Syphilitic membranoid occlusion of the rima glottidis / by Louis Elsberg, M.D.

SYPHILITIC MEMBRANOID OCCLUSION

OF THE

RIMA GLOTTIDIS.

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The laryngoscope has literally and metaphorically thrown light upon laryngeal diseases. The larynx is so frequently invaded when syphilis has effected an entrance into the system, that a treatise on the syphilitic affections of the larynx constitutes a special and quite important chapter in syphilology. Syphilitic membranoid occlusion of the rima glottidis is one of the diseases a differential diagnosis of which, in the living, was impossible before the introduction of the laryngoscope. In my expectation to find it specially described in reports of post-mortem examination in ante-laryngoscopic times, I have been disappointed, at least so far as my search into the literature of the subject has extended. My cases are recorded in my memorandum-books as follows:—

Case I.—On Sept. 20, 1860, C. G., æt. 48, came to me almost aphonic, and suffering from great difficulty of breathing. He evidently has been a robust, powerful man; now, however, is very weak, with an anxious look about him. Has followed the sea more or less since childhood, contracted chancre when quite a boy, has had venereal diseases repeatedly, and has taken large quantities of mercury. He has been hoarse for at least ten years; there have been times when he has been even more aphonic than he

is at present, but never had "so much trouble to get his wind as now for two weeks." There have formerly been pain and difficulty in swallowing, but these have almost entirely passed off. His fauces showed much cicatrization. I succeeded after some trouble in making a laryngoscopical examination, and found so much destruction, adhesion, and distortion that the details were not altogether recognizable. I discovered, however, a distinct web between the vocal cords, which seemed completely to occlude the laryngeal canal. I counselled tracheotomy, whereupon he informed me that he had seen several physicians who had given him the same opinion, and had been on the point of having tracheotomy performed by Dr. Lewis A. Sayre when he had been advised by his friends to consult me. Under these circumstances I requested as a favor to be present at the operation, but I never heard of the man again.

Although I saw this man but once, and made no drawing of the appearances, the picture which the mirror revealed is vivid in my memory. On inspiration it puzzled me to find any inlet for the air; and it was only when he expired that I saw the air literally squeeze itself out with a faint whistling noise by the side of the posterior glottis, pressing the membranoid web outward and escaping by its unattached posterior edge. This case taught me what a terrible degree of laryngeal stenosis may exist, and yet life be carried on, if the narrowing occur very gradually, as this must have been brought about. Indeed, although this patient could make no exertion, could not even walk, without panting fearfully, his breathing, when sitting quietly, was disproportionately good. I have not succeeded in finding out how long this man survived.

Case II.—Mrs. R. S., æt. 26, applied to the clinic of the University Medical College, and was referred to me by Dr. Metcalf, Jan. 21, 1864. Had chancre and constitutional syphilis five or six years ago. Throat symptoms were early developed, and have never been entirely away. I found inflammation and ulceration in the pharynx, extending up some distance behind the uvula, and down into the larynx. The velum was not perforated, but showed traces of past mischief. What the mirror revealed is delineated in Fig. 1. At the back of the tongue there was much cicatricial tissue and some active ulceration; the upper edge of the epiglottis was irregular, and a little to the left of the middle there was an ulcer with injected walled edges. The vocal bands had evidently been the seat of previous ulceration; the posterior halves of their edges were uneven and scarred, the anterior halves were obliterated by a web which united them, and which, when the rima glottidis was most widely open, stretched obliquely from the right to

the left side. With this condition of things there was not much dyspnœa, and only dysphonia. The patient became short of breath only on exertion, as going up stairs, etc., and she spoke in a rough, squeaky, semi-loud, and very unpleasant voice. The movement of the vocal bands was normal, and on their approximation the web-membrane seemed to become invisible; but there was a good deal of pain on swallowing, and it was only on this account, and for the ulcers in the fauces, that she sought relief. She was put upon anti-syphilitic general treatment; some of the ulcers were touched with acid nitrate of mercury, and some with a solution of nitrate of silver, and before I lost sight of her, which was in about six weeks, she was in every way improved, except that the partial occlusion of the rima glottidis was not much changed.

