for want of sufficient air. This was eventually relieved by the introduction of a very long tube. There was dulness at the base of both lungs, with bronchial râles. Poultices were applied to the chest, ammonia and ether were administered internally, and in a few days all these distressing symptoms had subsided. By June 3rd he was out of bed. The ventricular bands were still deeply ulcerated, and so enlarged that the anterior portion of the laryngeal cavity was blocked up by them. The iodide of potassium was now renewed in ten-grain doses three times daily, and the laryngeal swelling was soon much reduced. By the end of June the iodide of potassium was increased to one-scruple doses, as he complained of much pain in the sternum, radiating down the left shoulder and arm, and accompanied by violent headaches. Tenderness on pressure over the sternum followed, and by July 15th periostitis was fully developed. Mercurial frictions were added to the treatment, but the inflammation went on to suppuration. An abscess over the sternum was opened on August 9th. The laryngeal inflammation had been subdued by the treatment, and at this date the ulceration of the vocal cords was healed. The ventricular bands was still thickened, and the left band was slightly ulcerated. There remained a good deal of stridor when the canula was stopped. Tincture of the perchloride of iron was substituted for the mercury and iodide of potassium. The laryngeal ulceration was touched with a solution of chloride of zinc daily, while the ulcerated surface over the sternum was dressed with an aqueous solution of carbolic acid. On August 20th his breathing was again much embarrassed, and a distressing cough added to his suffering. There were coarse mucous râles to be heard throughout the chest, while respiration was deficient at the bases of the lungs, with dulness on percussion. Carbonate of ammonia, ether, and iodide of potassium, with rest in bed, relieved him of these symptoms in a week, and from this time he slowly but steadily progressed towards a cure. By September 17th the ulcers of the larynx were cicatrized, the thickening of the ventricular bands was in great measure absorbed, and a full view of the larynx could be obtained. It was now seen that the vocal cords were adherent to each other in front, diminishing the glottic space by nearly one-half. The patient

was breathing more comfortably while at rest, even with the canula stopped up, but he had much stridor on exertion. His voice was still very rough. The openings from the sinus over the sternum had nearly ceased discharging, he was in no pain, and was gaining flesh and strength rapidly.

On September 27th I passed the medium size laryngotome, already described, into the glottis, and divided the stricture between the vocal cords. After this I introduced the instrument once a day. He was discharged on November 3rd, 1877, still wearing the tracheal canula.

A month later I examined his larynx, and found a slight adhesion between the vocal cords remaining at the anterior commissure, which I divided as before. He remained under observation during the winter, and for a time I passed the dilator every other day. No further contraction took place. In May, 1878, one year after the tracheotomy had been performed, I removed the canula. The man returned to his employment a short time afterwards, and has remained well ever since. I saw him last in the spring of 1880. There was a little thickening left at the anterior commissure of the vocal cords, but during the act of phonation they met perfectly in the median line, and during forced inspiration their abduction was only slightly impaired, and they separated sufficiently to allow a good view of the trachea. His breathing was easy and quiet, and he said that it had never troubled him under the exertion of work, or in the cold air to which he is at all times exposed. His voice was very good.

In conclusion, I wish to refer very briefly to a few noteworthy points suggested by these cases of syphilitic stenosis of the larynx.

In looking over the list of good results obtained, we must not forget that in these operations many are the failures which might be put down to overbalance the successes, and experience teaches all of us who are, specially, workers in this field, that the question of the permanent advantage to be derived from dilatation in syphilitic stenosis is far from settled.

In cases of recurrent laryngitis of the intermediate period,

acute attacks of inflammation associated with swelling and œdema, threatening suffocation, may be averted by catheterization. In my own practice I have always found such cases yield, however, to rest and internal treatment. I have never met with any lesion in an earlier stage which could give rise to very serious dyspnœa.

Deprés reports a case * occurring during the first year of infection, accompanied by secondary lesions, which required tracheotomy, and subsequently resisted all his attempts at dilatation. His views with regard to the laryngeal obstruction, were that it was caused by a large mass of mucous patches, which had become the seat of vegetations. If this diagnosis were correct, it would seem that evulsion of the growths, with or without tracheotomy, would be indicated rather than dilatation.

