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# TRANSACTIONS

OF THE

SEVENTH ANNUAL MEETING

OF THE

## AMERICAN LARYNGOLOGICAL ASSOCIATION

HELD IN THE CITY OF DETROIT

JUNE 24, 25, AND 26

1885



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(TO FILL VACANCY ONE YEAR)

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TRANSACTIONS,  
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*First Day—Morning Session.*

THE Seventh Annual Congress of the American Laryngological Association was formally opened, at ten o'clock on the morning of June 24th, by the President of the Association, E. L. Shurly, M. D., of Detroit, who occupied the chair.

The Secretary proceeded to call the roll, the following Fellows being present during the meeting:

HARRISON ALLEN, M. D., Philadelphia.  
MORRIS J. ASCH, M. D., New York.  
J. SOLIS-COHEN, M. D., Philadelphia.  
WILLIAM H. DALY, M. D., Pittsburgh.  
T. A. DE BLOIS, M. D., Boston.  
D. B. DELAVAN, M. D., New York.  
W. C. GLASGOW, M. D., St. Louis.  
F. H. HOOPER, M. D., Boston.  
E. F. INGALS, M. D., Chicago.  
H. A. JOHNSON, M. D., Chicago.  
J. N. MACKENZIE, M. D., Baltimore.  
D. N. RANKIN, M. D., Allegheny.  
C. C. RICE, M. D., New York.  
J. W. ROBERTSON, M. D., Detroit.  
J. O. ROE, M. D., Rochester.  
C. SEILER, M. D., Philadelphia.  
E. L. SHURLY, M. D., Detroit.

An Address of Welcome was delivered by David Inglis, M. D., President of the Detroit Medical and Library Association, who referred to the high standing among the medical profession in general of the Laryngological Association, and eulogized the valuable character of the work which, since its organization, it had accomplished. He then gave expression to the appreciation, by the medical profession of Detroit, of the dual honor which the Association had conferred upon them in choosing as its President one of their number, and in selecting their city as the place of the annual meeting. In conclusion, Dr. Inglis said that not only the physicians of Detroit, but the citizens in general would unite in an earnest, honest welcome to the Association, and with a thorough confidence in the beauties and resources of the city to render the visit entirely pleasant and satisfactory.

Dr. Shurly followed Dr. Inglis, thanking him in behalf of the Association for the kindly reception given, after which he proceeded to deliver the Annual Address.

#### PRESIDENT'S ADDRESS.

*Gentlemen :*

Another year has rolled around and brought us together for the dual purpose of comparing our professional experience and exchanging expressions of good-fellowship. I have only to allude to the past six years' history of this organization in order to call to mind the many useful ends accomplished, and to point with pride to the fact that, as one of the stars in the galaxy of the science of medicine, laryngology has not been wanting in luster. It has been thought by some that, in tilling so closely one corner of this vast field of medical science, the crop garnered might seem inadequate to the labor expended, and hence the idea has been urged upon many of us that the scope and object of our work ought to be enlarged so as to include, for instance, otology, etc. This at first might seem to be the case, and indeed may prove to be the case in the future, since our indefatigable workers have attained such signal results. But while Nature yet keeps hidden so many facts regarding her mysterious processes even in this department, laryngology, there can be no fear that the ground will be so over-cultivated that we shall have for our pains nothing but sickly aphorisms or tall sterile theories.

I think the great success of this organization consists in the unity of action and aim which has imbued every individual member for the advancement of this particular branch of our art. Indeed, noth-

ing so thoroughly enlarges the mind and suggests to us the error of our ways as the sharp but friendly conflict with one another in an assemblage of this sort; but, while we may therefore justly feel proud of our organization with all its defects as heretofore maintained, perhaps it will not be out of place for us for a moment to look at ourselves as some others see us. It is well known to many of you that quite a number of the profession look upon specialists' organizations as aristocratic combinations. Of course the larger body of the educated profession, who have kept up with the times and who have seen the advance of medical science during the last twenty years through the instrumentality of so-called specialists, and who are therefore well acquainted with the work accomplished by such special organizations, take no share in any such conclusions. But there are those who do thus honestly censure us under the belief that no more can be accomplished in this wise than by the same amount of organized work in connection with the general professional body. It must be understood that I omit from consideration the criticisms of all those professional brethren who are comparatively ignorant, who are incased in the porcupine-shell of petty jealousy, or who are victims of that disgusting mental deformity, self-conceit; for the aggregate life-work of such comprises only a muddy patch on the posterior extremity of the professional body. But, in answer to those criticisms emanating from honest and respected members of our profession, I think I may say for all that such organizations may in one sense be regarded as aristocracies when based wholly, as in this case, upon a desire for intellectual improvement and mental achievements; for justly mental culture should be the test and essence of aristocracy in every sphere or walk of life. The object, then, of this organization being the achievement in a particular direction of mental superiority, and the acquisition of knowledge, we can plead guilty to the charge, I suppose, without a blush. The charge of mercenary aims can be discharged without argument, as the standard and character of our membership at once furnish a full refutation.

It has been urged with some feeling by many that this organization ought not to exist, but that its members ought to turn their attention and energies toward the building up of the section of ophthalmology, otology, and laryngology of the American Medical Association. Those of us who have from year to year attended the American Medical Association will at once see the impossibility of rendering as good service for the advancement of this particular branch in the American Medical Association as by maintaining a

separate organization composed of persons who are especially studying and practicing in this department. However, so far as our own personal advancement is concerned, we probably might reap greater benefits from papers read before a general medical body. To dispel an illusion, let me say that in no way can this organization be considered as at all in opposition to the American Medical Association, to which organization we are all allied, but it is a well-known fact that the highest order of thought will be generated upon a subject by the best-adapted stimulus; and when we get together in this organization of identical interests, the drift of thought and the character of the papers and discussions must necessarily be of a much closer and accurate nature than in an assemblage of only partially interested critics. It would therefore seem to me that this criticism, so frequently urged, is ill taken and comes mainly from a misunderstanding by those practitioners of the objects and standard which we essay to establish. I believe the standard of our organization can not be *too high* or the selections of members too carefully made, for it matters not if there are but twenty-five or thirty workers in the hive if these are men of ability, industry, and observation, bent upon bringing out all the facts connected with the subjects comprised in this department of science. It is indeed generally granted that no one is exactly competent for the study and practice of any specialty who has not been a thoroughgoing practitioner, because the several anatomical structures of the human body are both physiologically and pathologically so intimately connected that it is nonsense for a man to suppose that he can attain any material headway in practice without being fully acquainted with all the general workings of the human economy. Therefore, *all* members must be general practitioners.

My sense of propriety, gentlemen, will not allow me to omit calling your attention to the association's jewel—our secretary. I can truly indorse the remarks of my predecessor on the subject, and add with pleasure that the even and successful working of this organization is particularly due to his efficiency.

While we have very much for congratulation in the harmonious working of our organization, it is my painful duty to call your attention, before closing, to one or two of our adversities. Since we last met, death has broken our phalanx by taking away two of our members. One of those deaths, that of Dr. Louis Elsberg, one of the founders of the American Laryngological Association and the patriarch of laryngological science in America, constitutes a loss

which may, without exaggeration, be said to be irreparable. Many of you perhaps knew Dr. Elsberg better than I did, but, from my own knowledge of him, I feel that I can hardly be too extravagant in any eulogium which I might be able to offer. He was well known as one of the erudite members of the American medical profession. Although of genial, yet enthusiastic, temperament, he was sharp and incisive in debate, with an insight so critical as to be able to detect the slightest inconsistency or defect in the statements or work of a colleague, and a mind powerful and courageous enough to broaden such defects into chapters of instruction. With a disposition so bland that he could hurl the arrows of censure at any one of us without exciting the slightest tinge of resentment or animosity, he was indeed a great man. These qualities made him, I may say, our most valuable member, while his fund of knowledge constituted one of our most valuable storehouses; and that he should be stricken down in the very zenith of his career, and at the very time when his usefulness was so potent in our organization, is indeed a calamity. I trust that his example may awaken in us the development of such mental attributes that we may each, before "shuffling off this mortal coil," accomplish also something more than a mere sustenance of the body—the animal paradise.

The other gentleman, Dr. Chamberlain, was one of our newer members. I regret to say that my personal acquaintance with him was very short, but he promised to be a very active co-worker, while his spotless professional and social character was such as to make us feel that his demise is a very great loss to us. He had been for some years especially active in laryngology, and, although not a prolific writer, and for that reason not so generally known as some others, his sound judgment, philosophy, and earnest work had earned for him the very highest esteem of all professional brethren who knew him. In conclusion, gentlemen, allow me to reiterate my deep sense of thankfulness for the honor which you conferred on me a year ago by electing me your presiding officer, and also to state that this mark of your esteem will be gratefully remembered not only by myself, but also by the profession of the State to which I have the honor to belong. And let me indulge the hope that at no distant day we may again have the privilege of welcoming you to our great West. In accordance with the usual custom, I will now proceed to read a short paper on the "Use of Galvanism in Chronic Diseases of the Pharynx."



ON THE USE OF GALVANISM IN CHRONIC DISEASES OF THE  
PHARYNX.

BY E. L. SHURLY, M. D.

YOU will doubtless remember that at the Congress of 1880 I presented a short paper calling attention to the use of galvanism in the treatment of pharyngitis sicca. At that time I had had but a limited experience with this agent in such conditions, but since then I have used galvanism in a number of cases with, I think, such good results as to justify me in again calling your attention to the subject. The difficulties which I then narrated as attending the use of electrodes in the pharynx can be much reduced through the use of cocaine, and therefore this treatment is practicable for almost any person. I believe it is very generally confessed that our knowledge of the pathology and pathogenesis of the chronic affections of the pharyngeal mucous membrane is far from exact or complete.

Certain well-recognized features or symptoms, such as habitual engorgement, hypersecretion, glandular enlargement with or without paucity or perversion of secretion, constituting the local manifestations of many cases which present themselves to us, and which, I am sorry to say, puzzle us in the selection of the proper means for amelioration. That some of these conditions of the pharynx, chronic engorgement, hypersecretion, etc., are often only local expressions of a derangement of the stomach, the intestinal canal, or possibly some more remote organ, is well known and does not surprise us, since the anatomical and physiological connection or relationship between these organs and the pharynx is probably intimate. We also meet with neuroses of the pharynx, hyperæsthesia, spasm, paræsthesia, etc., which are dependent upon derangement either of these same organs or the genito-urinary or mental apparatus, all of which require little or no local treatment. But, besides this class of cases, there are certain organic lesions of the pharyngeal mucous membrane which can not be traced to any particular disorder of the neighboring or remote organs or glands, which are characterized by changes such as glandular hypertrophy, general hyperplasia, hypersecretion with or without extraordinary epithelial development, atrophy with diminished secretion, etc. It is to these that I wish particularly to call your attention.

They constitute changes which may be regarded as trophic, and which, however inexplicable, must be regarded as distinct local disor-

ders. In my mind there has long been a conviction that glandular hypertrophy and atrophy with or without persistent extra secretion and without much organic change in the membrane are due to a perversion of function of the nervous apparatus distributed to the pharyngeal region. It does seem impossible that the mere mechanical effect of infiltration or interstitial deposit can account altogether for the wasting of the membrane. Likewise does it seem impossible that the disagreeable symptoms of typical pharyngeal disease, even when associated with thickening or wasting of the glandulæ, etc., can be fairly attributed to ordinary inflammation and its consequences, because we often find people with throats presenting such appearances, even to a considerable degree, who do not complain of inconvenience nor show disturbance of the nutrition of the part. Therefore it would seem probable that some of these conditions must be at least regarded as distinct local disease having for its origin some nutritive abnormality antecedent to the inflammatory changes; and may we not find a possible explanation in the supposition of metabolic derangement through a disordered trophic function of the hypoglossal, pneumogastric, or sympathetic nerves?

Considering the analogy between the functions of the hypoglossal and the fifth, and the facts already demonstrated regarding the trophic influence of the latter nerve, this hypothesis would seem to gain support. However, the light of further investigation may show that, instead of the hypoglossal, either the pneumogastric or sympathetic, or both, may be the reigning influence in the nutritive changes of the pharyngeal mucous membrane; but, whichever may be the case, the result is the same. Acting upon the foregoing theory, I have been led into the employment of different agents for local use, with a view of counteracting this perverted trophic influence; but, of all the agents used, I think I have obtained more lasting effects from galvanism. Many of the local stimulant applications, while certainly valuable, are soon followed by a reaction which shows the excitement to have been only of short duration and in no wise of vital character. But with the galvanic current I think I have found much more enduring effects; for example, the mucous membrane remains in many cases of a vivid color and bathed in a quite fluid secretion for a number of hours after the application, and, moreover, leaves a sensation of heat and pliability, in cases of atrophy, which the patients describe as slightly exhilarating. The effect of the application is sometimes felt in adjacent parts—such as the cervical region. One of my patients states that the sensation of heat

always remains in his throat for about forty-eight hours. After a few applications the sense of dryness and the collection of desiccated secretion in and about the naso-pharynx, which occur in the severer forms of chronic naso-pharyngeal disease, very sensibly lessen. In cases of engorgement accompanied by hypersecretion the result of this treatment has been quite efficient. Also in distinctly neurotic conditions, such as paræsthesia, I have had good effects from galvanism.

I usually pursue the following method, viz.: First wash off the surface of the membrane, by means of a spray or posterior douche, with a solution of common salt or other appropriate fluid; then apply a four-per-cent. solution of cocaine hydrochlorate, and, after an interval of about five minutes, apply the electrodes (which I here show you), one through the nasal passage and the other to the posterior and lateral wall of the pharynx, moving them both rapidly but gently over the surface, being careful to keep them closely applied. I generally connect the electrodes with two cells (increasing to four or five) of a battery composed of the improved Leclanché cells. The electrodes are not covered, but naked, unless it is desired, as in cases purely nervous, to apply one electrode to the side of the neck, when that is covered. Gagging and muscular movements require the removal of the instruments, after a few seconds, for a short period of repose, when they are reapplied perhaps four or five times, according to the tolerance of the patient and the sensible effect produced. The *séance* may be repeated two or three times a week, as may seem advisable. I have experienced the greatest difficulty from the intolerance of the parts in question to the manipulation, but, as before mentioned, the use of cocaine has afforded, in the majority of cases, the desired tolerance. However, as might be expected, the drug to a certain extent antagonizes the effect of the galvanic application, and must be compensated for either by a longer or more frequent manipulation. In some cases one thorough treatment a week will prove sufficient.

Of course, it is not expected that this, any more than any other, plan of treatment will restore already destroyed tissue, but that it is competent to arrest those metamorphoses which finally result in either the loss of glandular as well as other elements of the membrane, or the substitution of adventitious for the normal tissues, I firmly believe, in view of my experience with it. The period of time required for reaching permanent results will vary, of course, according to the kind of case and the state of chronicity presented. The only thera-



peutic theory which I have to offer is a very commonplace one, viz. the restoration of the nutrition and normal secretion of the parts through the direct application of the electric fluid to the terminal nerve-filaments.

*Paper.*

THE RESPIRATORY FUNCTION OF THE HUMAN LARYNX. FROM  
EXPERIMENTAL STUDIES IN THE PHYSIOLOGICAL LABORATORY  
OF HARVARD UNIVERSITY.

By FRANKLIN H. HOOPER, M. D.