Case III.—C. A. McC., æt. 30, came to me May 30, 1866. He has had gonorrhœa, chancre, and consecutive symptoms. His throat has been affected three years. He has some difficulty "in preventing drinks getting in the wrong throat," is entirely aphonic, and has dyspnœa. I found some stellated scars in the fauces; an ulcer with raised edges on the glossal face of the epiglottis, on the right side; hypertrophy and proliferations on the

Fig. 1.

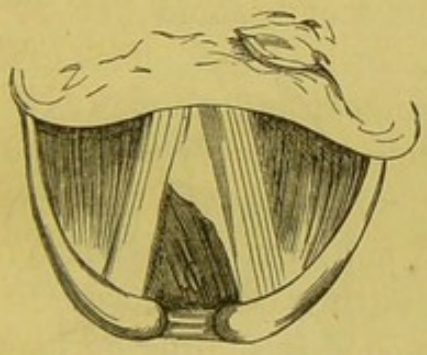
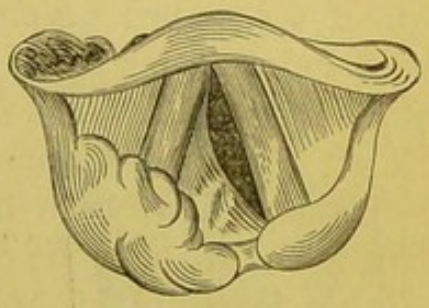


Fig. 2.



posterior portion of the right ary-epiglottic fold; and a cicatricial membranoid band attached along the edge of the right vocal cord, that seemed to be inserted into the interarytenoid fold to its verge at the left arytenoid cartilage, as represented in Fig. 2. During attempts at phonation the movements of the left vocal cord were unimpeded, the right remained almost stationary, as though it were held by cicatricial tissue. When the rima glottidis was at its widest during forced respiration, the cleft was about a line in width; ordinarily, the border of the occluding membrane appeared to be in contact with the free edge of the left vocal cord. The patient had previously taken so much mercury and iodide of potassium that I tried iodoform, commencing with one grain daily and increasing the dose gradually to five. Locally I applied the acid nitrate of mercury, not intensely, and only three or four times. Upon the web I experimented with galvano-cautery, but was unsuccessful on account of faulty instruments. I then made a number of incisions into it with Semeleder's concealed lancet and Bruns's naked knife, and had the satisfaction of making the cleft per-

manently wider and relieving the dyspnœa. Whispering dysphonia, not to say aphonia, remained however. I must mention that on one occasion, while thrusting the concealed lancet into the laryngeal cavity, dyspnœa supervened, which was so terrible that it came very nearly costing the patient's life.

Case IV.—June 2, 1867, R. L. S., night-watchman, æt. 31. Had chancre ten years ago, and again four years ago. For about seven months has had pain in swallowing, cough, and loss of voice. For some time he could not swallow liquids without coughing terribly, and only large mouthfuls of solid food. When he is very careful and swallows slowly, and with a premeditated effort, food at present passes down without much disturbance; he still coughs a good deal. He speaks in a harsh and squeaky whisper; and is very easily out of breath. Has been unable to do any work for seven months, and his general health has somewhat run down. The posterior wall of the pharynx was granular, irritated, and covered in patches with greenish phlegm; breath very malodorous. Has taken a great deal of mercury—has been salivated recently. The epiglottis was destroyed; only an irregular, ulcerated, and angry-looking stump remaining, as shown in Fig. 3. The upper aperture and whole interior of the larynx was con-

Fig. 3.

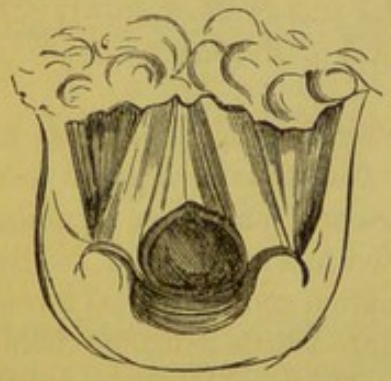
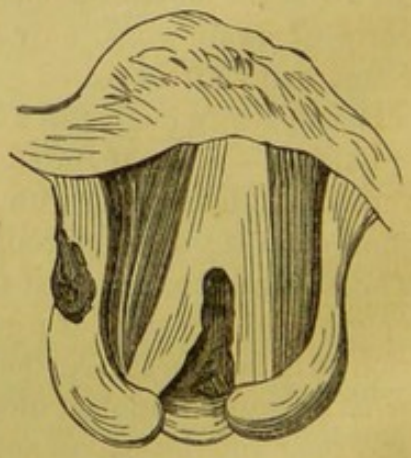


