

was made to sever it at the isthmus, but bleeding was profuse. Tying the vessels did not seem to make much difference; the forceps were therefore left in the wound for several days. The catheter was withdrawn the day after the operation and the wound allowed to close. He made an uninterrupted recovery and is to-day, June 4, 1901, in perfect health.

He has gained 30 pounds and grown 3 inches. He traced his trouble back but eight months, and the dyspneic symptoms about a week. The gland was very firm and weighed five and one-half ounces. The boy took sick at the beginning of vacation and was ready for school, September 1.

#### LARYNGO-FISSURE FOR PAPILLOMA.

A girl, aged 5, became quite hoarse, which condition was not relieved by treatment; two years later she was sent to me, and, as she allowed very little manipulation, I intubated her forcibly. After a week the tube was removed and some improvement seemed to take place, but soon the dyspnea returned and tracheotomy was performed. For the next two years I tried to have the



R. W., aged 9: 3 weeks after operation.

little girl tolerate the instruments, but she would not learn. Finally I proposed to split the larynx, and this was done, on May 3, 1901. The incision extended from the cricothyroid membrane through the larynx to the hyoid bone, and as the larynx was pulled apart the growth popped out, as it were, and was removed with a snare. There was so much bleeding that nothing more could be done, and the larynx was closed with catgut and the outer wound treated in the same way. Union took place by first intention, and the little patient made an uninterrupted recovery. The tracheal tube was removed in two weeks. The growth was situated subglottic, immediately below the cords, postero-laterally, by a broad pedicle which can be plainly seen. Any recurrence will be reported to the section.

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#### DISCUSSION.

DR. J. HOLINGER, Chicago—I would like to ask what the Doctor expects as to the possibilities of myxedema, according to the sense of Cobin, who has done several extirpations and uniformly found a condition develop which was extremely deplorable for the patient as well as for the surgeon.

DR. CORR, in closing—The first symptom in this case was noticed about eight months before the operation. I will say that Dr. Kocher is the best authority on the subject, since he

has done over a thousand extirpations and his son has done, so far, four hundred. In this case I left a little piece of the gland in the neck, perhaps a half or three-quarters of an inch, because of the bleeding. In order to control the hemorrhage I had to leave the forceps on for several days. It is supposed that when a portion is left, even if that portion be transplanted, as for example into the abdominal cavity or anywhere else, myxedema does not develop; hence, I do not expect it to develop in this case. If, however, that should occur, I shall report to the Section.

#### TYPES OF MEMBRANOUS PHARYNGITIS.\*

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Under the irritating action of any one of several species of infectious micro-organisms, there exudes upon the surface and into the substance of the pharyngeal mucosa a whitish-gray deposit known as a false membrane or exudate. The histologic changes consist of necrosis of the epithelium and alteration in the vessel walls with the exudation of a coagulable albuminoid substance derived from the blood serum and mixed with fibrin, desquamated epithelium and leucocytes. While the membranes differ somewhat in physical characters and composition in accordance with the intensity of the inflammation and the species of infecting germ, the distinctions are so slight as to be unreliable in diagnosis, except in connection with bacteriologic examination, supported by a close study of the symptom-complex. A familiar form of diffused exudate in the pharynx is that excited by the Klebs-Loeffler bacillus, which receives the distinctive title of true diphtheria. Most of the other diffused pharyngeal exudates have been grouped under the name simply of membranous pharyngitis, but recently there has been an attempt to classify the types of membranous pharyngitis in accordance with the kind of infecting organism, and to affix to each its characteristic chain of symptoms and physical appearances. This classification is far from complete, and good examples with bacteriologic confirmation and close clinical study are still needful. There are forms of membranous pharyngitis which commence apparently as follicular tonsillitis, in which the exudate, failing to remain punctated and limited to the lymphoid structures, spreads over the pillars to the uvula and posterior pharyngeal wall. The closest scrutiny should be given these cases in order to exclude diphtheria, but this done it is sometimes found that the only organisms discoverable are those which predominate in tonsillitis, the various staphylococci and streptococci. The systemic symptoms vary much in these cases, and the limited number of cases yet followed seems to indicate that the dominating organism is the main factor in influencing the course of the disease. Thus we speak of staphylococcus pharyngitis, streptococcus pharyngitis, pneumococcus pharyngitis, etc., although in none of these as yet has the micro-organism been made to conform to all of Koch's postulates determining the specific relation of a germ to disease. The following case will serve to exemplify what is now known as staphylococcus pharyngitis, while presenting points of unusual interest with respect to repetition of attacks, the extensive distribution and brief duration of the false membrane and the slight constitutional effect.