THE human larynx has two principal functions: (a) The respiratory, (b) the phonatory. They are mentioned in the order of their importance, for, while the muscles concerned in phonation, supplemented by other constrictors, are charged with the additional duty of closing the laryngeal aperture to protect the air-passages from the entrance of foreign bodies, yet it must be conceded that, whether employed in phonation—marvelous as this function is—or brought into action to exclude some foreign substance, the part performed by these constrictors is entirely subordinate to that of the respiratory muscle of the larynx, whose office is to hold the glottis open in order to insure an uninterrupted passage of air to and from the lungs.\* Nevertheless, it is this important muscle which is not only the chief among the intrinsic muscles of the larynx, but also one of the most essential of the whole body—a muscle, be it remembered, of *organic life* †—that many writers would have us believe has a special tendency to succumb to disease. Gerhardt, in his well-known paper,‡ was perhaps the first to speak of unilateral pa-

\* The intrinsic laryngeal muscles are in pairs except one, the transverse arytenoid. The posterior crico-arytenoids are the respiratory muscles. The phonatory muscles, which, like the respiratory muscles, are attached to the arytenoid cartilages, are the internal thyro-arytenoids, the lateral crico-arytenoids, and the transverse arytenoid. These phonatory muscles are, when it is necessary, brought into action solely to close the glottis and not for the purpose of phonation. Under these circumstances they are supplemented by the muscles which compose the aryteno-epiglottidean folds, and which, together with certain other muscular fasciculi, may be classed as the sphincter group—the constrictor vestibuli laryngis. The thyro-cricoids are also phonatory muscles; but with these, on account of their anatomical situation, we have nothing to do in this paper.

† By this expression we refer to the normal automatic character of the muscular action, and not to the microscopic structure of the muscle itself.

‡ "Studien u. Beobachtungen über Kehlkopflähmung," Virchow's "Archiv," vol. xxvii, p. 88, 1863.

ralysis of this muscle (the posterior crico-arytenoid) as the most innocent of all forms of laryngeal paralyses. He points out that neither the voice nor the respiration is impaired in such lesions. Schech\* writes in the same strain, and believes that, as the voice and quiet respiration are not affected in these instances, this circumstance accounts for their having escaped more frequent mention. Two prominent exponents of this theory (Rosenbach† and Semon‡) have stated that in central or peripheral affections where the filaments of the recurrent laryngeal nerve are compressed, the fibers innervating the respiratory muscle are earlier affected than those going to the phonatory muscles; that this is in accordance with the well-ascertained fact that, in central or peripheral nerve lesions, the extensor muscles# are more readily paralyzed than the flexors; that there is a "proclivity of the *abductor* fibers of the recurrent laryngeal nerve to become affected sooner than the *adductor* fibers, or even exclusively, in cases of undoubted central or peripheral injury, or disease of the roots or trunks of the pneumogastric, spinal accessory, or recurrent nerves." Another author|| has recently gone so far as to say that the vulnerability of these *abductor* fibers is a fact upon which all observers are now agreed.

We hazard the opinion, notwithstanding, that if we investigate this complicated subject from a somewhat different point of view—one not strictly clinical—we may discover certain reasons why one should not subscribe unconditionally to this conception of the pathology of laryngeal neuroses. We propose, therefore, to inquire into the truth of this problem purely from an anatomical, physiological, and experimental standpoint. This being, then, in no sense, a clinical paper, clinical evidence will not be offered, although the writer's experience is far from being in accord with the dictum that the nerve filaments which preside over the most useful and important function of the larynx should be especially prone to have that function arrested. The superior laryngeal nerve, and the median laryngeal, recently de-

\* "Experimentelle Untersuchungen über die Funktionen der Nerven und Muskeln des Kehlkopfes," "Zeitsch. f. Biologie," Band ix, p. 258, 1873.

† "Bresl. ärztl. Zeitschr.," Nos. 2-3, 1880; "Berlin. klin. Wochenschr.," No. 17, 1884; Virchow's "Archiv," Band 99, 1885.

‡ Mackenzie, "Diseases of the Throat and Nose," German edition, 1880; "Arch. of Laryngology," vol. ii, No. 3, 1881; "Berlin. klin. Wochenschr.," Nos. 46-49, 1883; *Ibid.*, No. 22, 1884.

# To this assumption that the posterior crico-arytenoid muscles are *extensors* we shall recur.

|| Gottstein, "Die Krankheiten des Kehlkopfes," p. 192, Wien, 1884.

scribed by Exner,\* need not in this study concern us. The only other nerve, as far as we know to-day, going to the intrinsic muscles of the larynx is the inferior or recurrent laryngeal. This nerve, according to our present knowledge, is purely motor,† and supplies all the intrinsic laryngeal muscles except the longitudinal tensors, the thyro-cricoids. It is an anatomical fact that it does not send off any branches to these muscles until it has reached the border of the cricoid cartilage. In its trunk, therefore, are contained two sets of nerve fibers, the respiratory and the phonatory, which must necessarily be strictly differentiated, since they are destined for muscles which carry on two separate and distinct functions. Now, where do these two sets of nerve filaments come from; is their origin as distinct as their function; whence do they derive their separate individualities; which are relatively or numerically the stronger?

The sources from which nervous impulses for the larynx may be received are the brain, the medulla oblongata, and the spinal cord. The channels through which they may be transmitted are the several motor nerves which join the pneumogastric before the recurrent is given off, for we are aware that from this point the recurrent proceeds to the larynx without any branch or junction which is in any way connected with the functions of that organ.

The experimental researches of Krause,‡ and the clinical observations of Delavan,# justify the belief that there is a center of motion for the larynx in the cortical substance of the brain. It is also probable, as advanced by many, that the several nerve filaments of the recurrent laryngeal may have independent ganglionic centers somewhere in the brain or medulla. Let us now follow down the real motor nerve tract of the larynx from the medulla oblongata to the point of exit of the recurrent laryngeal from the pneumogastric, and enumerate the different nerves which, from what we know positively or imagine hypothetically, may in any way influence either of the

\* "Die Innervation des Kehlkopfes," "Sitzungsb. d. k. Akademie d. Wissenschaften," Band 89, Abth. iii, 1 u. 2 Heft, 1884.

† We are aware that some have stated, but without giving experimental data to substantiate the assertion, that the recurrent contains sensory as well as motor fibers. We have not the space here to dwell upon our own experiments to determine this point, but they justify our remark that the recurrent is "purely motor."

‡ "Ueber die Beziehungen der Grosshirnrinde zu Kehlkopf und Rachen," "Sitzungsberichte der kgl. preuss. Akad. der Wissensch. zu Berlin," November, 1883.

# "On the Localization of the Cortical Motor Center of the Larynx," New York "Med. Record," February 14, 1885.

functions of the larynx. In so doing we shall adopt Longet's classification,\* who divided them into the *direct* and the *indirect*. Starting, then, at the medulla, we name as the direct communications to the pneumogastric the internal branch of the spinal accessory, the facial, the hypoglossal, and the anterior branches of the first and second cervical. The sympathetic may also furnish some direct fibers. Under the head of indirect nerves—namely, those which join the pneumogastric after having previously passed through the sympathetic ganglia—we have all the branches of the cervical below the second, and those of the dorsal nerves situated, of course, above the point where the inferior laryngeal shoots off from the pneumogastric to run its backward course to the laryngeal muscles.

Our knowledge of the part played by these different nerves in the performance of the functions of the larynx is now, and, from the inherent difficulties of the problem, must for a long time to come remain, unsatisfactory. The mass of contradictory statements which one encounters in working up a subject in any way connected with the respiration, and consequently with the pneumogastric nerve, is a sufficient admonition against too positive and dogmatic assertions. We approach this question, therefore, with reserve, admitting, as we must, that a great part of the subject is yet hardly beyond the confines of plausible conjecture.

It is pretty certain, however, as determined by the reliable experiments of Bischoff,† Longet,‡ Cl. Bernard,# and Schech (*loc. cit.*), that the spinal accessory is a purely motor nerve presiding over phonation, and having nothing to do with the respiratory function of the larynx.¶ That there may be other phonatory fibers in the pneu-

\* "Traité de physiologie," vol. iii, p. 512, Paris, 1869.

† "Nervii accessorii Willisii anat. et physiol.," Heidelberg, 1832.

‡ "Rech. expériment. sur les fonctions des mus. et des nerfs du larynx," etc., "Gaz. méd. de Paris," 1841.

# "Fonctions du nerf spinal," etc., "Leçons sur la physiologie et la pathologie du système nerveux," tome ii, Paris, 1858.

¶ Experimental physiology teaches us that if we cut the recurrent nerves of a kitten or a puppy a few days old it immediately dies of suffocation, which is not the case in old animals. The reason of this, as originally explained by Legallois ("Expériences sur le principe de la vie," Paris, 1812), is because in very young animals the cartilaginous portion of the glottis is but slightly developed, and, the soft and yielding parts not being held in position by the muscles, the laryngeal walls are sucked together by the inspiratory effort, and the laryngeal aperture is accordingly completely closed. Cl. Bernard showed that section of the spinal accessory in a kitten five weeks old was followed by aphonia, but glottic respiration remained free. Two days afterward, the kitten having remained well but

mogastric we can not gainsay. Now, how is the respiratory function innervated? Probably in many different and complex ways, in accordance with the truth of the physiological law enunciated by Longet.\* "Les moyens d'innervation propres à entretenir le jeu d'un organe se multiplient en raison de son importance physiologique." The posterior crico-arytenoids, the respiratory muscles of the larynx, are paramount to all the rest in physiological importance. From many sources they receive an abundant nerve supply, which is to protect them from disease, not to open up new channels by which harm might come to them. With others we assume that there are independent ganglia in the central nervous system which are essentially their own. Being respiratory muscles, it is more than probable that they may receive nerve force from such respiratory nerves as the facial, the hypoglossal, and the others already mentioned which run into the pneumogastric. But in this connection we must quote Longet's own words:† "Si la phonation, fonction secondaire et accessoire, dépend d'un nerf unique et disparaît avec lui, la dilatation respiratoire de la glotte, si essentielle, si indispensable à la conservation de la vie, est sous la dépendance ou plutôt sous la protection de nerfs multiples qui, dans certains limites, peuvent se suppléer les uns les autres. Aussi, comme je l'ai déjà fait remarquer, précisément avant de donner origine aux récurrents qui animent les muscles crico-aryténoïdiens postérieurs, voit-on les pneumogastriques emprunter des fibres motrices à des nerfs qui tous interviennent dans la respiration."

Summing up what has preceded, we can say that it all points to the conclusion that the respiratory nerve filaments contained in the recurrent laryngeal are derived from a greater variety of sources than the phonatory.

We pass now to the experimental evidence bearing on this point. It is a fact, familiar to all, that if anything other than air finds its way into the larynx it produces, by reflex action, a sudden closure of the glottis. It is equally certain that, under normal conditions, the

voiceless, its recurrents were cut, when it instantly died asphyxiated. He concludes from this that the pneumogastric has a motor power independent of the spinal accessory which permits the animal to breathe after the latter has been cut; or, in other words, the larynx is a vocal organ when excited by the spinal accessory, and a respiratory organ when under the influence of the pneumogastric, or more probably of other motor nerves associated with it. In certain animals, as the chimpanzee, the internal branch of the spinal accessory does not blend with the pneumogastric, but goes direct as a separate nerve to the larynx.

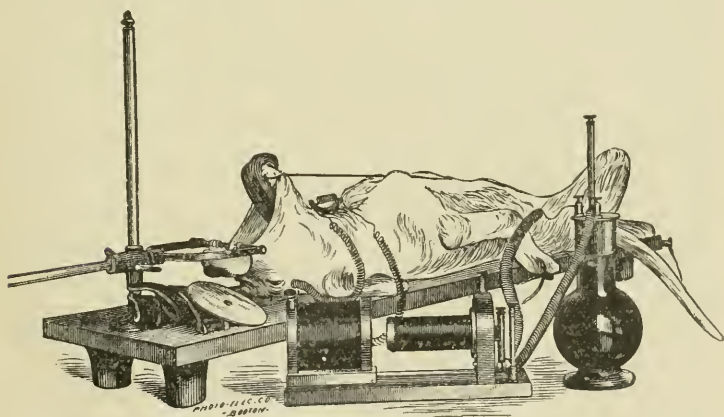
\* "Traité de phys.," vol. iii, p. 517, Paris, 1869.

† *Loc. cit.*, p. 518.



same contraction of the laryngeal muscles may be instantly called forth by direct stimulation of one or both of the recurrent nerves. Now, it may with reason be asked, How is it that this constricting action of the phonatory muscles is brought about if it be true that the nerve fibers animating the dilators of the glottis are the stronger and the more numerous? Why should we not get *abduction* of the vocal bands instead of *adduction* on irritating the recurrent nerves? The phonatory muscles are to the respiratory muscles as five to two, and the closure of the glottis has always been ascribed to the superior numerical strength of these constrictors. Yet if we compare, bulk for bulk, the muscular fibers which compose the five muscles of phonation with those of the two respiratory muscles, we do not find that they are much, if any, in excess of the latter, and we venture to think that there is some other factor concerned in this phenomenon apart from mere muscular force. It may be sought, perhaps, in this important difference between the respiratory and the phonatory function of the glottis, namely, that, while the respiratory muscles are ever on the alert, holding the glottis open during the entire healthy life of an individual, in his waking as well as in his sleeping hours, the phonatory muscles, on the other hand, are more dependent upon the *consciousness* of the individual in order to respond to any irritation. To explain: The phonatory function of the phonatory muscles could, as far as life is concerned, be dispensed with. Not so their constricting action with the view of excluding the passage of foreign bodies to the lungs. The constrictor muscles of the larynx are the sentinels who guard the approach to these vital organs. But they cease to act if the animal is in profound narcosis; they are asleep, so to speak, on their watch. A man in the condition known as "dead drunk," lying, let us suppose, on his back with his mouth open, would offer no obstacle to prevent any living insect that chanced his way from crawling in and out of his mouth, or meandering round in his larynx *à volonté*, without exciting reflex contraction of its muscles. The power of ether, chloroform, and other anæsthetics to impair the action of these constrictors is too well known to need mention. To carry this line of thought a little further, should we not expect that, provided we could preserve the organic life of an animal while its volition was at the same time completely abolished, should we not expect, we ask, under these circumstances, to get a dilatation of the glottis on irritating the recurrent nerves instead of a closure, for the posterior crico-arytenoid muscles are muscles of organic life? Indeed we believe we should, and we submit the following experiments in

support of that belief. In performing the experiments the writer has had the advantage of the collaboration of Professor Henry P. Bowditch, to whom he would express his thanks. With one exception, when a horse was the subject of an experiment, the animals used were dogs, the proper selection of which for studies in experimental laryngology is highly important. If a dog is either very old or very large he is most unsatisfactory, if not absolutely worthless. He should be small and young; the breed is of no consequence. By arranging him in the following manner a perfect view of the glottis can be obtained: After being thoroughly etherized, he is secured on his back to a dog-holder. A longitudinal incision is made in the skin covering the larynx, the fascia is divided, and the muscles are drawn aside. The larynx and trachea are thereby brought into view. One or both of the recurrent laryngeal nerves may now be exposed. The mouth is held open by the upper jaw being firmly attached to the cross bar of the dog-holder, while a cord, tied round the lower jaw and secured to any fixed point, keeps the jaws separated to the extent desired. If the animal is placed before a window, the light is transmitted through the wall of the trachea, illuminating the glottis below, while the ordinary head reflector throws the light in through the open mouth from above. The tongue may be stretched up over the lower jaw and secured to the skin by a thread. The epiglottis may be either tied up by a string passed through its tip, or held up by an instrument suitably



curved, having a long handle. The accompanying picture, taken from a photograph of a dog in readiness for experimentation, may

serve to make our description somewhat clearer. The animal is here shown under conditions by which both recurrences could be stimulated simultaneously.\*

The phenomenon of an irritation applied to the recurrent laryngeal nerve producing an *abduction* of the corresponding vocal band was first observed by accident. A small dog, of no particular breed, of an age estimated at about ten months, as it still had some of its puppy teeth, was being prepared for a different order of research. On looking for the left recurrent nerve, it was not found in its proper anatomical situation, but two small nerves were discovered near by. As it was doubtful what these two branches were, or whether they went to the larynx at all, a shielded electrode was placed on the outer and larger nerve, and, while the vocal bands were watched through the mouth, it was irritated. The very unexpected result of the stimulation was a forcible *abduction* of the left vocal band. Dr. J. W. Warren, assistant in physiology, was requested to come and witness this unusual sight. The ether sponge had been removed from the dog since the beginning of the experiment, and by the time Dr. Warren was ready to look at the larynx the animal was somewhat out of its influence.† At all events, on stimulating the nerve a second time, the familiar closure of the glottis was manifested instead of the dilatation so evident a few moments before. On the assumption that the degree to which the animal was narcotized might have something to do with these phenomena, a large quantity of ether was again administered. After the dog was profoundly under its influence, the nerve was irritated a second time, when both Professor Bowditch and Dr. Warren observed the *abduction* of the vocal band, which was more marked in proportion as the stimulation was more intense. On removing the anæsthetic the dilatation became less and less as the animal regained its consciousness, when finally a contraction of the glottis supervened. The different stages in this experiment were readily followed by watching the dog's vocal bands while, at the same time, the recurrent nerve was irritated at intervals of a few moments. Between extreme dilatation and forcible contraction, under these circumstances, there seemed to

\* For the sake of completeness of the figure, the primary coil is represented as connected with a small bichromate cell, but in practice it was connected with a Grove cell in a battery-closet. The induction apparatus is the one described and figured in the "Proceedings of the American Academy of Arts and Sciences," October 12, 1875.