As regards the tertiary affections, where dilatation is essential to overcome the laryngeal obstruction, the ultimate result of this operation must depend, in a great measure, upon the stage which the affection has reached. In attempting to arrive at any estimate I would propose here to classify these lesions under two main divisions—the *acute* and *chronic* stages of the tertiary period. This has, for a long while, appeared to me to be the most satisfactory classification for the study and treatment of these later manifestations. The cases included in the first division might seem to represent but the initial stage of the more advanced lesions; yet they appear to me to be worthy of a classification by themselves, not only on account of the striking difference of appearance they present, and the course they pursue, but that among them we meet with by no means a small number which maintain their differential character, though they have existed a long while. This class includes gummatous growths; either tumours, which are comparatively rare, or, far

* *Gazette des Hôpitaux.* 1869.

more often, softened gummata with consequent ulceration. These lesions, either single or multiple, are the laryngoscopic signs which we meet with in a fairly large class of patients, who present themselves for treatment with symptoms of hoarseness, deep-seated pain in the larynx, tenderness on pressure over the thyroid, and acute and, at times, dangerous suffocative attacks. In these cases we find a history of earlier infection, dating from three years to ten or more years before. Former symptoms have been treated, and a period of perfect immunity of varying length has preceded the laryngeal attack. In my experience, and I have treated a good many such cases, the cure, if treatment be instituted early, is almost as rapid as the onset and march of the disease was. Rest and specific treatment work wonders in these cases. These are the attacks which give the happy and misleading results that induce us to expect cures in syphilitic stenosis, more often, without tracheotomy. The reverse of this is too well-known to require to be more than noted, and the long list of cases steadily drifting to bronchotomy proves the fallacy of our hope. I believe that in these acute cases, where we have to deal with patients otherwise well, the failures are the exception. I have met with failures, when among men, mostly in those of intemperate habits, among the poor, and those who are much exposed. In women it has seemed to me that pregnancy and nursing their children have sometimes a bad influence over the progress of the case.

Whatever the cause may be, should the disease not be arrested, or should one or two attacks have preceded, a more chronic inflammation supervenes. In this, fibrous growth is a more marked element than in the former class, but the ulcerative process is also still active. In these cases, although pain and cough with intense hoarseness are always present, dyspnœa is a more painful symptom. These are the patients who come time and again to seek

relief; who get better, certainly, but in whom the parts are never entirely restored to their normal state. They comprise the large class of laryngeal deformities with cicatricial stenosis. The laryngoscopic signs are livid redness of the mucous membrane; thickening everywhere, but ulceration as well; ulceration, deep and destructive; an epiglottis more or less eaten away and bound tightly down by adhesions. An imperfect view of destroyed cords with impaired movements; a narrow glottis and adhesions between the bands. Tracheotomy is the almost certain fate of a large proportion of these cases, this being rendered necessary either by acute inflammatory swelling closing up the already narrowed glottis; through acute œdema coming on in the course of perichondritis, which is more rare, or through cicatricial contraction.

The last stage, and happily the least frequent, so far as my experience teaches me, is that where fibrous growth is, out of all proportion, in excess of other morbid processes. Steadily progressing dyspnœa marks its course. Acute attacks occur, as in the preceding class, giving to these cases also a recurrent type; but when the swelling subsides the thickening is seen to be as great as before. Very rarely have I known their course to be arrested, though I have met with such a result. I have never seen the growth diminish in the slightest degree under any treatment. The laryngoscopic appearances are—pale redness and even marked pallor of the larynx, except during an acute exacerbation; an epiglottis knotted and hypertrophied to very many times its normal size; the ary-epiglottic folds and ventricular bands twisted and thickened into a distorted mass; deep furrows alternating everywhere with knobs of tissue; a thickened fold encroaching upon the space behind, and a more or less narrow glottis bounded by thickened and rigid vocal cords The same hypertrophy of tissue extends

at times below the glottis in the trachea. These cases, which I have been in the habit of describing as Chronic Fibroid of the tertiary stage, are slow in their progress, and may drag on sometimes for two or three years, or even more, under favourable circumstances; but if subject to frequent acute exacerbations, they end fatally in a short period.