Fig. 4.



gested and somewhat swollen, and the rima glottidis occluded by a web-membrane stretching anteriorly from one vocal cord to the other, leaving posteriorly a circular opening of the diameter of a large-sized lead-pencil. I placed the patient on tonics, a generous nutritious diet, and large doses of iodide of potassium. On June 9th, I freed the vocal bands by means of galvano-cautery. With appropriate rests the operation lasted over two hours, and the stench arising from the burnt tissue filled the room. I introduced the galvano-cauter between thirty and forty times. I never had a patient who bore the mirror and galvano-cautery, or any operation, better. I intended to do only a very little at this primary operation, but he insisted on my "finishing the job." He complained of very little pain from the cautery, and I not only destroyed the web but also touched the ulcerated

spots at the root of the tongue. Within half an hour after the operation the throat became sore, and remained so all that day (Sunday) and until Wednesday. June 13th. I again examined the patient with the mirror, and found the parts covered with a little purulent mucus and slightly swollen; but the movements of the vocal bands were perfect, although I could not prevail on the patient to attempt to speak otherwise than in a low whisper. June 15th. Voice half loud, hardly any pain, swallowing rather difficult. Anterior angle of vocal bands not well seen, mainly on account of swelling of the stump of the epiglottis. June 19th. There is still slight pain at the root of the tongue, and a little swelling; breathing normal, even on exertion; patient says that he has not been out of breath since the operation; voice better.

The patient continued to take iodide of potassium for two or three months: the tonics became unnecessary after three weeks. He practised respiratory and vocal gymnastics every day after the first week, and used astringent spray, alternating with tannin and equal parts of alum and chlorate of potash. On the 17th of August he left the city. His fauces were smooth, and free from secretion; there were granulations and cicatricial tissues at the root of the tongue and above the stump of the epiglottis, but no ulceration; the whole larynx looked healthy; the vocal bands were united at the anterior angle for perhaps a line back. There was no difficulty of swallowing, only he had to be careful and swallow slowly; the cough had entirely ceased; there was no pain and no dyspnœa; the voice was sufficiently loud, and a little husky.

Case V.—V. K., of Buffalo, æt. 31, photographer; has been syphilitic for three and a half years, with skin eruption, etc. Got throat symptoms after three months; a severe cough, pain, great hoarseness, and some dyspnœa. The laryngoscope revealed the picture represented in Fig. 4. The swollen epiglottis shows signs of a good deal of inflammation and superficial ulceration on its laryngeal face, the ary-epiglottic folds are a little œdemic; there is what appears an indolent ulcer on the right side. The vocal bands are rough, and their anterior halves are united; their movements are sluggish. The patient is anæmic, though his general health is pretty good, and no tendency to consumptive disease in his family. He has taken large quantities of iodide of potassium. A year and a half ago he married, after consultation with his physician; this worries him, and makes him quite unhappy now. I ordered him to take cod-liver oil, and on January 22, 1870, commenced hypodermic injections of corrosive sublimate, a method of treatment in syphilitic disease introduced by Dr. Lewin, of Berlin, some years previously, and brought by me to the notice of the American medical profession in May, 1868.* I injected one-eighth of a grain, at first daily, then

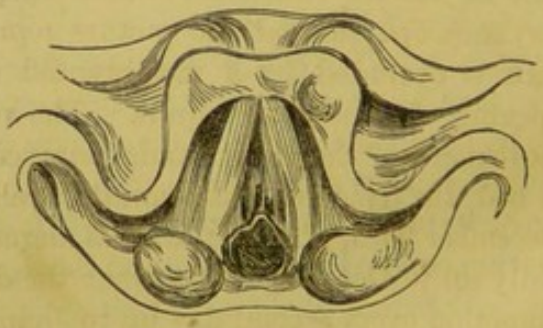
* See Transactions of the American Medical Association, 1868, p. 393. A translation of a work by Dr. Lewin, on this subject, has since been published by Lindsay & Blakiston, Philadelphia.

every other day; after two weeks every third day, until I had used nearly two and a half grains. Locally, I used galvano-cautery, and afterward spray inhalations of very dilute solutions of nitrate of silver. After six weeks the patient went home cured. The larynx looked normal; there was no dyspnœa, no cough, and the voice was very good.