† Not in any of these experiments sufficiently to feel pain.



be a neutral point, so to speak, when the stimulation produced merely a vibratory movement of the vocal band; but this was soon succeeded by an attempt at contraction, and this in turn passed into a frank and decided closure of the glottis as the animal, as before mentioned, came out of the effects of the ether. Similar results followed stimulation of one or the other of the divisions of the left recurrent nerve. These branches, as was shown by subsequent dissection, and as you will see on the specimen, unite into one nerve fifteen millimetres below the cricoid cartilage, and from this point to the larynx it is a single nerve. The effects of irritation applied to the right recurrent (which was single) agreed with those on the left. Stimulation was effected by means of an ordinary induction apparatus,\* the intensity varying from 1 to 40. In general, however, in this and in subsequent investigations on other dogs, the intensity used was from 1 to 8, never over 10, and generally about 3. The experiment many times observed on this animal was repeated, with confirmatory results, on eight different dogs. But the extent and the force, it must be mentioned, with which the vocal bands were *abducted* differed in different dogs. In five instances the arytenoid cartilage was rotated outward so forcibly that the vocal band lay flat against the wall of the larynx. Moreover, in one case there was a marked *abduction* of the vocal band on the opposite side. In other dogs a *mixed* movement was observed—that is, the band approached the median line anteriorly, while a simultaneous contraction of the posterior crico-arytenoid muscle took place posteriorly, which left, in the respiratory portion of the glottis, a large triangular opening, the glottic picture resembling an exaggerated form of paralysis of the arytenoidæus transversus muscle. These phenomena were observed after the recurrent nerve had been cut and its peripheral end stimulated as well as when the nerve was intact. Usually when a young dog is under ether the vocal bands are seen moving rhythmically and regularly with respiration. Occasionally, in this condition of profound narcosis, we noticed that, although the animal was breathing, the respiratory excursions of the vocal bands had entirely ceased, the glottis remaining widely dilated. As soon as the respiratory movements had recommenced, irritation of the recurrent nerve was followed by the usual *abduction* of the vocal band, an action

\* The electrical apparatus was the same as that used by the writer in former experiments, to which the reader is referred for an explanation of the terms employed. (See "Experimental Researches on the Tension of the Vocal Bands," "Trans. of the Amer. Laryngological Association," 1883, p. 121.)

we have become accustomed to regard as the normal one, *provided* the consciousness of an animal is completely abolished by sulphuric ether. The most striking demonstration, however, of this dilatation of the glottis is obtained by placing an electrode on each of the recurrent nerves and irritating the two nerves at the same time. Both arytenoid cartilages are now rotated simultaneously outward, the glottis is held widely open during the stimulation, and the effect is one not soon to be forgotten. Krause\* has noticed the difference in the mobility of the vocal bands according as the animal was more or less narcotized. Just in proportion as consciousness was deadened, the *adductors* became sluggish. We have repeatedly observed the same effect when the dog was under morphine, chloral, or chloroform, but we failed with all these agents to obtain the total abolition of the action of the constrictors, on irritating the recurrent nerves, which is so marked when large quantities of ether, which can be given with safety, are administered.

From the enormous development of the respiratory laryngeal muscles of the horse we conjectured that their contraction might be even more easily called forth than that of a dog's. In this we were disappointed in the single experiment we have performed on this animal. Chloroform was the anæsthetic used. An incision was made in the thyro-cricoid membrane, through which the finger was inserted and directed between the vocal bands. On irritating the recurrent nerve the finger was tightly squeezed by the contracting glottis. It is probable, however, that if ether had been employed instead of chloroform, and the horse thoroughly saturated with it, we should have felt the glottis dilate and not contract. We were indebted to the Harvard Veterinary College for this observation, and chloroform, for reasons of convenience, is the only anæsthetic used in that institution.

With a view to ascertaining whether certain fibers in the recurrent were more vulnerable than others, we undertook a series of observations of which the following may be taken as the type: The nerve was exposed and a small crystal of chromic acid was laid upon it. The electrode being placed below this point, the nerve was irritated at intervals while the chromic acid was working its slow destruction. In order to watch the effect upon the vocal band, the dog was arranged as in the previous experiments. When the animal was thoroughly etherized, the results did not differ materially from those

\* "Experimentelle Untersuchungen und Studien über Contracturen der Stimm-bandmuskeln," Virchow's "Archiv," Band 98, 1884.

already described. Stimulation produced *abduction* of the vocal band. As the destructive process of the acid progressed, the vocal band gradually became completely paralyzed. But, even after the respiratory movements of the vocal band had entirely ceased, irritation was followed by an outward rotation of the arytenoid cartilage. This was only occasionally seen, and lasted but a moment, for, as soon as the conductivity of the nerve was completely destroyed, stimulation naturally produced no effect. We can only say that under these circumstances we were able to produce an *abduction* of the vocal band as long as *any* action at all was produced. How early or how late in the destructive process the *adductor* or phonatory filaments were attacked we know not. Being few in number (probably) as compared with the respiratory filaments, and as ether, as we have shown, arrests so effectually their action, we can not say here whether there was a "proclivity" of either the one set or the other to become affected. We simply demonstrated that the *abductors* held on to the last moment, for, as long as a single nerve-fiber of any kind was left intact, we got a contraction of the posterior crico-arytenoid muscle. When the destruction of the nerve was complete, the vocal band stood motionless in the cadaveric position.

In proceeding now to a new order of experiment, we are able to record the endurance of the respiratory filaments contained in the recurrent laryngeal nerve, while those destined to supply the phonatory apparatus were altogether unable to respond to stimulation. We took a small, young dog, exposed the left recurrent nerve, and carefully passed a thread through the middle of it. The two ends of the thread were tied together in order to prevent its slipping out, but no pressure was exerted on the nerve itself. The object of the thread was simply to act as a foreign body. It was hoped that inflammation might thereby be excited, and, as the respiratory or phonatory fibers were the more readily attacked, the effect of an irritation applied to the nerve below the thread would be followed by certain derangements of motion of the vocal band. After the thread had been secured in the nerve, the parts were restored as nearly as possible to their normal situations, and the incision in the neck was sewed up. Inspection of the glottis showed that both vocal bands were moving normally with respiration. The following day the dog was again etherized and the glottis examined. No apparent change had taken place in either the appearance or natural mobility of the parts. The nerve was not disturbed. Since the thread had been introduced in it the nature of the dog had

undergone a change. From having been a confirmed howler he had become a model of propriety. This happy improvement in his disposition lasted until he was destroyed. The quieting effect of a thread in the recurrent nerve has been noticed in many dogs subsequently. At the end of a week, the dog having been etherized and the glottis inspected on four different occasions, he was again placed under the anæsthetic. As soon as a cannula could be placed in the external jugular vein chloral was injected into it and the ether removed. It is important to remember that in the following experiments the animal was chloralized and not under the influence of ether. A slight but evident change was now observable in the vocal band corresponding to the nerve operated upon. Although the arytenoid cartilage of this side appeared to move with respiration as naturally as did the right cartilage, the anterior portion of the left vocal band seemed to have lost its "tone"; it did not come up with the same "snap" on expiration as its fellow. On opening the incision in the neck, the nerve was found imbedded in a considerable mass of inflammatory tissue, from which it was impossible to separate it. After exposing the nerve below this point, it was placed in a shielded electrode. Irritation with an intensity varying from 1 to 10 produced *abduction* of the left vocal band, and cessation of its respiratory movements, the band remaining in the position of deep inspiration as long as the stimulation was kept up. On ceasing the irritation the respiratory movements went on as before. The right vocal band was in no way influenced when the left recurrent was stimulated with an intensity not exceeding 10. When, however, a more powerful stimulation (15) was employed, the right vocal band was brought to the median line (phonatory position), while at the same time the left band was pulled outward. We have, then, here a double effect: *adduction* of the vocal band on the healthy side, and *abduction* on the side where some alteration had taken place in the nerve fibers; or, in other words, the normal action of constriction of the right side was manifested while the left band was *abducted*, owing to the degeneration of the phonatory fibers, the respiratory filaments remaining unharmed; and, consequently, the respiratory muscle alone responded to the stimulation. The right vocal band was now paralyzed by section of the right pneumogastric, the band coming to a standstill in the cadaveric position, or the position we are accustomed to see in cases of "recurrent paralysis." Stimulation applied to the right recurrent resulted in a smart closure of the glottis, effected by the right vocal band being brought

forcibly against its fellow, as well as by the contraction of the arytenoidæus transversus, which approximated the two arytenoid cartilages. It could not be accurately determined whether the anterior portion of the left band contracted or not, as even a feeble irritation produced such a rapid and complete closure of the laryngeal aperture. If the closure of the left vocal band was brought into action, it was very slight; it was evident that the closure of the glottis was chiefly effected by the contraction of the constrictors on the right side, and by the arytenoidæus transversus muscle. The electrode was again changed to the left recurrent below the insertion of the thread. Stimulation was followed by the same outward rotation of the left arytenoid cartilage as was observed in the first experiment. There was also a marked movement of the right arytenoid cartilage toward its fellow, as if by the contraction of the arytenoidæus transversus muscle. The action of this muscle was prominently brought into play in the next experiment, when the peripheral end of the left recurrent was stimulated, after section of the nerve below the thread. Both vocal bands were now paralyzed and standing in the cadaveric position. All avenues to the brain were thereby cut off except through the anastomoses of the terminal branches of the recurrent with those of the superior laryngeal, and, perhaps, also with those from the pharyngeal plexus. Irritation of the peripheral end of the left recurrent produced both a contraction of the left posterior crico-arytenoid and transverse arytenoid muscles. That is, there was a distinct outward rotation of the vocal process of the left arytenoid cartilage, and an approximation of both arytenoid cartilages at the same time.

Positive as were the results of this series of experiments, we lay no stress upon them. If they are of any worth, it will be by suggesting to others some better method than was here employed, for all our attempts to verify the observations have failed. Even when the thread had been previously soaked in a one-per-cent. solution of chromic acid it did not cause any material disturbance when introduced through the nerve and retained there for many days. The only change noticed was that, in some of the dogs, a more powerful stimulation was required to produce a contraction of the vocal muscles through the nerve operated upon than in the opposite healthy side.

#### CONCLUSIONS.

The principal fact herein demonstrated is, to our mind, the power and the endurance of the posterior crico-arytenoid muscles and of



the nerves which supply them. We have spoken of the theoretical reasons: (1) The physiological importance of these muscles; (2) their belonging to organic life; (3) their extensive nerve-supply, all of which would tend to preserve their functional integrity. Moreover, if it be true that there is a "proclivity" of the *abductor* fibers to become diseased, and that unilateral paralysis of the abductor muscle is such a common and harmless lesion, should we not expect, theoretically, that bilateral paralysis of this muscle would occur more frequently? Yet there can be no dispute whatever that bilateral paralysis of the posterior crico-arytenoids is a disease as rare as it is grave.

Now, with regard to these muscles being *extensors*, and, like the extensors in other parts of the body—the forearm, for instance—more liable to succumb to disease than the flexors, we would ask this simple question: Why should the terms "extension" and "flexion" be applied to the rotation of the arytenoid cartilages? The principal office of the posterior crico-arytenoids is to maintain the respiratory patency of the glottis. From the beginning to the end of life they are in a state of semi-contraction—holding the glottis open. They come, therefore, just as near being flexors as extensors; but, as a matter of fact, they are neither the one nor the other in the ordinary acceptation of these terms as applied to muscles of the general system. They are *respiratory* muscles carrying on a special function. One might as well speak of the movements of the pupil as extension and flexion, or compare the diastole of the heart to the extension of the forearm, or its systole to the bending of the little toes. Muscles are analogous as they discharge analogous functions. We recognize no more analogy between the posterior crico-arytenoid muscles of the larynx and the extensor communis digitorum of the forearm than there is between "respiration" and "prehension." If we wish to seek muscles that are analogous, let us turn to other respiratory muscles and ask how they are affected by disease. In diffused, progressive diseases of the nervo-muscular system we know that of all muscles, except the heart itself, those belonging to the respiratory system are always the last to be attacked, and there is no valid reason why the respiratory muscles of the larynx—either one or both—should offer an exception to the rule, especially as they are the most important of all.

We propose to investigate this subject from a clinical aspect at some future date, when, perhaps, the positions which immobile vocal bands assume may be sufficiently explained without attributing to a

wise and conservative nature a "proclivity" to attack one of the most vital muscles of the human system.

*Discussion.*

J. SOLIS-COHEN.—It is a great honor to the American Laryngological Association to have had this valuable paper read before it, and I believe it will be an historical paper. These experiments will be subjected to criticism, and their verification will become a matter of history in the controversy now existing in the laryngological world as to the liability of these abductor fibers to become diseased sooner than the adductors. The dogmatism with which the assertion has been made seems to have almost paralyzed laryngologists, for, with the exception of myself, I hardly know of any one who has ventured a word against it. Even last year, when I presented a case opposing the theory, and showed a picture of the larynx, it was simply in deference to myself that not much was said against it. Not a single member of the Laryngological Association, even of those living in Philadelphia, where the patient was, would accept my invitation to the members to see the patient for himself, and verify the fact that the picture I presented was a correct one. The only word of commendation I received was from Krause, of Berlin, who wrote me a very interesting letter, stating that he believed my observation was correct, but attributed the lesion to a different cause. I will recall the case for a moment. A man had received a wound in the neck. He had instantly become aphonic, and when I saw him, a few months afterward, one vocal band was in extreme abduction. I took it for granted that the adductor fibers of the pneumogastric had alone been injured. Krause's explanation is this: The injury of the carotid having been attended with hæmorrhage, a clot must have occurred around the pneumogastric nerve, producing compression, which became permanent by the formation of the cicatrices. I do not know where that patient is now. I have seen him several times, and the affected vocal band has remained in extreme abduction.