\* Read in the Section on Laryngology and Otology, at the Fifty-second Annual Meeting of the American Medical Association, held at St. Paul, Minn., June 4-7, 1901.

CASE 1.—Mr. S., an intelligent man of affairs, robust, and of middle age, gave a history of having previously had three attacks identical with the two about to be related, making five altogether. The first passed for diphtheria, but without a bacteriologic examination. The second occurred in Boston where a careful culture-test excluded diphtheria. The third occurred while yachting and without medical attention. The fourth attack, and first under the author's observation, commenced like an acute follicular tonsillitis when first seen, on the morning of Nov. 23, 1898. The temperature rose during that day to 103 F., but in the following twenty-four hours, while the membrane extended, forming an uninterrupted plaque over both tonsils and spreading over the pillars and velum, the temperature fell to 100 F., and the patient felt generally fairly well. By evening of the next day, November 24, the false membrane had extended over the posterior pharyngeal wall and both surfaces of the velum palati and had gained much in thickness. It so resembled diphtheria that antitoxin was given without waiting for the culture. The same evening, and the following day, cultures were repeatedly examined independently by the Chicago Health Department and myself, but exhibited mainly staphylococci, with positively no diphtheria bacilli. The membrane began to shred off on the third day, which was so like the effect of antitoxin on diphtheria that a culture was submitted for further examination and animal injection, to Dr. R. H. Harvey, pathologist to Mercy Hospital, who made the following report: The growth on Loeffler's serum shows mixed infection, mainly staphylococci. No Klebs-Loeffler bacilli were found. As a control test the culture was removed on a platinum loop and inserted beneath the skin of a guinea-pig, under aseptic precautions, with absolutely no effect on the animal. On the fourth day the patient was without fever and able to go to business, feeling quite well, although the membrane did not wholly disappear until the seventh day.

As the infection in this case evidently originated in the tonsils, and these were moderately hypertrophied, I subsequently made a thorough fragmental excision, with a view to preventing further recurrence. Nevertheless, 1½ years later he suffered a fifth attack. It commenced in the merest remnant of tonsil tissue, deep between the faucial pillars, and a profuse thick whitish exudate rapidly extended over the pharynx, as before. The local discomfort was but moderate, more than usual in diphtheria, less than in streptococcus pharyngitis. There was considerable fever the first day, but none thereafter, and no systemic depression, the patient going to business and coming to the office daily. The Columbus Medical Laboratory reported upon the culture as follows: "April 23, 1899, specimen from Mr. S.—diphtheria bacilli absent; pus cocci and saprophytic bacilli present. [Signed] Adolf Gehrmann." Of the pus cocci, in my own examination staphylococci very largely predominated. The patient received no antitoxin during this attack, neither did the false membrane seem to loosen and commence to shred off so promptly. Otherwise the duration and course of the disease was the same as for the previous seizure. It remains to be determined whether diphtheria antitoxin does not have some favorable influence in arresting and loosening membranous exudates other than those caused by the diphtheria bacillus, as appeared to be the case in this patient's fourth seizure. Its alleviation of the

crustation and fetor of atrophic rhinitis indicates that its action is not absolutely confined to diphtheria.

It is impossible to assert that the staphylococci which so largely predominated in this case, was the real infecting agent. Efforts to reproduce membrane from it in animals have failed. It is possible that some other still hidden organism may be the real cause. Staphylococci are commonly present in the mouth and crypts of the tonsils. They seem to become actively pathogenic only under certain conditions; also, as in this case, a culture usually reveals more than one germ, mixed infections cause varying manifestations and interfere with a rigid classification; nevertheless, where one organism so largely predominates, together with an absence of the specific diphtheria microbe, especially when it is found that the principal germ species excites, respectively, characteristic symptoms, it justifies the recognition of types named from the dominating organism.

The characteristics of staphylococcus pharyngitis as exemplified by this case have also been formulated by Bullock,<sup>1</sup> cited by Wolfenden and by Jaques.<sup>2</sup> The temperature rises suddenly, 102 to 104 F., and falls rapidly on the second or third day, even while the membrane continues to extend. The constitutional effects are slight and the duration brief, recovery occurring in from six to eight days. The pain in the throat is but moderate. The membrane commences in the tonsils and thence extends. It may be profuse, thick, soft, whitish, not necrotic, and loosens or dissolves quickly. Membrane is little disposed to form in the larynx, although spasmodic laryngitis may be excited.