Case VI.—T. J. C., seaman, æt. 30; consulted me January 27th, 1870. For nearly two years he has breathed through a canula in his trachea, which had been inserted in one of the London hospitals on account of syphilitic sore-throat and impending suffocation. For six weeks he has suffered very much, more than before, from pain, especially in swallowing; has a troublesome cough and absolute aphonia. The soft palate was in part destroyed, and on the right side several adhesions to the posterior wall of the pharynx were found. In addition to several large syphilitic ulcers and cicatrices in various localities about the throat, pharyngo-nasal space, and nose, there was a characteristic ulcer on the side of the epiglottis, and a very large ulcer involving both arytenoid cartilages, and extending over to the anterior wall of the œsophagus. The interior of the larynx presented the curious appearance attempted to be depicted in Fig. 5. On the left side there was a curved band of tissue visible, of which it was impossible to say whether it was or ever had been a vocal band; there was nothing of the kind on the right side. A cicatricial membrane occluded the laryngeal cavity, in which there was a narrow triangular chink, that ap-

Fig. 5.

Fig. 6.



peared like a rent in the membrane, commencing at its posterior attachment, and extending in nearly the middle line half way across it. On closing the canula with the finger, no air, or, at best, but very little air, could be made to enter the lungs through this chink; on breathing out, however, phlegm and air bubbled out through it. No vocal sound could be made under any circumstances. The picture which the laryngoscope revealed was not by any means so distinctly and easily made out as the sketch of Fig. 5 shows. As there was so much active ulceration going on, I at once injected one-sixth of a grain of corrosive chloride of mercury, dissolved in about 20 minims of distilled water, into the back. Thereafter I injected one-eighth of a grain every day, or every other day, with occasional longer intervals, until, in the course of six weeks, about three grains had been used. He also

took afterwards 10–15 grains of iodide of potassium three times daily, and vapor-baths. I used both the knife and galvano-cautery for destroying adhesions in the fauces and pharyngo-nasal space during the first month, and on the 4th of March commenced the use of galvano-cautery in the interior of the larynx. I had succeeded by the 19th of March in making an artificial rima glottidis, through which breathing could be carried on so perfectly that a cork could be borne in the canula all day; a rough vocal sound could also be made. The canula was finally removed, and the wound closed with adhesive plaster, April 6th. The voice at this time was rough and hoarse, but distinct and audible. Although the external wound gave us a good deal of trouble, there never was any difficulty of breathing through the larynx after the beginning of April. The patient remained in New York until near the end of that month.

Türck has recorded the following three cases in his "*Klinik der Krankheiten des Kehlkopfs und der Luftröhre*" (Vienna, 1866, pp. 408, 409, and 410):

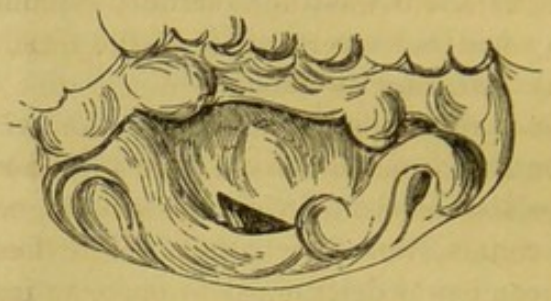
Case VII.—M. K., æt. 20, locksmith, entered hospital December 23, 1859, stating that for about three years his speech has been nasal; for two years he has been hoarse, and since three weeks he coughs. The bones of the nose are fallen in; the uvula and a great part of the soft palate are absent. He denies all syphilitic infection, and has no scar on the penis. At present he suffers with considerable dyspnœa and intense hoarseness. The laryngoscope showed the picture represented in Fig. 6. The rima glottidis is occluded by a membranoid cicatrix, which leaves posteriorly an opening of the size of a quill. The voice is semi-loud, very hoarse. The movements of the vocal bands unimpeded. After a few days of mere rest in bed, the dyspnœa was somewhat relieved. Inunction was commenced December 25th, of half a drachm unguentum cinereum, which was repeated daily up to December 30th, when the dyspnœa was quite slight; thereafter inunction every second day up to January 10th. January 21st the patient left the hospital.