The following typical case may, not inappropriately, be here related in illustration :—

Joseph S., æt. 45, a traveller, applied for relief in May, 1876, suffering from pain in swallowing, hoarseness, and irritable cough with distressing dyspnœa. He stated that fifteen years previously he had contracted a chancre, followed by eruptions, a sore throat, and inflammation of one of his eyes, for which lesions he was treated with mercury. He had had manifestations from time to time ever since, and he still bore scars upon his face and body, from an ulcerating syphilide which he had suffered from four years before. Two years previous to this visit to me, and thirteen years after the primary ulcer, he began to suffer with hoarseness, cough, and dyspnœa, and these had never entirely left him. Under treatment he had been relieved, but he always remained subject to relapses—often from exposure to the weather, or after excesses in drinking.

On examining him I found no lesions of the mouth or pharynx. The laryngoscopic appearances were as follows :—The mucous membrane everywhere was pale red. The epiglottis was very greatly thickened and distorted, superficially ulcerated, and rigidly fixed by the overgrowth of tissue. The ary-epiglottic folds were also much thickened and nodulated; the right one was ulcerated. The ventricular bands and vocal cords were thickened, and their surface was very uneven. There was the same excessive hypertrophy of tissue over the arytænoid cartilages. The whole cavity of the larynx was encroached upon by the growth; the abduction of the vocal cords was thus interfered with, and the chink of the glottis much narrowed. The signs in the chest were those of chronic bronchitis.

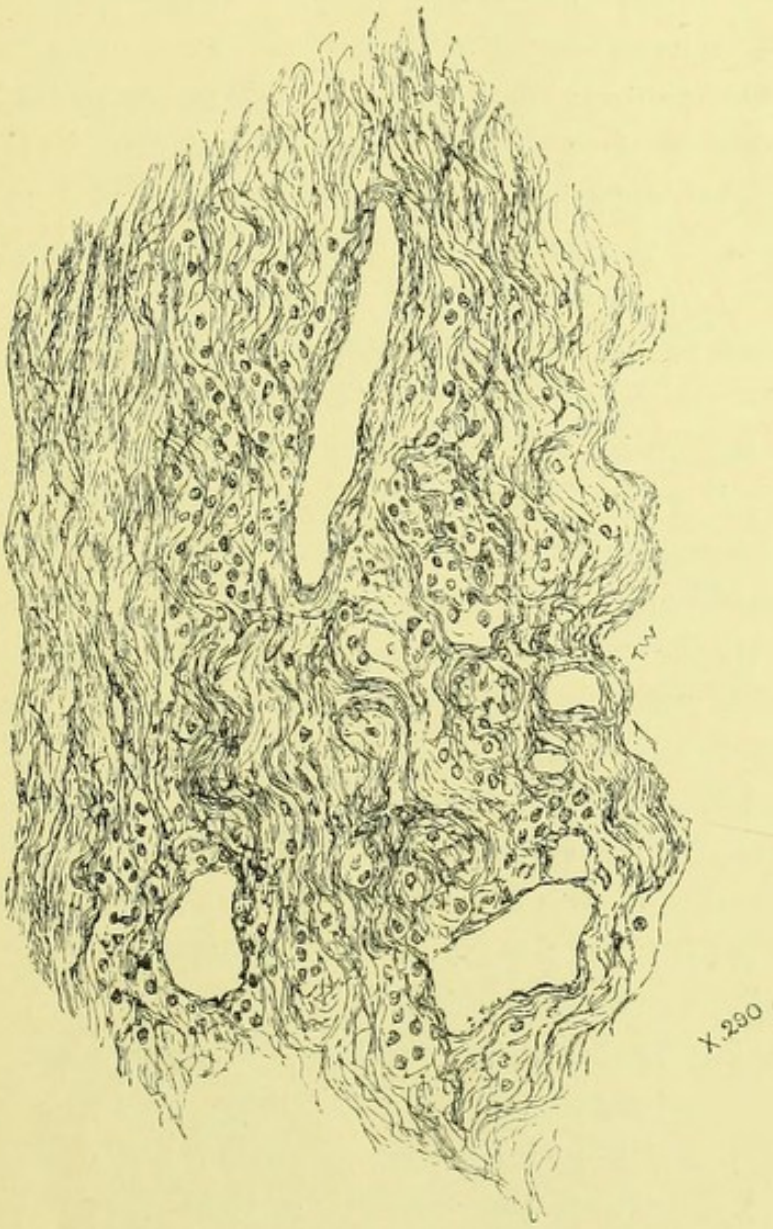
I was obliged to treat him as an out-patient, as he would not give up his work; but even under these unfavourable circumstances he did, for a time, better than I expected. He took mercury and iodide of potassium, with but few intermissions, until the middle of August, by which time he was much improved. No active ulceration remained, and the swelling was sufficiently reduced to leave him a fair amount of breathing room.