The condition is quite different where streptococci predominate, as exemplified by the following case:

CASE 2.—Mr. D. J. E., aged 40 years, had distinct malaise and soreness of the throat for two days, succeeded by a chill and a temperature of 104 F. His pulse was 100, skin perspiring, face flushed, and there was mental hebetude and enlargement of the cervical lymphatic glands. The tonsils were only slightly enlarged, but were deeply congested, and exhibited at first a punctated exudate which soon formed a plaque and extended in the form of a thin milk-like film over the anterior pillars and part of the velum. The rest of the throat was highly inflamed and very red and sensitive. Convalescence was not complete for about twelve days. No diphtheria bacilli, but numerous streptococci associated with staphylococci were found.

Thus the average characteristics of streptococcus membranous pharyngitis are a more gradual rise and decline of the temperature, likewise reaching 102 to 104 F. The systemic depression is pronounced and the duration ten or twelve days. The membrane is apt to be thin and scanty, of slower formation and longer duration. The throat elsewhere is highly inflamed, very red, and perhaps edematous. It may border upon or be identical with erysipelatous pharyngitis or pass into a phlegmonous pharyngitis. The throat is very painful and the cervical glands swollen. There is a decided tendency to involvement of both the nasopharynx and larynx. In the larynx edema and swelling, as well as membrane, are causes of stenoses, and uninfluenced by antitoxin, while intubation must be maintained for two or three weeks.

In scarlet fever the pseudomembranous type of pharyngitis may evolve from the primary inflammation during the first few days, or it may not appear till about the second or third week, as if it were a secondary infection by the diphtheria bacillus as, indeed, it often

is. Heretofore the primary inflammation has been ascribed to a streptococcus infection, but recently Class<sup>3</sup> demonstrated what seems to be the specific organism of scarlet fever, a large diplococcus, which is present in the blood, scales and throat. Other organisms, especially streptococci are present and doubtless exert an influence. Diphtheria bacilli are present in from 10 to 50 per cent. of scarlatinous exudates.

Pneumococcus membranous pharyngitis, due to Fränkel's organism, almost to the exclusion of other germs, has been demonstrated,<sup>4</sup> but as yet I have been unable to verify, by precise bacteriologic methods, cases in which, from the association of pneumonia, I have suspected this condition. The pharyngitis is said to be ushered in with rigors, high fever and pronounced exhaustion. The false membrane is white, fibrous and resistant and ceases to form at the end of a week.

Emil Mayer<sup>5</sup> has recently reported a case of chronic recrudescing membranous pharyngitis, determined by elaborate bacteriologic methods to be due to the bacillus of Friedlander. The enamel-white membrane would recur at intervals of a few days, always cover the soft palate and sometimes the entire pharynx, remain one or two days and then exfoliate. Five other cases, some of them acute, are reported in the "Annals of the Pasteur Institute."<sup>6</sup>

A membrano-ulcerative angina in children, in which ulceration always follows membrane formation, is described from Paris, by Athenasin,<sup>7</sup> as due to the conjoined presence of the fusiform bacillus and the spirillum of Vincent.

Also, thrush, aphtha or soor, due to the oidium albicans, while usually discrete and affecting the mouth, occasionally becomes confluent and involves the pharynx, when it constitutes a type of membranous pharyngitis. It affects mostly children and adolescents, but likewise adults who are debilitated from other causes. I have observed it in advanced tuberculosis, when it is apt to hasten a fatal termination.

Pharyngitis leptothricia, while usually chronic and confined to the tonsils and lymphoid tissues, may involve the pharyngeal mucosa and even occur in an acute form, as in one case which simulated diphtheria.<sup>8</sup>

Still other conditions which should be kept in mind in making diagnoses are the mucous patches of secondary syphilis, herpes and pemphigus, all of which, while commonly discrete, do exceptionally occur in the pharynx in diffused confluent form, closely simulating membranous pharyngitis.

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#### DISCUSSION.

DR. EMIL MAYER, New York City—The Doctor has, in his usual way, presented the subject so thoroughly that there is but little to add. I would only emphasize the need of further examination beyond the mere throwing in of light and visual examination. In the case that the Doctor mentioned of membranous pharyngitis that was under my care, the method of bacteriologic examination was carefully described in detail, because nothing of the kind had been done before. In every one of these cases coming to us, in which there is the slightest

question, the most thorough examination should be made. The disease remains for a long time; just as in the skin, so it is in the mucous membrane of the pharynx. But in the case cited there was simply a marvelous amount of exfoliation. In a few days' time there was a white coating covering the whole of the soft palate, which in a few days would disappear again.