Case VIII.—P. M., æt. 25, mason, entered April 7, 1860. Had chancre and a bubo in right groin in January, 1860; afterward papula on the corners of the mouth and condylomata at anus. Patient has always been somewhat hoarse, but the hoarseness increased. On May 6th, examination revealed the anterior halves of the vocal bands united by a web-membrane nearly a line thick. There is no dyspnœa; the movements of the vocal bands normal; moderate hoarseness; cough rather sharply limited. By means of corrosive sublimate internally, and *Plenk's* solution locally, the symptoms of constitutional syphilis disappeared, and the hoarseness became as it had been formerly. The membranoid tissue appeared at the discharge of the patient, August 25th, 1860, flatter than before; otherwise unchanged.

Case IX.—F. R., æt. 21, a blooming girl from the country, had suffered for three years in consequence of constitutional syphilis, with aphonia and symptoms of laryngeal stenosis. Examination in October, 1863, showed

Fig. 7.

Fig. 8.



the appearances represented in Fig. 8. The epiglottis in great part destroyed; vocal bands and ventricular folds are indistinguishable from each other, both seem united in a cicatricial tissue which occludes the rima glottidis, so that there remains only a small orifice for the passage of the air posteriorly. Wrisberg's, Santorini's, and a part of the arytenoid cartilage on the right side are destroyed, and in their stead cicatricial tissue is seen; these parts on the left side, as well as the pyriform sinuses on both sides, are perfectly normal. Complete aphonia. The dyspnœa, ordinarily slight, becomes considerable on exertion. On inspiration and expiration a blowing noise produced in the larynx may be heard. The hand placed upon the part distinctly feels a trembling movement from the thyroid cartilage to the trachea.

The patient having been informed that an operation could relieve the dyspnœa, but not restore the voice, on October 27th, 1863, partial local anæsthesia was produced by local application of morphine and chloroform, and the membrane was split from before backward, the superficial layers having been first cut into with Wintrich's concealed lancet, and the incision through the resistant tissue, about two lines thick, completed by means of a probe-pointed properly curved knife. The intention to cut out a piece of the web had to be given up on account of the thickness and resistance of the membrane and the restlessness of the patient. The incision was not accurately in the median line; the left vocal band now moves to the middle line, but the inner edge of the right side of the new rima remains immovable. Reunion took place anteriorly, nevertheless, about half of the cleft remained patent when the patient was discharged on December 31st, and dyspnœa was removed. The same condition was found a year afterward. The patient could perform severe field labor without dyspnœa.

A case is reported in the London *Medical Times and Gazette* (August 19, 1871, p. 218), treated by Morell Mackenzie. There is no pictorial representation of the appearance added.

Case X.—J. D., æt. 33, formerly a farrier in the Life Guards, was admitted into the Hospital for Diseases of the Throat, May 11th, 1871, wearing a canula. Eighteen months previously he had been admitted, on account of extreme dyspnœa and complete aphonia, which had existed for nearly two years, and was due to tertiary syphilitic disease of the larynx. Tracheotomy had been performed at the time, and the patient left, after a few weeks, wearing the tube.

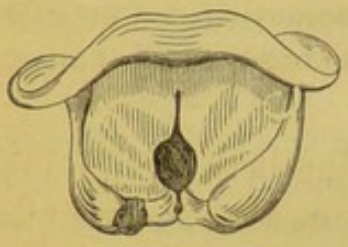
On his readmission, an examination with the laryngoscope showed a web extending from one vocal cord to the other, and occupying the anterior five-sixths of the glottis. He was, of course, able to breathe well through the canula, but there was absolute loss of voice. Under these circumstances, it was determined to make an incision in the mediate line, through the thyroid cartilage, and to divide the web; and in order that it should not again unite, it was proposed that the patient should wear a double-branched canula, one branch consisting of the ordinary tracheal tube passing downwards, and a second similar tube passing upwards between the vocal cords, and being attached externally to the first tube. This was accordingly done on May 16th. The patient did very well for the first three days, but on the evening of the third day it was seen with the laryngoscope that the upper portion of the tube was producing an ulcer on the right arytenoid cartilage, and great pain was experienced in swallowing. On the following morning, May 20th, both tubes were removed, as it was deemed important to allow as full a current of air as possible to pass through the trachea. It must, however, be understood that the upper laryngeal canula was obliged to be removed, because of the irritation it produced, before all chances of reunion were over. He appeared perfectly well for the first few days, but on May 25th, one or two severe attacks of dyspnœa having occurred, the tracheal canula was replaced. June 1. On laryngoscopic examination it was found that the greater portion of the web had been destroyed, and that more than three-fourths of the area of the glottis was free.