The accompanying drawings show very well the conditions of the larynx before and after treatment, up to this date.

During September, although his breathing was easy, the iodide of potassium was continued in fifteen-grain doses, owing to the thickening, which had not yielded. He remained in much the same condition until the early part of November; then, with the first fog, he caught cold, and at once his breathing became worse. The epiglottis, ventricular bands, and inter-arytænoid fold were now very much swollen and deep red. By confining him to the house, and renewing the iodide of potassium together with sedative inhalations, he soon picked up again, and the improvement continued until the winter had fairly set in. Then he had a severe attack, from which, however, he quickly recovered as before, and indeed was enabled to keep going about at his work through the greater part of the season. Towards spring, however, the acute attacks became more frequent, the intervals of relief were less complete, and at last, unable to struggle on any longer, he entered the hospital. Iodide of potassium was given in large doses with mercury, which was pushed to slight ptyalism; but, although the patient was restored to a fairly comfortable state by these means and under the favourable conditions of hospital care, no change took place in the larynx beyond the subsidence of the acute inflammatory swelling—the thickening remained as before. Still, on mild days he was able to go out for a walk, and seemed in no immediate danger. Suddenly one day, early in April, after an attack of acute bronchial congestion, I was obliged to perform tracheotomy on account of œdema of the ventricular bands and arytænoids. He rallied well after the operation, but two days afterwards he became delirious, and died from exhaustion at the end of a week.

I regret that no further post-mortem examination was obtained than the removal of the larynx and trachea, the appearances of which are very accurately reproduced in the annexed lithograph (*see* Frontispiece), showing the great deformity of the parts.

The specimen, when examined microscopically, showed an abundant small cell-growth under the mucous membrane, and the epithelial layer somewhat thick. In other parts there was an abundant development of fibrous tissue, apparently *contracting*, as the sinuous and twisted appearance seemed to show. In the meshes were some of the small cells, but irregular in shape, from having been subjected to pressure by the said contracting fibrous tissue.



For this report, and the accompanying drawing, which shows so beautifully the microscopic appearances, I am

much indebted to my friend, Dr. Whipham, who kindly examined the specimens for me.

Taking then the division of tertiary affections of the larynx which I have proposed, viz., into (1) Acute Gummatous Inflammation, (2) Fibro-gummatous, or Relapsing Laryngitis of the Tertiary Period with cicatricial deformities, and (3) Chronic Fibroid, I think that it may be fairly cited from the experience of former operations that successful dilatation of the larynx may be regarded as probable among cases of the first two classes, notably where the contraction is due to adhesion, and where the thickening of tissue is of recent formation. In the third class tracheotomy is, as a rule, imperative, and remembering the almost certainty that, even with the best-directed and most energetic internal treatment, there is no retrograde movement in the morbid process, and rarely a halt for long, tracheotomy should not be delayed after this change is once fully established and breathing is embarrassed. When, however, it is performed, there is, in my opinion, no benefit to be looked for from mechanical dilatation. Finally, I would dwell upon two practical and highly-important points in all these cases as having a direct influence upon a successful result. (1) Early tracheotomy, to decarbonize the blood and admit of reparative change, as well as to avoid pulmonary irritation. (2) Early subsequent efforts at dilatation, to prevent those morbid processes which may arise locally from pressure of the tube, or by extension in the lungs; at the same time guarding against a too early withdrawal of the tracheal tube.

Touching the laryngeal dilator devised by me, I would note the facility with which it may be introduced, and the advantage it possesses as a cutting and dilating instrument. By putting the tissues on the stretch before the incision is made, it enables this to be carried out with more precision than if it were effected by a knife alone.

As the incision may be limited in depth and the tissues be finally divided by laceration, there is less chance of subsequent adhesion. The safety of a guarded blade need not be dwelt upon. When a notice of the instrument first appeared, in January, 1878, a critic stated that as the dilator concealed the very part it proposed to operate upon, it, of necessity, could not be an efficient instrument. Experience has not verified this objection made to it, in my hands, and I hope it may be of use to others as well. I do not seek, however, to lay too much stress upon its merits over other instruments that have done good service in the hands of other operators. In cases as perplexing as these, it is well to have many resources to fall back upon.

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