I have had no experience in such physiological experiments as Dr. Hooper has made; but there is a point he spoke of which receives clinical support. That is with reference to the influence of the facial nerve in sending the respiratory forces to the pharyngeal. We all know the effect of cold on the facial nerve in restoring suspended respiration. I remember a case in which I was called to see a child who had diphtheria following measles. There was great dyspnoea, but I declined to perform tracheotomy, because the child was under two years of age, and I knew that the operation was usually unsuccessful after measles. Knowing the great effect of cold on the facial nerves, in stimulating the facial centers, we placed ice cloths all over the lower part of the neck and jaw up to the ears. Every time the iced cloth was placed around the jaw an inspiration took place, and the physician in attendance, Dr. O'Hara, by his own

efforts in keeping this up, saved the child's life. So many times a minute he replaced the cloth. Several pieces of cloth were kept between two pieces of ice. As soon as the piece in position ceased to produce any effect it was replaced by another. So there is a point in which, clinically and physiologically, these facts support each other. The phenomenon of stimulating one recurrent nerve so that its vocal band passes beyond the median line in phonation is, if I remember right, confirmatory of some of Krause's experiments. He states that, when he stimulated one nerve, the vocal band of the opposite side moved also. It would touch the other, no matter what position it was in, whether it was in the median line, in the cadaveric position, or in the inspiratory position. In the case presented by me last year, when the man tried to speak, the sound vocal band crossed away over beyond the median line, and beyond the ordinary position which it occupies in the dead body.

Dr. HARRISON ALLEN said that, in his judgment, the analogy between constriction and adduction, and between dilatation and abduction, was tenable. At least it was of some value in suggesting research. Careful clinical study would often take the place of experiments, and it could be certainly shown from the clinical point of view that adductor muscles and constricting muscles were alike in their ability to withstand disease as compared to the abductors and dilators. The morphologist could also assert that the position of a flexed point in a limb resembled the epiglottis when bent down over the aperture of the glottis, as the extension of the limb-joint might be compared to the erect position of the epiglottis. In the muscles of the limb it was found that the adductors were specialized muscles of the flexor group, and the abductors of the extensor group. Perhaps it might be well to have distinct terms to express this harmony of action between flexion and constriction, but, as part of the study of muscle phenomena taken in a comprehensive sense, the speaker saw much to show that a close association, if not identity, existed.

Dr. INGALS.—In support of the paper in a clinical way, I have had a recent experience, similar to the one related by Dr. Cohen, excepting as to the origin. A gentleman had a cold, over-used the voice during the cold, and in the course of two or three days became completely aphonic. I saw him five weeks later, and found complete paralysis of the left cord, which was fixed in extreme abduction. After two months, there had been no special change in the position. In phonation the sound cord did not cross over as in Dr. Cohen's case; it crossed a little beyond the median line, but very little.

Dr. DELAVAN desired to unite his congratulations with those of Dr. Cohen upon the paper just presented. It was a most welcome and valuable addition to our knowledge of the subject, and worthy of the highest praise. Reference had been made in the paper to a motor center for the human larynx. Since he had first called attention to the existence of such a center several important contributions had appeared which tended still further to establish the fact; he hoped that sufficient clinical and



pathological evidence would soon be accumulated to place it beyond a doubt.

Dr. HOOPER.—I have only attempted in this paper to study this subject on general physiological and experimental grounds. Clinically it seems to me a difficult question and one in which there are many sources of error. We are dealing, in the first place, with one of the most complicated organs in the body, and in using the laryngeal mirror we are looking at things in perspective, which are in almost constant motion. It is often impossible to say whether a vocal band stands motionless in the median line or a few millimetres off from it. If we call every paralyzed vocal band we see a paralysis of the posterior crico-arytenoid muscle, we can multiply such cases very rapidly. Not only is the theory that there is a proclivity of the posterior crico-arytenoid fibers to become diseased contrary to nature, but the dogmatic manner with which it has by some been advanced ought of itself to cause us to doubt its accuracy. I should feel sorry to have an association like our own subscribe to this notion on the very shallow evidence we have at present.

I must thank you for the attention you have given my paper. What there is in it which you say has interested you is chiefly due to the perfect arrangements of the physiological laboratory of the Harvard Medical School for pursuing such investigations. The professor of physiology, Dr. Bowditch, and others connected with the department, are always ready with their time and advice to aid those who are carrying on any kind of research, and I shall, therefore, convey your kind expressions of interest to the quarter where they really belong.

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*Business Meeting.*

At the close of the morning session a business meeting was held for the appointment of committees and the election of Fellows.

The President appointed the following :

*Nominating Committee.*—Drs. Ingals, Hooper, and Mackenzie.

*Auditing Committee.*—Drs. Glasgow, Roe, and Allen.

Ballot was then taken, and the following gentlemen, upon the nomination of the Council, were unanimously elected active Fellows of the Association :

H. Clinton McSherry, M. D., Baltimore, Md., proposed by Drs. Donaldson and Mackenzie. Thesis, "Functional Neuroses of the Larynx."

Charles H. Knight, M. D., New York, proposed by Drs. Smith and Asch. Thesis, "Abscess of the Tongue."

*First Day—Afternoon Session.**Paper.*

## ON CERTAIN VASO-MOTOR DISTURBANCES OF THE NASAL MEMBRANE.

By WILLIAM C. GLASGOW, M. D.

FOR a number of years my attention has been attracted by a series of cases which could not be explained by the well-known factors of inflammatory process. Resembling them in some particulars, still there are differences which necessitate an additional and independent influence for their production. The laws of vaso-motor action, although still imperfectly developed, would seem to explain them, and the success attending the use of therapeutic agents would seem to verify it. During the last few years the subject of vaso-motor disturbances of the nasal membrane has been very fully developed by several members of this society, and especially by Dr. Mackenzie, of Baltimore, Dr. Roe and Dr. Daly, and our collaborer, Hack, of Freyburg. I find, however, that my experience of these cases has been somewhat different from that of my *confrères*, and I would aim in this paper to record my views and the conclusions which they would seem to justify. For a number of years my attention has been attracted by a series of cases characterized by great swelling, more especially of the cavernous tissue, a profuse discharge of limpid fluid, and abnormal paleness of the mucous membrane. Formerly, when they occurred during the summer months, I was content to consider them as modified types of so-called hay fever. When, however, I found they occurred during the year irrespective of seasons, I became convinced that there was a different agency from that then recognized as an essential factor in hay fever, *i. e.*, the pollen of Wyman, Blakley, and Phoebus. Dr. Beard's work first attracted my attention to the possibility of a neurosis being the chief factor in the disturbance, and gave me my first ideas of what I considered to be the true theory of these cases. Considering the so-called hay fever to be a functional disorder of the nervous system, in which the over-sensitiveness of the nasal mucous membrane occurs, and producing through this certain well-known reflex symptoms and disturbances of the normal vaso-motor action, I can still consider these cases as closely allied, both in aetiology and mechanism, with the so-called cases of hay fever. From a number of cases I have selected three, showing the distinct and different

types of nasal disturbance. I would eliminate from consideration another class of cases in which we find neuralgia, especially orbital, supra-orbital, and frontal, occurring as a result of subacute rhinitis; although having many of the pathological conditions found in Case II, still there is wanting the primary neurotic element capable of producing the vaso-motor disturbance.

CASE I.—I. W., an Englishman, a merchant, forty-five years of age, was brought to me for consultation by his physician. He was of stout build, somewhat florid, and had been generally healthy. He was suffering acutely with a neuralgia of the superior maxillary nerve of the left side, and complained of great obstruction, with a profuse flow of a clear watery fluid from the left nostril. He stated that this had only commenced with the neuralgia, and had been constant. On examination, the left nostril was found occluded by a swelling of the cavernous tissue; the mucous membrane was colorless in appearance, and seemed to be saturated with moisture which constantly oozed from its surface. The touch of the probe produced instantly an increase of the swelling and an increase of the discharge of the limpid fluid. The right nostril was normal and unobstructed. He was treated by his physician for the neuralgia, and received no local treatment. With the subsidence of the neuralgia the nasal disturbance disappeared.

CASE II.—Mrs. P., thirty-two years of age, well developed, healthy, of a nervous temperament, and inclined to hysterical attacks. Has had three children; married eight years. Three years ago she noticed a nasal trouble for the first time, although for many years she had been suffering with follicular pharyngo-laryngitis and naso-pharyngitis. Her first attack occurred during pregnancy, and has been repeated at irregular intervals about four times a year. There is no special dependence upon atmospheric conditions. The attacks usually occur at the beginning or at the close of the menstrual epoch. The first symptom is a violent sneezing, occurring in paroxysms, with a profuse watery discharge from the right nostril. This is soon followed by an intensely painful spot in the right nostril, and by neuralgic pains radiating to the eye and the frontal regions. Congestion of the conjunctiva, lachrymation, and ptosis of the right lid soon follow. The right nostril becomes completely closed, especially toward evening, and there is generally accentuation of all the symptoms. The attack is accompanied by slight fever, with general lassitude and loss of appetite. There is also increase of the general arterial tension, as shown by the pulse, and pronounced accentuation of the second sounds of the heart. About the third day a plug begins to form in the nostril, which completely prevents the passage of air. The plug is of a dense structure. It is elastic and solid, and resembles no other nasal secretion that I have seen. It resembles somewhat a piece of rubber, and the elasticity is well marked on tearing it. The nostrils are now completely occluded by the swollen membrane and the plug,

and the probe can only be passed by force. With the removal of the plug relief is given. The walls become less swollen and the nostril opens. During the next twelve hours another plug forms, and we find a renewal of the same symptoms, only in a moderated form. Without treatment this condition lasts ten days, with paroxysms varying in intensity and gradually diminishing toward the end. The nostril is then found in the normal condition, which is that of hypertrophic rhinitis. During the attack the mucous membrane is swollen and œdematous, pouring out quantities of limpid fluid. It is of a pale red, the pallor being in marked contrast to the color of the other nostril. It shows complete occlusion of the nostril, and it is exquisitely sensitive. The slightest contact of the probe causes increased swelling and profuse discharge, with violent paroxysms of sneezing; intense pain is felt radiating from the nose to the orbital and supra-orbital region, and immediate congestion of the conjunctiva is produced. Relief of this condition is most marked by bleeding the opposite nostril. The slightest touch of the knife produces a free hæmorrhage. The touch of the knife to the affected membrane increases the symptoms, and little blood is obtained unless the puncture is deep into the cavernous body. The blood is always pale and watery. The bleeding is then followed by the use of the hot alkaline sprays. By these means the swelling is reduced and the plug can then be blown out. I have also found the insufflation of the vapor of ether to have a very happy effect in promptly reducing the swelling and drying up the mucous membrane; the nitrite of amyl has also produced good effects.

CASE III.—Miss S., thirty years of age, healthy, in excellent general condition. Has periodical attacks in the spring and fall of what she calls acute catarrh. When I saw her in March she complained of great obstruction of the nostril, and profuse watery discharge of both nostrils. On examination, both nostrils were found to be occluded by swelling of the cavernous bodies, the mucous membrane œdematous, of a pale color. A watery secretion seemed to be oozing from the mucous membrane and the discharge was profuse. The touch of the probe increased the swelling and the discharge, but produced no pain. A deep puncture in the cavernous body produced a slight hæmorrhage, the blood being very pale and watery. This always opens the nostril. Insufflation of the vapor of ether gave a certain amount of relief. The instillation of atropine into the nostril was also beneficial, as well as inhalations of camphor. These attacks would last about two weeks, and were always shortened by treatment, and the nostril would be left in a normal condition. In this case I found great benefit in the external use, in the shape of liniments, of the camphor chloral, aconite, and veratrine. This liniment was applied to the course of the fifth nerve and over the nose.

These three cases, although resembling each other in some respects, will be seen to be essentially different. In Case I we see the

effect on the mucous membrane, the irritation being applied to the body of the nerve. In Case II we notice the effect produced by the irritant being within the nasal cavity in a case complicated by inflammation of the membrane. We find added to the original symptoms extreme sensitiveness and the tender spot with acute pain. The presence of the plug causes a swelling of the cavernous bodies, the swelling only subsiding on its removal. Case III is to me obscure. I have seen several such cases, some of them absolutely resisting all treatment for the reduction of the swelling. It may be due to some derangement of the vaso-motor centers, or some irritation within the nasal canal which has been overlooked. In the three cases, and in all of this character which I have seen, there are found the three factors of great swelling of the cavernous bodies, abnormal paleness of the mucous membrane, and profuse discharge of the limpid fluid. And in all these cases these symptoms are aggravated by the application of an irritant to the affected membrane. These conditions I will consider to be due to disturbed nerve action, probably altered tone in the minute arterioles, produced by derangement of vaso-motor control. The mechanism which causes the swollen and œdematous tissue, the pale color of the membrane, and the profuse discharge must be explained simply on theoretical grounds; and, in the present state of our knowledge of vaso-motor action, it must certainly still remain problematical. Are the cavernous bodies congested, as has been asserted? Congestion presupposes a dilatation of the blood-vessels, with increased supply of normal blood. Under such conditions we shall find, not pallor, but increased redness. The prominent feature, however, in these cases is pronounced paleness, and this, in my opinion, disproves the possibility of dilatation of the blood-vessels. I would rather assume the opposite condition to exist—a contraction of the arterioles, due to an increased tone of the vessels caused by an augmented action of the vaso-constrictors. In short, the minute vessels supplying the arteries are in a state of spasm through nerve irritation, the general arterial tension is increased, the onward flow of the more solid portions of the blood is prevented, and the cavernous bodies of the mucous membrane become infiltrated with escaping white corpuscles and the liquor sanguinis. To these must be added the liquefaction and the increase of the glandular secretion, as the result of gland stimulation. The theory of spasm of the arterioles is supported by the favorable action of remedies which favor arterial dilatation—such as atropine and nitrite of amyl. In the present state of the knowledge of the laws



of vaso-motor control it certainly is hazardous to base a theory on such laws. But the conditions existing in the nasal cavity seem to me to be explained solely by this means. I firmly believe that, whenever the laws governing the vaso-motor system shall be more thoroughly developed, we shall find more of the functional disturbances of the body to be due to disturbed vaso-motor action than is generally believed.

*Discussion.*

Dr. ROE.—The subject of neurosis of the nasal membrane is certainly a very extensive one, and there are so many different factors which enter into the consideration of the subject, that many times the cause and effect are not properly differentiated. In many cases the nose is the objective cause, and in many cases, no doubt, the subjective cause. There is no reason why the nose may not be affected in a subjective manner, from irritations in other parts of the body, reflected through the sympathetic system, as well as the larynx or other portions of the body. But in the great majority of cases we find the nose to be the primary seat of the reflex irritations. As an illustration of this I will cite a case in point. Last summer, about a year ago, a gentleman came to me with a moderate naso-pharyngeal catarrh. In addition to his throat trouble he had marked pain in his chest, which caused him great anxiety. He suspected that he had a pulmonary difficulty. Careful examination of his chest revealed no trouble whatever. But in his nose there was, in addition to inflammatory trouble, an exostosis of the inferior turbinated bone, which came in contact with the septum. I advised him to have that removed, as the pain might be a reflected one, and as we are often surprised by the great amount of trouble which is reflected from the nose, and also as necessary in the cure of the nasal affection. He consented to the removal, after which, within an hour or two, the pain in his chest disappeared.