About two and a half months later, at the time when the report was made, the man was acting as under-porter at the hospital, and it was expected that the tube would soon be removed. He wore a canula with a pea-valve and an oval opening on the upper surface of the tube. Dr. Mackenzie adds that the plan of treatment pursued he had found successful in two previous instances, without, however, mentioning the details of these instances. The patient was able to speak well, and Dr. Mackenzie concludes, "At the time that it was originally intended to dispense with the tracheal tube, there was a good deal of inflammatory swelling consequent on the recent operation, and hence the patient was unable to breathe without an artificial opening. All thickening having now subsided, there is every reason to believe that the patient will soon be able to breathe perfectly well through the natural passages."

Navratil has reported a case which occurred in the St. Rochus Hospital at Pesth (*Laryngologische Beiträge*, Leipzig, 1871, p. 60).

Case XI.—The patient was 16 years old. There was general constitutional syphilis, absence of the uvula, perforation of the soft palate, destruction of the bridge of the nose. There was cicatricial contraction and displacement of portions of the larynx, and membranoid occlusion of the rima glottidis, as represented in Fig. 9. The orifice in the middle of the membrane, which served the purpose of breathing, was of the size of a pea. There was noisy respiration and complete aphonia. The patient's general health being excellent, the constitutional anti-syphilitic treatment was instituted successfully and without difficulty. The membrane was found to be very tense posteriorly, and much less resistant toward the anterior commissure; it was split by means of the naked lance-shaped knife, introduced into the orifice and carried first backward, then forward. Hemorrhage was exceedingly little, reaction inconsiderable. After some days the anterior portions of the membrane were found reunited, the posterior remained separated. Dr. Navratil states that he intended to destroy the reunited web by galvano-cautery; but the patient, glad to be able to breathe better, was satisfied with the success so far obtained, and refused further treatment.

Fig. 9.



Occurrence.—In about 270 cases of laryngeal syphilis, which have come under my observation during the past fifteen years, membranoid occlusion of the rima glottidis occurred six times. The frequency of its occurrence, a percentage of nearly $2\frac{1}{4}$, is so great that I cannot pass it by as accidental, or regard the condition a rare one, although my figures are too small to generalize from. I have found only five cases reported by others; but many more must have occurred in the practice of these and other laryngoscopists, or been met with on post-mortem examination; accounts of other cases may have been published and escaped my notice.

From the circumstances of the case such an occlusion can exist in only a comparatively late stage of the disease; indeed, as to the parts affected, it is a result of, and a local termination of, the syphilitic process. I should therefore unhesitatingly range it as tertiary, if, on the other hand, it was not so frequently accom-

panied by still actively progressing ulceration of the mucous membrane rather than of the deeper structures. In only two of the eleven cases was the cartilaginous free portion of the epiglottis reduced to a stump, in two more its upper edge was in part eaten away, while in six the cartilage itself was normal, and in the one remaining case, its condition not being mentioned, it was probably also undestroyed. Of the arytenoid cartilage there is evidence, in only one instance, that it was affected. None of the other cartilages were attacked in any case. In two cases the nose was fallen in.

In relation to the length of time intervening between the primary infection and the formation of the web, nothing definite can be deduced from these cases. In one case (Case VIII.) chancre was contracted in January, and the web found, on examination, in May, *i.e.*, after four months; but this patient had always been hoarse, and although the hoarseness was worse during the continuance of the constitutional symptoms, and became less after anti-syphilitical treatment, yet, as the patient had never been examined by means of the laryngoscope previously, there is no certainty that the web had not existed before the chancre. In the other ten cases there is no reason for suspecting the formation of the web to be due to anything else than the infection; but as to none of the cases in which mention is made of the time of the primary sore, is there any means of knowing how long the cicatrix existed before the laryngoscope revealed it. This refers to the shortest interval between the infection and the web formation; as to the longest, it does not appear that in any of these cases more than ten years elapsed between the two events.

Under no circumstances could we make any generalization concerning age and sex from our few cases; with one exception, viz., Case I., the subject of which was 48 years old, the patients were young; in one instance, Case XI., only 16 years old, the others ranging 20, 21, 25, 26, 30, 30, 31, 31, and 33. The occlusion occurred nine times in the male sex, and only twice in the female, a disproportion which we might jocularly ascribe to the proverbial constant use of the vocal bands in the latter.