DR. B. R. SHURLY, Detroit—Most interesting would be the prognosis, which we would immediately figure upon, if we knew the bacteriological identity of the various forms. Our treatment must be modified by the special form of germ with which we have to deal. Also, the relative tendency of these different bacteriological forms to invade the adjoining mucous membranes would be a most important problem. The natural tendency of about 15 per cent. of the Klebs-Loeffler exudates to invade the larynx is very familiar to us, and it would seem to me that the exudates arising from these other modified forms of membranous involvement would carry with them a much less number of laryngeal involvements.

DR. EMIL AMBERG, Detroit—In connection with this subject I should like to call attention to a statement made by a Detroit physician, before a medical society. About a year ago he had a case of scarlet fever in a family with several children. He used antitoxin with other members of the same family, as a preventive measure, and he thought the antitoxin prevented the further spread of scarlet fever. A similar statement was made by a French physician, if I am correct. I would ask Dr. Casselberry in closing to enter upon this most important point. Naturally as mere hypothesis I may suggest that we, perhaps, may get a better knowledge of the pathology of these conditions *exjuvantibus*. It is not impossible that we may have in future, instead of the differentiation which is going on nowadays, perhaps a unification.

DR. J. HOLINGER, Chicago—One of the main features is the fact that we can not depend upon the looks or the extent or any other characteristic of the membranes in the differential diagnosis between the true diphtheric membrane and the streptococci or staphylococci or any other form of membrane. You know the diagnostic point was given that the diphtheric membrane is usually more compact and in patches and pretty early transgresses the limits of the tonsils. On the other hand the other membranes, the streptococci membranes, are much more limited to the tonsils and not quite as voluminous. Such a differentiation is absolutely impossible. A case came under my observation only a short while ago. A friend of mine, a physician in Chicago, complained just a little of sore throat, hardly any of malaise, and in a largely joking way he asked us to look into his throat. There was scarcely anything to see, but I advised him to have a bacteriological examination made. He went to the health office and came back with a diagnosis of diphtheria. The Klebs-Loeffler membranes have been observed to disappear in a short time, so that the diagnosis must depend upon the microscopic examination.

DR. CASSELBERRY, in closing—I would emphasize what Dr. Mayer has said in reference to the thoroughness of bacteriological examinations in all these cases, and especially in those in which the diphtheria bacillus is suspected. Now, while I have reported these cases, one as a streptococcus pharyngitis and the other as a staphylococcus pharyngitis, it is questionable whether those micro-organisms are the fundamental causes of the conditions. They may multiply without being the actual infecting organism. But no other organism having been found, these are assumed to be the cause of the disease. In regard to herpes, you will remember that it was mentioned in the paper as one of the conditions that must be distinguished. Under certain conditions, it might be very difficult to differentiate herpes from other types of membranous pharyngitis where there was no herpes elsewhere on the skin surface to suggest herpes of the throat. I am satisfied from experience that the streptococcus inflammation does often extend to the larynx; perhaps not as often as the membranous exudate of true diphtheria, but with some frequency, and these cases are little influenced by antitoxin. Edema is a prominent feature in them. The suggestion regarding the possibility of antitoxin exerting a favorable influence on other types of pharyngitis, not diphtheric, I simply throw out as a possibility. We know that the

use of normal salt solution and several other substances injected into the circulation stimulates the organism. It is possible in certain forms of pharyngitis other than diphtheria, that antitoxin may have a beneficial effect.

## THE RELATION OF THE MIDDLE TURBINATE BODY TO CHRONIC NASAL DISEASES.\*

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Chronic nasal catarrh is so prevalent on this side of the Atlantic as to have received the epithet of "the American disease," and the failure of medical men to find means for the cure or amelioration of the disorder has become an opprobrium to the profession and a prominent feature in the bids of the charlatans for patronage. We can not ignore the influence of climate and habits of living among us as the exciting causes, but there are long periods of the year in which these are not especially active in keeping alive the trouble, so we must seek elsewhere for the causes which operate to prevent the natural tendency to spontaneous recovery which exists in the presence of acute nasal disorders.

The easy accessibility of the inferior turbinate body, and its proneness to participate in all nasal irritations and respond by swelling and producing nasal obstruction, has made it the scapegoat for the rest of the offending organ, and it has been seared and cut, pinched and stabbed without mercy until, if it had had a tongue, its prayer for relief would have ascended to the skies.