Dr. ROBERTSON.—I have noticed in a large number of cases, in subjects of hay fever, this peculiar paleness of the mucous membrane. I think the case just related would naturally come under that subject—*i. e.*, that peculiar condition of the mucous membrane which is due to an irritation of the nervous system. I have such a case in mind who, I consider, had chronic hay fever. She would have paroxysms of sneezing and discharge of watery fluid from the nose. The peculiar paleness of the mucous membrane and the usual hyperæsthesia of the membrane were very marked. The attacks were frequent. They came on during the summer, fall, or winter, but were undoubtedly of nervous origin. because, with any mental disturbance, from going to a party, or to school, she would sneeze twenty or thirty times, and then the watery discharges would take place. This case was treated with spray and with a preparation of eucalyptol, with relief for a few days. I have noticed a number of cases of hay fever in which this condition of the pallidity of the mu-

cous membrane and these peculiar watery secretions were very marked. As far as swelling of the membrane is concerned, it frequently occurs during the early stages of the disease, but gradually subsides. I believe it due to a swelling of the cavernous portions of the turbinated bodies, with contraction of the membrane itself. There might be contraction of the arterioles and capillary blood-vessels of the skin, and still directly underneath the skin, congestion. In the turbinated bodies this would only occur in conditions of disturbance of the vaso-motor system.

Dr. MACKENZIE.—I do not propose to reiterate on this occasion all that I have said and written on the subject of which Dr. Glasgow treats; but there is one point in regard to the pallor of the mucons membrane, which is a good one, to which my attention has not been directed before. On the contrary, I have found in my experience that the opposite condition is the most prevalent one. I think with the cases which Dr. Glasgow has described you will allow me to include a number of so-called hay fever, and of these some to which I have ventured to give the name of sympathetic rhinitis. In its pathology two factors enter. The peculiar irritability of the tissue of the nose may be due to different causes: either from some local pathological process, or from a host of other peripheral influences, or from some irritation starting in the nervous centers, or possibly due to some disease of the nervous system as a whole, or from some reflex irritation from its various parts, or, finally, from some disease of a distant organ. In one of my papers on vaso-motor coryza I have called attention to the purely psychical element in the production of the paroxysms. Lately I saw a lady who had been suffering for over fifteen years with certain forms of so-called hay fever. The paroxysms were so violent that she was compelled to take to her bed and remain there in great suffering until it was over. It was unquestionably a case of so-called rose cold. She could not go into a room where roses were without bringing on an attack. She was nervous in the ordinary acceptation of that term, but was not, however, hysterical. I had a perfect artificial rose constructed, of such exquisite workmanship that it was the exact counterpart of the original. I carefully kept this in a clean place in my office behind a screen, and when she was expected I carefully removed every particle of dust from it by a thorough washing. Several days before I had used the galvano-cantery, and when she came to my office that morning she said she had never suffered so little during the past fifteen years as during the three days prior to coming to my office. After she had been in my office over a quarter of an hour I produced the artificial rose, and, sitting down in front of her, dangled it in my hand, at the same time conversing on some topic foreign to her case. In less than a minute she said she would sneeze. In less than two minutes she had intense itching at the nose, and in less than four minutes from the time I produced the rose from behind the screen the symptoms of asthma had commenced. As soon as the difficulty in breathing had commenced, I removed the rose and told her it was an artificial rose, and her astonishment



was of course very great. Four days afterward she came to my office. I produced the most perfect specimen of a real rose, into the center of which I plunged her nose and kept it there a long time. I tried to get all the pollen I could in her nasal chambers, and I think I was fairly successful. I kept it there for about five minutes without exciting the slightest tendency to the so-called rose cold. On the day on which I performed the experiment with the artificial rose she entered my office apparently a well woman, and left it with one of the severest coryzas she ever had. The pallor of the mucous membrane is a point of extreme interest, and worthy of our future consideration.

Dr. HARRISON ALLEN.—I saw a case last winter which illustrated the point taken by Dr. Glasgow. A lady, the subject of Bright's disease, suffered from intense irritation of the nasal chambers, accompanied with absolute occlusion. The condition was undoubtedly due to a constitutional cause, and yielded to general remedies.

Dr. RICE.—I have been pleased with Dr. Glasgow's classification of these cases, for there certainly is great difference in the pathological appearances presented. In some we find all the color of inflammation, and in others the pallor which has been mentioned. In hay fever the inflammatory condition enters more largely than in these so-called "neurotic cases" which Dr. Glasgow has spoken of, the redness and swelling in one case being due to dilatation of the arterioles, while the white, boggy enlargement is caused by the transudation of serum, the capillaries being contracted. I have noticed the different action of cocaine upon these two classes, and it may be made a means of differential diagnosis. In simple inflammatory hypertrophies of the nose we know that the swelling is instantly and completely reduced when cocaine is applied; but in the white swellings little effect is produced in causing absorption of serum.

Dr. GLASGOW.—I think the point that the irritation of the cavernous tissue is the primary one is not valid. The swelling is simply the effect, and due to irritation. In the first case I reported we had a beautiful illustration of disturbance without an inflammatory condition. There was profound pallor, such as I have never seen, except in the cadaver. Now, here irritation was increased, and the swelling of the cavernous tissue was simply the effect of this disturbed nerve action. In the second case there was a swelling of the cavernous tissue, due to this same cause. Call it vaso-motor or not, it is a disturbed action due to irritation in the nostril. Remove the plug, and you immediately remove the swelling; so that the swelling could not have been primary, but a secondary effect of the primary nerve irritation. Dr. Mackenzie also beautifully illustrates this fact in his rose experiment. I am a profound believer in this mental influence; but I neglected to mention in my case that the lady could intensify her colds by thinking about them. If she had any little annoyance during the day, toward evening her trouble would be greatly intensified.

*Paper.*

REFLECTIONS ON THE ÆTIOLOGY OF THE SIMPLE INFLAMMATORY  
AFFECTIONS OF THE UPPER AIR-PASSAGES.

By JOHN N. MACKENZIE, M. D.

*"Ille bene curet, qui bene morborum causas agnoscit."*—CELSUS.

IN view of all that has been said and written concerning inflammatory conditions of the naso-laryngeal tract, it is amazing to find what little advance has been made toward a more rational conception of the causes that underlie diseases of such prevalence and wide distribution.

It is not the purpose of the present communication to treat in an exhaustive manner the conditions under which inflammation of the upper air-passages develops, but simply to offer for your consideration a few general observations and desultory reflections, which, I trust, through the discussion which follows them, may serve to throw new light upon the subject, and stimulate others to more perfect and fruitful research.

At the outset of our inquiry we should divest the mind of the idea that the pathology of nasal and laryngeal disease is an isolated pathology. The eruption of catarrhal processes in the respiratory tract is governed by the immutable laws that condition the development and course of inflammation in general, and the rational interpretation of nasal and laryngeal affections presupposes, therefore, the application of general pathological principles to the peculiar conditions which the anatomical and physiological functions of the structures involve. Above all, we should remember that peculiarity of structure is not anatomical isolation; we should remember the correlation of organ and organ, the sympathy of tissue and tissue which make up the perfect physiological life of man. In looking upon the subject from the high vantage ground of general pathology and laws of health, we may, therefore, more readily apprehend the rôle which external and internal influences play in the evolution of nasal and laryngeal disease than if we viewed the same from the level of a narrow specialism or from the standpoint of the mere empiric.

I. Inflammation of the upper respiratory tract, either in its entirety or localized in its individual parts, is a disease of the human race which has existed from the remotest period of historic time.

II. As the chief predisposing and exciting causes of the affection have been in operation for all ages, it follows, therefore, that its origin is coeval with the birth of man.

III. The evolution of nasal, pharyngeal, and laryngeal inflammation in a given locality is, in all probability, a part of its geological history, and goes on *pari passu* with its varying meteorological conditions. Hence the geographical limits of the disease have varied with the different epochs of the earth's formation.

The elaboration of the above propositions involves an inquiry into the origin, the predisposing and exciting causes of nasal, nasopharyngeal, and laryngeal inflammatory affections, and their distribution over the surface of the earth.

ORIGIN.—In the third book of Plato's "Republic" the philosopher tells us that the names of catarrhs were unknown to Homer, and only came into use in the age of Socrates. This assertion of the Grecian sage has been made the groundwork of the thesis that catarrhal diseases are the products of civilized life, and furnishes, among other things, the basis of the Schneiderian argument that these affections are born of luxury and ease and of the general degeneracy of mankind.

It is doubtless true that a marked tendency to catarrhal diseases belongs to modern man from the accidents which pertain to his environment, and that as civilization awakens morbid conditions unknown or rarely met with in the savage state, so the disposition to inflammatory troubles of the upper respiratory passages may be encouraged by transmitted vices and the enervating surroundings of modern social life. At the same time it is reasonable to assume that, as the chief causes productive of acute and chronic inflammation of the naso-laryngeal tract have been in operation from the remotest times, the origin of the affection is therefore traceable to that of man himself.

The very etymological derivation of the word *coryza* carries us back through the dialects of the Hebrews, Arabians, Chaldeans, and Assyrians to the time when history emerges from fable; the attention paid by the most ancient exponents of medical art, of which we have any record, to inflammatory states of the nose and throat, implies the former frequency of these affections, while the derivation of the terms *angina* and *cynanche*, and the early origin of bronchotomy, point to their recognition of the most dangerous forms of laryngeal disease. The classification and correct clinical history of disease is, moreover, a process of gradual evolution, and, in view of

the confusion which reigned among the latter-day nosologists in regard to laryngeal affections, it is not surprising that in the most ancient records of medicine we fail to find that exact anatomical division of catarrhal affections which was the natural outcome of subsequent more advanced anatomical and physiological investigation.\*

Inflammatory disorders of the upper respiratory apparatus may be the result of a host of conditions external to the body which arise from man's relation to the outer world, may proceed from agencies within the organism, whose sphere of operation embraces the system as a whole, or is limited to its individual parts, or, finally, they may be the outcome of defective anatomical and physiological relations—of absence or abrogation of activity in the respiratory structures themselves and in the functions and forces under their control.

The discussion of the causes proceeding from the first source leads naturally to the consideration of the geographical distribution of the affection.

GEOGRAPHICAL DISTRIBUTION.—*Predisposing and Exciting Causes.*

—The geographical limits of nasal and post-nasal catarrhs are as yet imperfectly defined, but it is highly probable that they bear a close relationship to the distribution of catarrhal affections of the respiratory organs in general over the surface of the earth. Thus it may be laid down as a rule that catarrhal inflammation of the nasal passages is much more frequently met with in cold than in warm countries, in high than in low latitudes. The observations of travelers and explorers show that the nearer we approach the equator the less prevalent become affections of the respiratory apparatus, while in the temperate zone they are the most common of all diseases, and preponderate in these regions according to the proximity of the individual localities to the polar circle. In the temperate zones of both hemispheres catarrhs are more frequently met with in those places which lie between the isothermal lines of 18° and 4° (Seitz). The prevalence of these affections is related not only to the geographical position of a given country, but also to its elevation above the surface of the sea; the higher above the sea-level, the more marked the tendency to catarrh (Hirsch, Seitz), a fact partially

\* Hence we find in the *Āyur Vēda* affections of the larynx confounded with those of the palate and pharynx, and among certain of the Hippocratic and Galenic schools the names pharynx and larynx are occasionally employed as convertible terms.

explicable by the analogy of natural conditions or meteorological relations between high mountainous regions and those of the frigid zones. In every zone the geographical distribution of the complaint depends, other things being equal, apparently mainly on climatic influences. *In those countries where extremes of temperature follow each other in rapid succession, where the thermo- and barometrical fluctuations are most sudden and occur with the greatest frequency, and where the material composition of the atmosphere is continually changing, catarrhal affections of the naso-laryngeal tract are most frequently met with. The appearance of the disease seems to depend not so much upon the degree of heat or cold as upon the rapidity and intensity of the change from the one to the other.* In warm countries, coryza and allied affections most frequently prevail during the sudden cooling of the atmosphere by rain-showers, electrical disturbances, or when the heated condition of the atmosphere alternates with dampness and chilliness of the nights. In a similar manner the more or less sudden passage from a dense to a rarefied atmosphere, as in balloon and mountain ascensions, favors the development of nasal congestion and inflammation.

*The influence of season* in the production of nasal inflammation is simply a part of the greater question of temperature mutations, and will therefore vary with the period of greatest temperature changes in a given year. While spring and autumn furnish perhaps the largest percentage of nasal and laryngeal catarrhs, the coryza which appears in the summer months, when the air is suddenly cooled or altered by electrical and other disturbances, yields to none in the severity of its symptoms and course.

Of all conditions of the atmosphere the most pernicious to the nasal, and consequently to the pharyngo-laryngeal mucous membrane, is perhaps its saturation with aqueous vapor. Its influence is much more potent in the production of nasal inflammation than that of cold. Indeed, the injurious effect of the latter, *per se*, has been grossly overrated, and, if we examine the subject closely, we will find that there are many other agencies at work whose operation explains the prevalence of these affections in the frigid zones and in the regions of perpetual snow. *The effect of moisture is furthermore intensified by its association with intense cold or oppressive heat.*

It is impossible to overlook the rôle of the *winds*, especially when associated with brusque thermometric changes, in the spread of coryza and allied affections. The strata of air of different tempera-



tures which they bring with them, the moisture, dust (germs?), and, in some instances, the physical shock and pressure which they exert upon the body, as well as the rapidity of evaporation of the cutaneous and respiratory transpiration which they occasion, are powerful agents in the determination of naso-laryngeal catarrh. The terrible effect of the hot wind of the desert upon the throat and nose leads the camel instinctively to bury its nose in the sand until the fury of the tempest is past.

Besides the meteorological relations which condition the geographical distribution of these affections, there are others which pertain to the *geological character of the soil*, to the *configuration of the locality*, and to the *emanations which arise from the surface of the earth*. The two former furnish additional proof in favor of the power of climatic conditions in the evolution of naso-pharyngeal inflammation. It is not within the scope of the present paper to enter into an elaborate discussion of this vast and imperfectly understood question, but it may be said, in general, that the temperature of a given locality will depend, to a certain extent, upon the color of the soil and the presence or absence of vegetation. In some countries—as, for example, in Savoy—the peasants spread dark earth upon the land which they desire to cultivate early, which causes the snow to melt fifteen to twenty days earlier than in other localities (Tortual); it is a well-known fact that the temperature is lowered and humidity of the soil encouraged by the presence of forests or large tracts of dense undergrowth. The presence of vegetation exerts, too, a remarkable influence upon the chemical composition of the air, and hence upon the development or dissipation of nasal and other forms of catarrh. The noxious exhalations from certain forms of vegetable life probably act as indirect or predisposing agencies in the spread of catarrhal disease, while the presence of others, by purifying and tempering the atmosphere or filling it with certain odors, seems to secure immunity from the affection. The sulphurous air of volcanic regions has been utilized from time immemorial in the treatment of laryngeal affections, and the singular infrequency with which the latter are encountered in places where the air is laden with resinous and balsamic odors has been familiar from the earliest times. The *configuration* of a country enters as a factor in the localization of catarrh in so far as it conduces to exposure to the variations in temperature which have been mentioned above.