As to the mode of formation of the web, and its pathological

anatomy, I need say but very little. It is formed of cicatricial tissue, resulting from syphilitic ulceration. It appears to begin always at the anterior angle ; and the greater or smaller orifice, or breathing space that is left, is usually at the posterior extremity of the rima. In two cases the membrane occluded the whole rima, being in one (Case XI.) attached both anteriorly and posteriorly, with a hole in about the centre; and in the other (Case I.) being unattached posteriorly. In another case (Case III.) the membrane was attached both in front and at the interarytenoid fold, but left the main portion of the edge of the left vocal band free, so that there was along this free edge a narrow breathing chink.

Diagnosis.—I have already stated that the diagnosis of syphilitic membranoid occlusion of the rima glottidis in the living is impossible without the laryngoscope. Clear symptoms of laryngo-stenosis, especially the combination of hoarseness or aphonia with dyspnœa, may point to the existence of obstruction in, or occlusion of, the laryngeal canal, and the history of the case may settle its syphilitic nature; but its precise seat, and that it is membranoid, a laryngoscopical examination alone can determine. Syphilitic non-membranoid occlusion is situated usually above the rima glottidis, and comes from either infiltration and swelling of the ary-epiglottic folds, posterior or lateral walls of the superior laryngeal cavity, or ventricular folds ; deformity of the same parts from cicatrization, destruction and displacement of structure, by which the laryngeal canal is encroached upon; or warts and other excrescences and growths. Non-syphilitic membranoid occlusion of the rima glottidis may be either congenital or traumatic. Of the latter I have seen instances after intended suicidal or accidental wounds of the throat, and after thyrotomy for surgical purposes; of the former I have reported an interesting case to the American Medical Association.* Now, not only can a laryngoscopical examination always decide the question whether a syphilitic occlusion is membranoid or not, but sometimes it can also decide whether a membranoid occlusion is syphilitic or not. There are characteristic ulcers

* See Transactions of the American Medical Association, 1870, p. 217.

which may be seen in various parts of the larynx and neighboring organs, and enable us, especially when other morbid processes, such as tubercles, lupus, etc., can be excluded, to form a diagnosis. In the absence of such factors, symptoms of constitutional syphilis in other portions of the body, especially in the pharynx, nasal passages, and on the skin, the history of the case, and the rapid subsidence of suspicious phenomena by anti-syphilitic treatment, must be taken as auxiliary means of arriving at an opinion. On the point of history I desire to remark, that on the one hand we must be careful not to regard every symptom and ailment of a patient as syphilitic, simply because he admits having had a chancre years ago; and on the other hand, the laryngeal disease may certainly be syphilitic, in spite of the patient's denial of all primary infection, and the absence of scars on the genital organs, as in Case VII.

Prognosis.—My main object in publishing these remarks on syphilitic membranoid occlusion of the rima glottidis is to recommend what I believe to be its proper treatment, and with this carried out, I regard its prognosis as quite favorable. The course of its formation is more or less chronic, and the dyspnœa which it produces, aside from hoarseness or aphonia, comes on usually so slowly that the organs adapt themselves, and so it may exist to a fearful degree before destroying life, as seen, for instance, in Case I. Nevertheless, any occlusion at all extensive always endangers the patient's life, more especially as catarrhal or other swelling up of neighboring parts easily occurs, which, under other circumstances comparatively harmless, may, by reason of its coexistence, become rapidly fatal. With proper treatment the prognosis, not only as to the dyspnœa, but even as to the voice, is better than I could, without the experience gained in some of the preceding and other cases, have conceived possible.

Treatment.—In this, as in all local manifestations of syphilis, the treatment should be both general and local. As to general treatment, hygienic measures must play a capital part, as well as tonics, suppletories, and such medicaments as, acting on the skin, bowels, and kidneys, tend to invigorate and preserve the general health. Of the great anti-syphilitics—mercury and

iodide of potassium—I may say that if the patient has already taken much of the former, the latter should be given in increasing doses, otherwise they may be combined; and in all cases vapor or hot-air baths are useful depuratives. Whenever the patient's condition is suitable for mercurial treatment I would strongly recommend the hypodermic method. But it is not my object to dwell upon the general treatment. Sometimes neither mercury nor iodide of potassium is indicated, but the indication to remove, if possible, the web, always exists. In every case of extreme dyspnœa we must be ready to perform tracheotomy; *this may be needed before we can attempt to remove the web.* In one of my own cases, and in Mackenzie's case, a tracheotomy tube was worn when the patient came under treatment.