Acute observers long since recognized that chronic nasal disorders existed which were out of the sphere of influence of the inferior turbinate, but the weight of authority favored nasal stenosis as the chief cause of nasal disease, and the possibility of other factors being more active than this one was overlooked. My purpose in the present paper is to call attention to the much greater influence which the middle turbinate has upon the course and progress of nasal disorders, in the hope that it may assist the work of others along the same line, and sooner usher in the day when we may promise our patient with chronic nasal troubles a cure which will stay a cure.

In this, as in other diseases a knowledge of the anatomy of the organ involved must first be had before we are in position to know what are pathologic changes; hence, I will hastily review the anatomy of the middle turbinate.

The middle turbinated body is so located as to be in the most intimate and important relations with the meatuses and accessory sinuses of the nose, the olfactory nerve and the most sensitive portions of the septum.

In its normal state this body protrudes from the side wall of the nasal chamber and is bent sharply downward, lying parallel to the septum and midway between it and the lateral wall. It occupies most of the space between this wall and the septum from its point of attachment down close to the superior surface of the lower turbinate.

In the living subject the space between the turbinate and the septum or turbinate and side wall varies between one-twentieth and three-sixteenths of an inch, but this space may be obliterated by swelling of the membrane or hypertrophy of the bone.

The turbinate covers the outlets of the maxillary antrum; the hiatus semilunaris in which are the ori-

ces of the anterior ethmoid cells and of the frontal sinus; while its rear portion is in close relation with the sphenoidal foramen, all of which openings are the outlets for considerable sized cavities liable to inflammation consecutive to disease of the nasal membranes.

The soft tissues of the middle are much less erectile than those of the inferior turbinate and when thickened are less amenable to shrinkage by medicinal means, as cocaine, suprarenal extract, etc.

The shape and size of the middle turbinate varies considerably within what may be termed physiologic limits. For instance, it may be thin and knife-like from front to rear, with uniform thickness and equal spacing from the lateral walls. Again, its attachment varies greatly, sometimes being low down and again very high; the horizontal portion may be wide or scarcely demonstrable; the anterior and the middle or the posterior part may be either wider or thicker than the balance of the bone. According to these variations does the anatomical relation to the surrounding tissues vary, but so long as there is no pathologic change or inflammation present these variations do not signify.

The bone is very thin, being filled with pneumatic cells with fragile lamellar walls. From various causes, developmental or nutritional, these cells are prone to enlargement, altering the structure, shape and relations of the bone to surrounding parts.

The soft tissues overlying the middle turbinate bone become edematous when inflamed or irritated by discharges from neighboring cavities, and by their swelling close off the upper meatuses and the outlets of the various sinuses. The sinuses are slow to become involved in inflammations of the nasal cavities, and are also slow to recover from them. They are occluded by the swollen turbinate, which in turn is irritated by their discharges, and the condition is thus self-perpetuated.

With the obstruction of the meatuses acute inflammations soon pass over into chronic, and a creamy pus exudes continually, which running over the mucous membrane, produces granulation tissue just as a similar discharge elsewhere, and the abundant serum supply, aided by gravitation often makes them hypertrophy to an enormous degree.

The mucous membrane of the middle turbinate, having to stand the brunt of the irritation, is the first and very often the sole seat of polypoid growth. Every one who removes polypi with the snare, under good illumination, will have seen, on removal of those lying toward the maxillary antrum, a gush of pus as if the stopper of a bottle had been removed. This issues from some of the sinuses and, however frequently and thoroughly you may remove the polypus, you will not usually cure the discharge except you remove the turbinate, owing to the swelling of the membranes retaining the discharge until new polypi form. The most careful extirpation with snare, curette, caustic or cautery will not cure them until the turbinate is removed either in whole or part.

Very often polypi are concealed above and behind, and can not be seen or reached by the probe, and yet are found on removal of the turbinate, it would be impossible to cure such a case and leave the turbinate *in situ*. It is a common practice to cauterize the base from which polypi have sprung, with a view to checking their formation, but my experience is that this procedure fails more often than it succeeds, while it is a fruitful source of adhesions which are very obstinate to removal. In some of these cases the number of polypi concealed by the turbinate is astounding, equaling or exceeding those that were visible before it was taken out.

\* Read in the Section on Laryngology and Otology, at the Fifty-second Annual Meeting of the American Medical Association, held at St. Paul, Minn., June 4-7, 1901.