There are also a vast number of injurious influences dependent upon *modes of life, dress, imperfect sanitary conditions*, etc., which



have been brought forward as the alleged causes of localization of catarrhal affections of the respiratory tract, which, although exercising an undoubted irritating effect, are nevertheless purely secondary and accidental, and have led to crude hypothesis and hasty generalization concerning the essential causes of these diseases.

There are a multitude of conditions which follow as the natural results of imperfect sanitation and professional occupation which act as predisposing and often exciting causes of nasal inflammation. In general, it may be said that residence or work in a confined or overheated atmosphere, or in one filled with impure gases or floating particles of organic or metallic matter, conduces to the development of the disease. Thus it is well known that artisans who are subjected to a dusty atmosphere—tobacconists, workers in woolen goods, stone-cutters, millers, laborers in chemical works, etc., or in overheated apartments, as, for example, bakers—are thereby rendered more susceptible to catarrhal affections. In addition to the meteorological conditions which prevail in elevated regions, as, for example, the Alps, the finely divided particles of metallic dust suspended in the atmosphere are said to be important factors in determining affections of the respiratory apparatus. The nasal erectile bodies are peculiarly sensitive to the impression produced by certain noxious gases, especially those given off in the combustion of coal, while the furnace heat of the modern dwelling, and the dry, impure air of apartments fed by the majority of coal-burning stoves, and the varying temperatures of the different rooms, create a vulnerability of the mucous membrane which, in our American cities, constitutes a not unimportant ætiological factor.

In some parts of our country there is a widespread popular belief that *dust* is the chief factor in the localization of inflammatory disease in the naso-pharynx. As there are some who ascribe all diseases to the peripatetic excursions of a vagrant micrococcus, so there are others who see in dust the source of all our ills. While it is undoubtedly true that dust, when accidentally lodged in the naso-pharynx, may give rise to inflammation, I believe that comparatively few cases originate in that way. In some of the Western States the prevalence of large quantities of dust in the atmosphere is supposed to determine the geographical distribution of the complaint; but even here, in estimating the amount of injury done by dust in this case, we should not forget the important meteorological changes that condition its presence in the atmosphere, nor should we lose sight of the fact that these localities are thousands of feet above the

water-level, a condition that subjects them more easily to impressions made by sudden variations in the temperature and brings them directly under the dominion of the winds that sweep across the continent from sea to sea. Moreover, when an individual is exposed to an atmosphere filled with dust, the greater portion of the inhaled particles is retained within the nostrils. This is due in a great measure, as I have pointed out elsewhere, to the erection of the turbinated corpora cavernosa, which latter serve, in that respect, a certain teleological purpose. That portion which finds its way into the posterior nares is carried into the lower (not the upper) pharynx, not only by the force of the inspiratory stream but also in obedience to the law of gravitation. When the atmosphere is unusually dense, as in storms of dust, this erection of the corpora cavernosa is often so considerable as to necessitate mouth-breathing, and it is to a large extent in this way that the lower pharynx and larynx become filled with foreign matter. It is also a notorious fact that in the nasal passages themselves the region of olfaction is much less liable to catarrhal inflammation than the respiratory passage. The nasal pharynx is therefore infinitely less liable to inflammation from a dusty atmosphere than either the larynx or lower pharyngeal cavities.

*Among the influences which, approaching from the external world, encourage the eruption of naso-laryngeal affections, the chief, and at the same time predisposing, exciting cause, and that which determines the geographical distribution of nasal, naso-pharyngeal, and laryngeal catarrh, is that combination of varying meteorological conditions which are understood when speaking of a changeable climate; the home of naso-laryngeal catarrh is the land of the greatest and most rapid thermo- and barometrical change.\**

Turning now from the effect of temperature changes and the direct action of local irritation from substances derived from the external world to the agencies which, operating within the organism, determine the localization of catarrhal disease in the nasal passages and throat, we must confess that the ancients exhibited the greatest shrewdness of observation when they referred these affections to defective digestive processes and lowered powers of assimilation. Catarrhal diseases, according to the fathers of medicine, are due to imperfect "coction"—that is to say, imperfect assimilation—and

\* The alternate subjection of the pharynx and larynx to extremes of heat and cold in the ingesta acts, though to a far less degree, in the same manner in determining catarrhal inflammation as the sudden changes in the temperature of the external air.

the resulting discharge or secretion was looked upon as aliment which had not undergone the necessary digestive changes, or, in other words, as half-cooked food. While their notions of the ætiology of catarrhal affections were in the main crude and curiously influenced by the prevailing philosophical vagaries of their time, they nevertheless contain an amount of common sense which it behooves us to pause and consider.

*It may be said, in general, that all those influences which impair the general health, interfere with the proper circulation or impair the constituents of the blood, retard the processes of digestion and assimilation of food, or beget a hypersensitive condition of the vaso-motor nervous system, react upon the upper respiratory tract in common with the other organs of the economy, and predispose, other things being equal, to catarrhal inflammation of the same.* Thus the latter is more liable to develop in anæmic persons with weak, relaxed conditions of the tissues and who lead sedentary lives, and in those of highly nervous organization, than in those of strong and vigorous constitution and who pass most of their time in active out-door exercise. The existence of syphilis or tuberculosis in an individual is a constant invitation to catarrhal inflammations of the nose and throat, and the same is true in regard to the rheumatic, gouty, scorbutic diatheses, to chronic alcoholismus, and a host of other affections.

Over-indulgence of the appetites, excesses of all kinds, habitual interference with the bodily excretions, notably the intestinal, predispose to inflammatory disease of the naso-laryngeal tract, so that Schneider was not far from the truth when he said that the cure of catarrhs consisted in "sobriety, continuous bodily exertion, and tranquillity of mind."

Besides being predisposed to or conditioned by pathological states of the system as a whole, *catarrhal affections of the nose and larynx are not infrequently the result of reflected irritation from its individual parts*, as, for example, disease, over-stimulation, or suppression of the functions of the cutaneous (eruptions, suppression of perspiration, etc.), gastro-intestinal (habitual constipation, hæmorrhoids, parasites, etc.), or genito-urinary apparatus (Bright's disease, utero-ovarian irritation, etc.), teeth and gums (caries, dentition, etc.), external auditory meatus or middle ear (inflammation, impacted cerumen, parasites, etc.). Let us examine this subject more closely: As the respiratory passages and skin are the sole avenues through which oxygen reaches the blood, and as they are held in close consent by

virtue of their community of function, it naturally follows that the abrogated activity of the one will necessitate vicarious action on the part of the other. This supplementary or compensative action, if prolonged, sooner or later transcends its physiological limits and eventuates in morbid conditions of the organs whose machinery has been thereby overtaxed. Familiar examples of this vicarious action are the congestion or inflammatory disorders of the respiratory apparatus which follow sudden or prolonged interference with the cutaneous functions, as in sudden chilling of the external surfaces or in the exanthemata, the sudden suppression of tinea capitis and eczema, and, on the other hand, the night-sweats of consumption. One word in regard to the eruptive fevers. The catarrhal nasolaryngeal disease may usher in the attack (especially is this the case in measles), may occur coincidently with the exanthem, or may follow the disappearance of the latter, or, finally, it may not develop until convalescence has begun. The catarrhal affections complicating the essential fevers may disappear completely during the latter period, but in many cases go on to the chronic state. This is especially true, in my experience, in regard to affections of the nasopharyngeal space. *There seems to be a special tendency to the localization of the disease in this region, and a large majority of the cases of hyperplastic conditions of the adenoid tissue coming under my observation, are directly traceable to some acute blood-poisoning in infancy, as scarlet fever, measles, diphtheria, etc.* This is doubtless due, to a great extent, to the fact that the naso-pharyngeal affection is overlooked by the attendant; but it may be that the *tendency of the eruptive fevers to leave traces of their existence in the glandular structures of the throat (notably the tonsils) may determine diseased conditions of the adenoid elements of the nasal pharynx.*

It now and then happens that during convalescence from acute infectious processes *irregular fluctuations in the temperature* occur, and even a veritable septicæmic condition, inexplicable by the ordinary examination of the functions of the patient, and which depend upon the persistence of the inflammatory process in the retro-nasal space. I have observed this after scarlet fever and diphtheria, but there is no reason why it should not occur in other and allied affections. This is an important practical point, for by simply cleansing the naso-pharynx of decomposing secretion (I find bichloride of mercury to be the best agent for this purpose) the temperature becomes normal and the disagreeable symptoms dissipated. In this connection let me observe that in all infectious processes character-



ized by inflammatory manifestations in the pharynx the greatest relief to the child may be secured through careful cleansing of the retro-nasal cavities. In diphtheria, for example, the greatest comfort is experienced by attention to this expedient. To digress still further: In the ordinary acute catarrhal throat affections of infancy much comfort may be given, and the tendency to spasm diminished, by careful attention to the nasal and retro-nasal cavities.\* There is an old woman's saying in this part of the country that "if a croupy child sneezes, it is well." But no one ever thinks of the nasal passages in connection with a croupy infant. Yet there is, nevertheless, always more or less inflammation of the post-nasal passages, and the tendency to spasm may be diminished by cleansing the passages of mucus, especially before the child retires for the night.†

There is an affection of the skin which is observed in connection with certain forms of coryza, and notably that of sympathetic origin, or rhinitis sympathetica. I refer to urticaria. It appears and subsides with the coryza, and seemingly depends upon the imperfectly defined neurosis or vaso-motor influence which is probably the connecting link between the two affections (possibly some functional derangement of the cervical sympathetic).

Passing now to the *reciprocal relationship existing between the turbinated nasal tissue and the auditory meatus and middle ear*, it is not an uncommon matter in my experience to find that the subjects of chronic nasal inflammation suffer from a more or less constant dryness and itching of the former or a tendency to the inspissation of cerumen, and this, apart from existing disease of the middle ear. I have on several occasions adverted to the rôle of congestive conditions of the erectile tissue in the production of middle-ear affections (doubtless through reflex influence). It remains for me to call your attention to the fact that unilateral coryza, either acute or chronic, sometimes depends upon irritation of the external auditory passage. Two years ago I was consulted concerning a case in which a severe unilateral discharge, with stoppage of the nostril, hemicrania, and other phenomena referable to the same side, of a number of

\* In this disease, too, the paralytic condition of the palatal muscles interferes materially with the voluntary removal of secretion from the retro-nasal space.

† *The influence of the febrile state is also occasionally exerted in the direction of cure of existing catarrhal disease of the nasal passages and throat.* This is especially true of those affections with special tendency to local manifestation in the throat, and the cure may be permanent or temporary. I have also observed complete disappearance of a naso-pharyngeal catarrh during the course of malarial fever. (See paper read before this association at its last session.)

weeks' duration, was completely dissipated by the removal of a mass of impacted cerumen from the ear of the affected side; and recently a similar case has come under my professional care in which the swelling of the erectile tissue disappeared upon removal of the ceruminous plug. In the presence of these facts the conclusion is irresistible that an intimate physiological relationship exists between the nasal cavities and the auditory meatus.\*

It has thus been shown that *nasal and laryngeal inflammation may proceed from the direct or indirect (reflex) irritation of a host of substances derived from the external world, from an almost indefinite number of pathological conditions of the system as a whole, or from irritation or disease of organs distant from the seat of local inflammation.* The predisposing influence of *certain structural peculiarities of the nasal chambers* remains to be briefly adverted to. These consist most commonly in deflection (or malposition) and perforation of the septum, anomalous conditions of the turbinated bones (hypertrophy, abnormal position, atrophy?), and disturbance of the anatomical relations of the nasal fossæ either through accident or disease. There are certain anomalies of structure of the throat and nasal passages that are seen in several members of the same family which are undoubtedly inherited and which are of such a nature as to give rise to no inconvenience, or, on the other hand, encourage the development of inflammatory processes; in the latter cases their influence is purely mechanical. There also exists in some families a *peculiar vulnerability of the mucous membrane* of the nose and throat which is sometimes conspicuous for several generations. Such persons are said to "inherit" catarrhal inflammation or to be the subjects of the "catarrhal diathesis"—a view which has descended to us chiefly from the earlier French physicians. It is undoubtedly true that the children of parents debilitated by disease, excesses, or other causes, or who inherit, for example, the enfeebled constitution of the syphilitic or tubercular, diatheses well known as predisponents to catarrh, may, by virtue of the inheritance of a vice of constitution, yield more easily than those of healthy parentage when exposed

\* In certain persons, notably those of highly developed nervous organization, or in the hysterical or hypochondriacal, coryza is occasionally produced by direct impression upon the olfactory nerve, or, from simple association of ideas, by physical or mental over-exertion or emotional excitement. Here there is usually some co-existing local nasal disease or vaso-motor neurosis, and such cases are closely allied to, if not a part and parcel of, the sympathetic form of rhinitis (rhinitis sympathetica). (See abstract, in "Maryland Medical Journal," April 11, 1885, of paper read before the Clinical Society.)



to the exciting causes of the disease; but there is no evidence yet adduced that puts beyond a reasonable doubt the descent of a simple inflammation from father to son. These remarks apply with equal force to the so-called catarrhal diathesis, which latter may be looked upon simply as a generic term for a multitude of varied physical peculiarities, each susceptible, upon close analysis, of reference to a definite and tangible cause, or to a combination of injurious influences.

*Catarrhal inflammations of the nose and throat in the newly born, when not due to gonorrhœal inoculation, probably owe their origin to causes operating during intra-uterine life.\** It occasionally happens that inflammatory affections of these cavities are ushered in at some physiological epoch, as puberty, or existing disease dissipated by the nutritive changes which occur at that period. The subacute laryngitis which occurs at puberty occasionally develops into a chronic inflammation, especially in the subjects of inherited constitutional vices—a fact which it is well to bear in mind both in a prophylactic and prognostic point of view. Inflammatory conditions of the throat and nasal passages occasionally make their appearance at the menstrual period, appearing either coincidently with the uterine hæmorrhage or as the vicarious representative of that process, and I have seen one case where a catarrhal affection of these passages ushered in the menopause and subsided with the termination of menstrual life.†

*Ætiology of Pharyngeal and Laryngeal Inflammation.*—The chief predisposing causes of acute pharyngo-laryngeal inflammation are the existence of chronic hyperæmia or inflammation of the naso-bronchial tract, abnormal state of vitality from inherited or acquired disease, excesses, subjection to imperfect sanitary conditions, and constant confinement to a vitiated atmosphere. While in the vast majority of instances acute inflammation of the pharynx or larynx occurs as a complication of acute or chronic naso-pharyngeal (or bronchial) catarrh, it may nevertheless be met with as a primary affection. I do not share the extreme view of my friend Dr. Bosworth, who has written so well upon this subject, that acute laryngitis only occurs as a symptom of the chronic form. While I regard the

\* See article by the author in "Phila. Medical News," October 4, 1884.

† See on this subject a paper by the author on "Irritation of the Sexual Apparatus as an Ætiological Factor in the Production of Nasal Disease," "Am. Jour. of the Med. Sci.," April, 1884. (Prize essay, Maryland Academy of Medicine.)

existence of the latter as its most prominent predisposing cause, it is nevertheless true that the disease may appear as a primary affection limited to the laryngeal or pharyngeal structures.