Now, how should the web be removed? I answer: By operation; and not by means of thyrotomy, but through the mouth; and not by the knife, but by galvano-cautery.

Let us analyze the preceding cases. Morell Mackenzie split the larynx open from without, to divide the membrane. Whether he removed any portion of it the report does not say. The idea of the two-branched tube was a very ingenious one, although the upward branch produced so much irritation that the whole of it had to be removed. Thyrotomy itself is followed sometimes by an adhesion of, or the formation of a web between, the anterior portions of the vocal bands, as in one case where I performed it for the removal of a growth in which I had subsequently to destroy a cicatricial web by galvano-cautery. At all events, in Dr. Mackenzie's case the anterior portion of the web evidently reformed, and it seems to me that all that was accomplished could have been accomplished by Dr. Mackenzie, by means of the laryngoscope, *per vias naturales.* (In parenthesis, I may observe, *apropos* to the two-branched tube, that in several other cases of laryngeal stenosis, where there was a tracheal opening, I have, after making the larynx patent, derived great benefit from passing large œsophageal and rectal bougies through the mouth and out of the opening, or reversely, and moving it backward and forward, as well as teaching the patient to do this himself a number of times

during the day. I have also used trivalve and tubular laryngeal dilators, both in cases where there was and where there was not a tracheal opening, and have even allowed a tube, open at both ends, to remain for some time.)

Türck operated locally in only one of his three cases: in this one he used the laryngeal knife through the mouth, and although he split the web thoroughly, its anterior portion reunited.

Navratil operated in the same way, and the same thing occurred to him. He adds, in his report, that subsequently he intended to destroy the reunited membrane by galvano-cautery, if the patient would have let him.

My first case came to me at a time when laryngoscopal surgery was in its infancy; and the patient, who certainly was primarily in need of tracheotomy, gave me no chance to do anything for him. In the second case there was not much dyspnœa, and I failed to operate upon the occluding membrane. If the patient would present herself at this time I would certainly propose to remove it.

The third case I attempted to treat by galvano-cautery, but failed for the want of proper apparatus. I succeeded in cutting into the membrane with the knife, but partial reunion took place, particularly in front.

In the next three cases I destroyed the web by galvano-cautery, and was entirely successful in removing it.

The desideratum of a galvanic battery for cautery purposes, entirely satisfactory, is still unsupplied. By far the best that I am acquainted with, for our purposes, is Voltolini's (Middeldorpf's) carbon-zinc battery of two elements. I have had experience with a large number of others, and if it were not for its requiring two acids, viz., nitric and dilute sulphuric, and a good deal of care to keep it in order, I would not desire a more convenient or efficient apparatus. Dr. Sass, of this city, in whose ability and ingenuity I have great confidence, is experimenting with a view of perfecting a new galvano-caustic battery which is to obviate all objections.

The laryngeal galvano-caustic instruments themselves hardly admit of further improvement. I use almost indiscriminately

the dull knife-shaped galvano-cauters of Voltolini, made in Breslau; of Schnitzler, made in Vienna; and of Von Bruns, made in Tübingen. There is one point about their use which is of great importance, and which, so far as I know, has never been published, viz., their becoming hot on account of conduction from the point. As the conducting tubes or rods must be very thin, and the platinum point white hot, the heat rapidly spreads toward the handle. Before I had discovered a way to obviate this, it became so annoying in both laryngeal and pharyngo-nasal operations, that in a number of cases I had to refrain from the further use of galvano-cautery. At first I thought it was due to imperfect insulation, until I found it arose from the spreading heat from the platinum point. By the device of closely surrounding the rods with silk thread, and dipping the instrument into cold water just before introducing it, I entirely overcame the difficulty.

Usually a number of galvano-cauteric applications are needed, repeated from time to time, although in one of the cases reported (Case IV.), they were all made at one visit. As I learned from these and other cases of occlusion, the after-treatment need be but little, although it is well to have the patient go through vocal gymnastic exercises, and inhale astringent and soothing sprays, or to use bougies and dilators, until the danger of re-formation of the web has passed.