Apart, then, from the inflammation resulting from local pathological processes, mechanical or chemical injury, abuse of the forces of expiration and inspiration, the isolation of this disease in the larynx (acute primary laryngitis) is one of the rarest of pathological events. In adult and infant it most commonly occurs as a complication of acute nasal catarrh or as a part of a general inflammatory condition of the naso-bronchial tract. I am inclined to believe that in the irritable state of the nasal tissues, and notably the cavernous bodies, resides an important aetiological factor in the adductor spasm which characterizes the disease in the infant; the engorgement of the sensitive area when the recumbent posture is assumed, and the gravitation of the nasal secretions into the laryngeal vestibule, being the most important agents in awakening the reflex laryngeal spasm. In the adult, acute catarrh of the larynx is a relatively rare disease, a fact which is remarkable, as Flint\* has pointed out, in view of the frequency of acute pharyngeal inflammation, and illustrates the conservatism of the natural law in regard to the extension of inflammation.

The reflex or collateral hyperæmia of the larynx which is present in inflammatory conditions of the nasal and pharyngeal cavities is too often mistaken for acute inflammation, and confusion too often arises, especially when the laryngoscope is not available, from failure to remember the simple truth that hoarseness is not laryngitis.

Chronic catarrhal laryngitis as an isolated affection is rarely met with; it is almost invariably secondary and associated with inflammatory disease of the nose or nasal pharynx, upon which it, in the large majority of cases, depends. Indeed, setting aside the inflammation which results from purely local irritation, it may be laid down as a law that the vast majority of cases of catarrhal, pharyngeal and laryngeal disease originate primarily in inflammation of the nasal cavities. Catarrhal rhinitis leads to inflammation of the pharynx and larynx in one or all of the following ways:

1. By mouth breathing, which I may say acts not only through the irritation of the cold, dry, and impure air inspired through the mouth, as in nasal obstruction, or through the nasal passages, as in atrophy of the turbinated structures, but also by crippling the respiratory and vocal forces, shortening both inspiration and ex-

\* "Principles and Practice of Medicine," Philadelphia, 1873, p. 263.

piration, compelling rapid respiration and resulting vocal and respiratory fatigue.

2. By the constant endeavor to overcome the loss of nasal power and resonance, and the consequent pharyngeal and laryngeal fatigue.

3. In certain cases, by interference with the normal motility of the palatal structures.

4. Through reflected irritation.

5. By the irritation of the atmosphere, vitiated in some instances, not by virtue of its passage through the mouth, *but through the nasal chambers themselves.*

6. By so-called extension of inflammation.

7. Possibly by irritation of secretion.

In studying the pathological conditions of the naso-pharyngeal space and middle ear, we may, for practical purposes, regard these cavities as accessory to the nasal chambers, so intimately interwoven is their pathology with a diseased condition of the nasal fossæ. As stated elsewhere,\* in a large proportion of cases of so-called middle-ear inflammation the latter "is merely a symptom of nasal catarrh, and gradually disappears without special treatment upon the removal of its primary cause." When the middle-ear affection is thus symptomatic, it is generally traceable to mechanical causes or to reflected irritation.

Inflammatory conditions of the naso-pharyngeal cavities are encouraged and existing disease of these structures perpetuated by paralytic conditions or defective muscular power (*e. g.*, from existing chronic inflammation, enlarged tonsils, defective innervation, etc.), or from abnormal approximations of their walls (from adhesions). As a consequence of the impaired functional exercise of the structures thereby induced, congestive and catarrhal processes develop in the laryngeal cavity, which result from the constant endeavor by abuse of the expiratory forces to overcome the loss of power in the pharynx. Both loss of power and adhesions, which latter act by crippling the muscular action and disturbing normal anatomical relations, tend also to prevent voluntary cleansing of the retro-nasal space, and thus form another factor in the persistence of the chronic inflammatory process.

Finally, I wish to observe that in a large proportion of cases it will be found, upon careful examination, that the existence of the nasal, pharyngeal, or laryngeal affection is not due to any one par-

\* "Trans. of the Med.-Chir. Fac. of Maryland," 1883.

ticular cause, but to a combination of injurious influences—the resultant of a number of internal and external forces.

*Discussion.*

Dr. J. SOLIS-COHEN: We gather from the essay the fact, not fully appreciated, that many catarrhal affections are due to climatic and constitutional conditions, and that this indicates a feature in the treatment which is too frequently ignored. Climatic conditions can not be altered, but the susceptible individual can be protected by suitable hygienic and dietetic supervision. The function of digestion and the secretions of the intestines and kidneys must be attended to, the skin be kept in good order, and thus revulsive measures be adopted to withdraw morbid influences from the upper respiratory tract. Too great an attention to local measures without due consideration to constitutional conditions does not fulfill the requirements.

Acute laryngitis, in my experience, occurs frequently in individuals who are not at all suffering with chronic catarrhal disease, and subsides without such a sequel. On the other hand, subacute inflammations occur most frequently, in my experience, in the subjects of chronic disease as exacerbations due to some special exposure.

The spasmodic affections of infants alluded to in the paper as occurring in the subjects of chronic naso-pharyngeal catarrh are similar in origin to the night-cough of infants, being due to trickling of mucus into the larynx. The indication, then, is to place the sleeping infant in a position which will not favor the entrance of secretions into the larynx, and, of course, to treat the catarrhal disease.

Dr. H. A. JOHNSON: Naso-pharyngeal catarrh is common around our lakes, and is frequently benefited by a change of climate to the Western plains, up to an altitude of five thousand or six thousand feet. In the high mountains the disease is aggravated. In the treatment of this trouble tonics are usually of great value, and we are tempted to overlook the general conditions in the presence of the local lesion.

Dr. GLASGOW: I can not strictly agree with the speaker in the relative importance of atmospheric change and dust in producing catarrhal diseases. Although rapid changes of atmosphere lead to catarrhal disease, I fully believe that dust or atmospheric dirt holds the most important place in their production. We find evidence of this in the fact that people living in atmospheres laden with dust are particularly liable to catarrh. For instance, persons living in my own city, St. Louis, are especially prone to these troubles. Removal into the purer air of the country invariably lessens the difficulty, and it is again aggravated by a return to the city. I believe this is the general experience in all dust-laden cities.

We also see evidence of the importance of dust in the experience of people in the alkali regions of the West, and this without special regard to the elevation. Catarrhal disease is the rule in this section. If previ-

ously existing, it is aggravated; if the naso-pharyngeal membrane was previously healthy, a commencing catarrhal inflammation is soon noticed.

Dr. INGALS: I agree with the other speakers as to the necessity for attending to the constitutional condition of the patient, but we must not lose sight of the constitutional manifestations due to the nasal disease. In many cases great impairment of the general health, which may have existed for years, is dependent upon nasal obstruction, and remarkable improvement will immediately succeed removal of the nasal affection.

Dr. ALLEN: The study of catarrh should be considered in great part as a phase of morphology. The careful study of each separate case is important. It is always well to treat individuals rather than diseases. The identification of the local structural cause of the catarrh is, in the majority of instances, alone possible after unremitting scrutiny.

Dr. MACKENZIE: I fully agree with Dr. Allen as to the importance of local treatment; at the same time it should not be forgotten that in many instances the balance between cure and failure may be easily turned by neglect of constitutional measures. Cases occur in which local measures must be carried out before relief can be obtained, while, on the other hand, constitutional measures must be employed in order to secure the maximum of good in treatment. Dr. Glasgow misunderstands the position which I took in regard to dust as a factor in the production of catarrh. My proposition is simply this: That the localization of catarrhal processes in the retro-nasal space or the geographical limits of the disease have little to do with the presence of dust in the atmosphere. While it is true that dust accidentally lodged in the naso-pharynx may give rise to inflammation, I believe that few cases originate in this way, for reasons which I have explained in my paper.

### *Paper.*

#### ERYSIPELAS OF THE LARYNX AND PHARYNX.

By D. BRYSON DELAVAN, M. D.

SINCE the remarkable and exhaustive thesis of Cornil, which appeared in the "*Archives générales de médecine*" in 1862, little new knowledge has been advanced, either in the pathology, the clinical features, or the treatment of this affection. Morell Mackenzie, in his excellent *résumé* of the subject, tells us that erysipelas of the mucous membrane of the pharynx and larynx is, pathologically, similar to the same malady when situated on the skin, and that it occurs either primarily or by extension from the face along the mucous tracts of the mouth, nose, or ear. Its causes are the same as those which give rise to it when situated upon the external parts of the body, although it has been most often observed in the



course of general epidemics of the disease. Of eighteen patients seen, in whom the pharynx was affected, fifteen were under the age of thirty, and two thirds were females. Again, on inspecting the pharynx, the appearance of the mucous membrane when affected with erysipelas differs considerably according to the form of the disease which is present; the local phenomena are generally very different from those of tonsillitis, but sometimes can not be distinguished from those of simple inflammation of the part. Cornil makes three divisions of the malady, viz.: (1) erysipelas with simple redness; (2) erysipelas with phlyctenulæ; and (3) erysipelas terminating in gangrene. Erysipelas most commonly reaches the larynx from the pharynx, but the former organ may be primarily affected while the pharynx remains healthy. According to one author, quoted by Mackenzie, the disease may extend still farther down the respiratory tract. In cases which come under the first division the diagnosis must remain doubtful except where the throat lesion is accompanied by manifestations upon the skin.

As to the prognosis, the dictum of Hippocrates—namely, “When erysipelas extends from within outward it is a favorable symptom, but when it removes to the internal surfaces it is a deadly one”—has been confirmed by modern observation. In nine cases analyzed by Cornil where the face was first attacked, seven deaths occurred; whereas, in nine other instances where the enanthem preceded the skin eruption, seven recoveries took place. Mackenzie states that he has seen but four cases in the whole course of his practice.

From the foregoing statements it would appear that the disease in question has been so long ago recognized, and its nature so well understood, as to render its introduction at the present time unnecessary. In searching for the records of authentic cases in available American literature, however, we are surprised to find but a single instance in which the disease has been described, namely, the one reported last year by Dr. T. A. De Blois. The case reported by Dr. William Porter, of St. Louis, was that of an Englishman whom Dr. Porter attended while residing in London. Whether it is more rare in this country than in Europe, or whether, on the other hand, it is either allowed to pass unrecognized or else regarded as a simple and ordinary complication of the general affection unworthy of special mention, it is impossible to say. That the condition is an important one no one will question, while the very general nature of the treatment suggested proves that additional light upon the subject is greatly to be desired. With the intention of awakening a



sufficient interest in it to secure a more careful recording of such cases as may arise, together with the methods and results of their treatment, the following histories are presented :

Edward Smith, aged twenty-nine, of robust appearance, had always enjoyed good health. On February 10, 1883, two months after admission to the Workhouse, applied at the dispensary, complaining of chilliness, general muscular soreness, and pain in the bones. There was slight soreness of the throat, and pain in deglutition, which he stated he had first felt upon the right side. The tonsils were congested and slightly enlarged, particularly the right.

*February 11th, 12th.*—Felt much worse and experienced more dysphagia. He also complained of a feeling of dryness in the nasal passages and inability to breathe through the nose. Described the nasal condition as being like a "cold in the head." The pulse was somewhat accelerated, and there was a slight rise of temperature.

*14th.*—Was transferred to the hospital, all of the above symptoms being exaggerated. Temperature  $102^{\circ}$ , pulse 96, respirations 27. Tongue and teeth covered with sordes; tonsils and pharynx deeply congested. At this time also an herpetic eruption appeared on the face, below and to the outer side of the angle of the mouth.

*15th.*—On the morning of this day an erysipelatous redness, attended with swelling, appeared upon the upper lip, adjoining the alæ of the nose, and fading off upon the cheeks. There was also severe pain in the back of the head and the neck. The appetite was good, and there was little malaise. The temperature, however, was  $104^{\circ}$ , pulse 96, respirations 24.

*17th.*—The swelling and redness had extended to the margin of the hair, and had invaded the neck. The face was covered with blisters. The pulse was running and intermittent at 80, and the tongue black and dry. Severe pain still continued in the back of the neck.

*18th.*—Did not appear to suffer much pain. Erysipelas not extending.

*19th.*—Patient fell into a semi-conscious condition, from which it was impossible to arouse him, and questions put to him met with no response.

*21st.*—Semi-consciousness continued, but the patient began to be very restless and delirious. His hands were kept in constant motion, and it was almost impossible to keep him in bed. The facial swelling had subsided, and exfoliation of the epidermis had begun. The tongue was still black and thickly coated. The pulse and temperature were normal.

*22d.*—Patient was more rational and able to answer questions.

*23d.*—Was again slightly delirious, constantly sitting up in bed and throwing off the bedclothes, and fighting any one who came near him. Temperature  $97^{\circ}$ , pulse 50, respirations 21.

*24th.*—The delirium became active and of an hilarious character, the patient singing, shouting, and constantly arranging the bedclothes, and

imitating the actions of the ward attendants. The condition of the tongue had cleared somewhat, and the appetite had returned.

*26th.*—Patient was slightly irrational. Tongue clean; exfoliation of epidermis of face, neck, and ears progressing. Temperature and pulse normal.

*March 3d.*—Delirium entirely gone. Exfoliation almost complete. Hair began to fall out. During the whole illness there was obstinate constipation.

*12th.*—Patient was discharged, apparently cured.

On the morning of March 16th, however, the attention of the house surgeon was called to Smith on account of his wild appearance and strange actions. He was wandering aimlessly about the corridors, and seemed sullen and morose. This continued until the morning of the 18th, when he was transferred to the hospital again. He would pay no attention to those about him, answered questions a long while after they were put to him, imagined that his fellow-workmen were trying to annoy him, and that every one was plotting against him. While in the hospital he had delusions of a religious character at times, and at other times he imagined that some one whom he did not know was constantly urging him to the performance of a variety of strange actions, and he believed that he must obey. He was treacherous, and would strike at the attendant whenever a good opportunity presented. His nights were restless and sleepless, and the constant hallucination of an outside impelling influence kept him busily engaged, while he would hide under the bed, fix himself in various grotesque positions, arrange the bedclothes, and at times sit and stare at some one object for half an hour. If given something to do, he did it well, and while busy was happier and more satisfied to stay in the ward, but, when unemployed during the day, would constantly walk up and down, watching an opportunity to escape. During the five days he remained in the hospital he had no rise of temperature, his pulse was somewhat accelerated and weak, and his appetite good. As soon as his transfer could be effected, he was sent to the Insane Asylum at Ward's Island, where, when last heard from, he still remained.

The following case occurred in the wards of the New York Almshouse Hospital during the service of the writer in the spring of 1882. Unfortunately, careful notes were not taken at the time, and it will, therefore, be possible to report only as much as can be given from memory. The patient was an aged pauper of about seventy years, large, somewhat stout, and decidedly rheumatic. She was attacked with what at first seemed an acute laryngitis. The disease, however, spread rapidly in both directions, involving both the lungs and the pharynx, producing in the former distinct and widespread broncho-pneumonia, and in the latter an intense congestion. The mucous membrane here was also œdematous, and of a dark, purplish color. So peculiar was its appearance, and so threatening the extent of the œdema, that a laryngoscopic examination was made to ascertain the probable necessity for tracheotomy.

Although in a state of general tumefaction and of the same dark color as the pharynx, there was an ample rima glottidis, but marked hoarseness of the voice. The constitutional symptoms were slight, considering the nature and severity of the attack. By degrees the inflammation extended from the pharynx to the lips, whence, apparently having received a fresh impetus, it spread over the face. Meanwhile, the co-existence of diarrhœa, mild delirium, and continued high temperature rendered the general condition grave. This period marked the height of the attack. The lungs were first to improve, and the disappearance of the pneumonia was followed by a subsidence of the laryngeal and pharyngeal inflammation and a marked improvement in general. Strange to say, as desquamation occurred in the face and neck, the erysipelas extended, by slow degrees, over the whole body, the march being slow, the general symptoms mild, and no great extent of surface being involved at any one time. At the end of several weeks this process was completed by involvement and subsequent desquamation of the legs and feet. The patient recovered.

The case first related would, if classified according to the method of Cornil, belong to division number two, since it was decidedly severe in its nature, and the presence of phlyctænulæ, although not mentioned in the history by my house surgeon, was distinctly observed by myself. The features of the case which especially distinguish it are, first, the occurrence of the disease idiopathically in a patient who, so far as could be learned, had not been exposed to any erysipelatos infection; secondly, the distinct limitation of the disease to the tonsil for a period of three days; and, thirdly, the marked cerebral disturbance and subsequent insanity.

No especial cause of irritation was apparent in the tonsil; the man had been to all appearances unusually strong and healthy, and the sanitary condition of the premises was at the time tolerably good. The limitation of the inflammation and its absolutely benign appearance at the beginning of the attack were sufficient to disarm suspicion as to its true nature, and entirely out of harmony with the subsequent severity of the symptoms. By far the gravest of these was the effect of the disease upon the brain. So far as could be ascertained, the patient had never before manifested any sign of mental aberration. His insanity, therefore, bore such a distinct relation to the attack that, beyond question, the one was intimately associated with the other. Of course, it is by no means unusual for facial erysipelas of the ordinary type to be complicated with delirium and coma, and even with the more serious cerebral symptoms indicating meningitis, so that it is not surprising to find it developed

by the form under special consideration. The mechanism of this metastasis, however, is a matter of much interest. Formerly, it was explained as being a localized manifestation of a general morbid condition. At present, believers in the germ theory will maintain that it is due to an incursion of the bacillus of erysipelas from the frontier regions to the interior. Before accepting the foregoing it seems but just to call attention to the possibility of *direct extension* of the disease from the deeper layers of the olfactory region, and through the cribriform plate of the ethmoid bone, to the meninges; or, as is still more likely, from the surface of the face in the vicinity of the nose, forehead, and eyelids, through the anastomosis of the angular branch of the facial and other superficial facial vessels with the ophthalmic vein.\*

As has been long ago pointed out by Mr. Spencer Watson, of London, and others, in cases of severe inflammation of the nasal cavities an important point from the clinical aspect is that the intracranial symptoms come on very insidiously, and that the nasal disease is often quite overlooked, so that the appearance of meningitis seems inexplicable, or is attributed to some other cause. Mr. Frank Ogston reports a case ("British Medical Journal," May 16, 1885) in which the post-mortem examination showed that the exciting cause was an inflammation of the nasal mucous membrane which had spread through the orbital plate of the ethmoid bone and the dura mater to the arachnoid membrane, which it had attacked, and the inflammation had spread along the subarachnoid space.

Careful examination of the dura mater showed that it was healthy except a small patch which covered the orbit, which was thickened, roughened on the side toward the bone, and covered with a layer of lymph on the side next the brain, by which it was glued to the arachnoid. The orbital plate of the right side presented a canary-yellow appearance and a congested and roughened state of the bone. On cutting through this, the nasal cavity was found to be filled with a thick, creamy pus, which welled out into the brain cavity. Dr. McNaught, in a succeeding number of the same journal, reports two similar cases, both of which were attended with fatal results. There were no autopsies. In both cases a very profuse discharge of fœtid pus took place suddenly from both nostrils. Although there was nothing especial pointing to the frontal sinuses in these cases, Dr. McNaught thought that there would be little doubt that the menin-

\* Quain's "Elements of Anatomy," eighth edition, London, 1878, vol. i, p. 484.



gitis had been set up by continuity from inflammation of the mucous membrane lining these cavities.\*

While it is extremely improbable that in ordinary conditions of chronic inflammation the disease should thus extend itself, still it is by no means difficult to believe that a violent phlegmonous lesion of the deeper structures of the olfactory region might communicate itself to the neighboring highly vascular structures of the brain cavity. Still more reasonable is it to suppose that an erysipelas, involving the integument of the nose, forehead, and eyelid, should be conveyed to the brain-cavity by the way of the ophthalmic vein. The influence of inflammatory conditions of the middle ear and of the frontal sinus in exciting cerebral complications is well attested.

By whatever process it may have occurred in the case under consideration, there was established, without doubt, a meningitis, at first acute. Subsequently the acute attack passed into the chronic form, presenting the symptoms of this condition typically described toward the end of the history.

Case number 2 is more after the usual course of the disease. The patient was old, feeble, and lithiatic. She was housed in a crowded, ill-ventilated hospital ward, in which, although there may not actually have been another case then, erysipelas was never, for any great length of time, absent.

That the original seat of the disease was the larynx is plain, while its extension to the lungs on the one hand, and to the pharynx and the general surface on the other, renders the case one of rare and peculiar interest.

In an article published in the "*Rivista Clinica e Terapeutica*," No. 1, 1885, Dr. F. Massei, of Naples, endeavors to prove, from a study of thirteen cases, that the so-called primary œdema of the larynx, or phlegmonous laryngitis, corresponds clinically to a localization of erysipelas in the larynx. He describes the objective symptom of the disease as being a marked swelling, which, beginning at the epiglottis, extends to the mucous membrane of the aryteno-epiglottic ligament and the inter-arytenoid space, causing dyspnoea, dysphagia, and aphonia. The onset is generally sudden, and the laryngoscope shows such intense swelling that the interior of the larynx can not be demonstrated. Blood and pus are occasionally poured forth from spontaneous rupture of the mucous membrane. Often the swelling migrates, decreasing on one side and increasing

\* "Report on Laryngology," Dr. F. H. Hooper, "*Boston Med. and Surg. Jour.*," August 20, 1885.

on the other. The prognosis is, either recovery or else death by asphyxia or pneumonia.

Massei considers the disease erysipelatous for the following reasons:

1. Its rapid development and its tendency to wander, as well as its predilection for parts in which the lymphatics are abundant.

2. The constitutional symptoms, which resemble those of erysipelas.

3. Its want of resemblance, from its migratory character, to the ordinary forms of laryngitis.

4. The tendency of the disease to extend to the lungs; and, finally, its occurrence during the course of epidemics of erysipelas.

He concludes:

1. There is a primary erysipelas of the larynx.

2. Many cases reported as primary œdema of the larynx are really cases of erysipelas; this occurs more commonly than is generally supposed.

3. There are two forms: in the first the local manifestations precede the general; in the second they close the scene.

4. The best methods of treatment are applications of cold, scarification, and, finally, if asphyxia threatens, tracheotomy.

It will be seen that Massei's observations relate solely to the larynx. Although somewhat general in their nature, they are given as supplementing the views of the writers quoted above.

As to treatment, this of course must be both local and constitutional. Morell Mackenzie has had beneficial results in two cases of pharyngeal erysipelas from the insufflation twice daily of morphia, one quarter grain, diluted with starch, while ice was constantly sucked and bromide of potassium given every four hours. He believes that hot soothing inhalations should not be used so long as there is any chance of arresting the inflammation. Should gangrene supervene, antiseptic gargles must be employed. Iron, and, if necessary, quinine, ammonia, and stimulants should be administered, and a most nutritious diet insisted upon, while the danger of asphyxia must be borne constantly in mind.

By a careful study of the special conditions and necessities of individual cases, and by the prompt application of such measures as shall meet the given indications, much may be done, without doubt, to relieve the patient and hasten recovery.

It is hoped that the discussion of this paper may elicit minor suggestions more definite and more useful than any we have been



able to give. In general, it may be said that in local treatment the effect upon the patient of such drugs as morphia, etc., must be carefully remembered. The use of the spray apparatus, as contrasted with the older methods for making applications, promises well for additional comfort and success.

The writer is certain that, as house surgeon ten years ago in a large public hospital in which the erysipelas pavilions formed an important part of the service, both laryngeal and pharyngeal cases were occasionally presented. Unfortunately, their real nature was not then recognized, and in the lapse of time which has since occurred the recollection of the facts connected with them has become too indistinct to enable him to refer to them with any confidence or accuracy.

#### *Discussion.*

Dr. DE BLOIS said: My case, to which the reader has just referred, closely simulated follicular tonsillitis, and I treated it as such for twenty-four hours. The pharynx was involved in the inflammatory process, and both tonsils were equally affected. On the next day it appeared to have extended to the nasal cavities. There was a discharge from the nose, and what was much like a diphtheritic membrane in the posterior nasal cavities. There was no appearance on the face of any skin affection. There was some malaise, but the patient did not have a higher temperature than would be usual in the course of a severe tonsillitis. On the fourth day, when the disease passed on to the nasal cavities, the inflammation of the tonsils was somewhat improved. Later erysipelatous redness appeared over the bridge of the nose. The internal manifestations meanwhile became somewhat better, and the case progressed to a very severe attack of facial erysipelas. She subsequently recovered. The point which I wished to bring out was, the difficulty of diagnosis.

Dr. RICE.—It would seem strange that erysipelas of the larynx and pharynx should be such an infrequent disease when the conditions are so favorable to its development. Cases of facial erysipelas are very common when at the same time the patient is suffering with extensive ulcerations of the nose and pharynx, which, we should suppose, would invite an extension of the disease to this locality. And yet this is a rare occurrence. Ulcerations on the cutaneous surface are almost always attacked; on the mucous membrane it is the exception. I am convinced that erysipelas of the larynx does exist where a diagnosis is not made. I remember in the erysipelas wards of Charity Hospital there were two cases (which were called "œdema glottidis") where tracheotomy was done; the inflammation here was probably of an erysipelatous nature.

Dr. ROE.—An interesting case of erysipelas of the larynx and pharynx came under my observation about a year and a half ago, in a lady, about

thirty-seven years of age, of a nervous sanguine temperament. She was under treatment for naso-pharyngeal catarrh. The attack seemed to be due to exposure during a slight fall of snow, in the course of which she rubbed her face with snow. Within six hours afterward she had well-marked facial erysipelas. This went on its usual course, but soon assumed a severe type. Within thirty-six hours afterward she had delirium. The erysipelas extended to the neck and into the pharynx, also into the larynx, causing marked œdema of the larynx and pharynx, so that there was severe dyspnœa for about twenty-four hours. One night I remained in the house expecting to have to perform tracheotomy before morning. I used the usual course for erysipelas—*i. e.*, mild alkaline sprays, with a little alcohol—which seemed to have a very quieting and soothing effect, and soon the erysipelas began to subside in the face and gradually in the larynx and pharynx. In about four days the symptoms in that region disappeared. These cases must be unusual, as Dr. Delavan has said, although often attributed, probably, to other causes.

Dr. COHEN.—Having seen the admirable effects of the hypodermic injection of hydrochlorate of pilocarpine in facial erysipelas in hospital practice, it occurs to me that it would be an admirable method of treating these rare cases. Its action in doses of one sixth of a grain is very prompt.

Dr. DELAVAN, in closing the discussion, said: There seems to be no reason why any inflammatory condition of the pharynx—such as diphtheria, follicular tonsillitis, or peritonsillar abscess—should not excite an attack of erysipelas, so that a case beginning as a simple attack of one of the former affections may result in the latter. With regard to the use of pilocarpine, I have found the dose recommended to be, in some cases, excessive, and would urge the employment of this potent drug in smaller quantities, one twentieth of a grain often being sufficient.

### *Paper.*

#### LEUCOPLAKIA BUCCALIS ET LINGUALIS, OR ICHTHYOSIS LINGUÆ SUCCESSFUL TREATMENT WITH THE GALVANO-CAUTERY.

By E. FLETCHER INGALS, M. D.

**D**URING the past year it has been my good fortune to cure a case of the rare and intractable disease which forms the subject of this paper.

This disease has been recognized but a short time, and very little can be found upon the subject in general medical literature, but, by a thorough search in the library of the Surgeon-General's Office in Washington, I found about fifty papers, mostly reports of cases which, with the single exception of one by Bazin, which I take

second-hand, seem to embrace all that has been written concerning the disease.

The literature is involved in what at first seemed inextricable confusion, for the reason that several different affections have been confounded and described under the same name. Thus, "smokers' patches," the peculiar condition of the mucous membrane of the mouth found in old glass-blowers, termed by Guinaud\* "professional patches," psoriasis linguæ, and various manifestations of syphilis, have been considered by different authors as true leucoplakia, or as one of its phases.

The term leucoplakia, which, of the names proposed for this affection, seems open to least objection, was suggested by Professor Schwimmer,† who gives a lengthy and exhaustive description of the disease. Ullmann‡ employed the term tylosis, which is strongly advocated by W. Fairlie Clarke.# The affection was first brought prominently before the profession by J. W. Hulke,|| under the title ichthyosis linguæ, a name which has been quite generally accepted save by Debove<sup>^</sup> and some other French writers, who have described it, together with other affections, as a manifestation of psoriasis.

*Definition.*—*Leucoplakia buccalis* is a chronic affection of the buccal mucous membrane, characterized by thickening of the epithelium, and the formation of white, opaline, elevated patches, which usually become fissured and painful, and, after continuing for a long time, are likely to terminate in epithelioma.

*History.*—The first mention that I can find of ichthyosis linguæ is in a paper under the title of "Maladies de la peau," 1822, by Alibert, who records a case, reported in some of the journals, of a young woman in Naples who had extensive ichthyosis of the skin, which finally involved the tongue and lips. In 1837 Samuel Plumbe◇ described a case of enlargement of the papillæ of the tongue which he regarded as precisely similar in its nature to local ichthyosis of the skin. In 1858 Ullmann‡ described a case of leucoplakia under the name of tylosis. In the same year J. J. Buzenet↑ reported two cases of undoubted leucoplakia, and, in 1861, J. W.

\* "Syphilis des reniers," "Lyon méd.," xxxv, 1880.

† "Vierteljahresschrift für Dermatologie," iv, 1877.

‡ "Aerztlich. Intelligenzblatt," Munich, v, 1858.

# "British Med. Jour.," 1874, vol. i.

|| "Med. Times and Gazette," London, 1865, vol. i.

<sup>^</sup> Paris thesis, 1873.

◇ "Diseases of the Skin," Philadelphia, 1837.

‡ *Loc. cit.*

↑ Paris thesis, 1858.

Hulke\* recorded a case under the title of "Wart and Corn of the Mucous Membrane of the Tongue." The following year Sir William Fergusson† presented a somewhat similar case in a clinic at the, King's College Hospital, and in the same year, in the report of a clinic by Dr. Andrew Clark,‡ we find a case described under the name of aphtha figurata, which is supposed by some to have been true leucoplakia, but which seems to have been psoriasis of the tongue. The same year J. Moore Neligan# notes a case of true leucoplakia which finally terminated in epithelioma. February 28, 1865, J. W. Hulke,|| of London, presented what is generally credited as the first paper on the subject to the Royal Medical and Chirurgical Society. Subsequently brief articles appeared on the subject by S. James A. Salter,^ 1866; Bazin,◇ 1868; M. Lailier,‡ 1869; Sir James Paget,↑ 1870; C. Saison,‡ 1871; and W. Fairlie Clarke\*\* 1872. Finally, in 1873, Charles Mauriac†† published an exhaustive article on the subject under the title of "Du psoriasis de la langue et de la muqueuse buccale." Since Mauriac's article numerous papers have appeared, the most important of which are by M. G. Debove,‡‡ 1873; Henry Morris,## 1874; W. Fairlie Clarke,||| the same year; Robert F. Weir,^^ 1875; Professor Ernst Schwimmer,◇◇ 1877 and 1881; and E. Vidal,‡‡ 1883.

The disease is very rare, but its frequency can not be accurately determined, on account of the diversity of opinion which has been entertained by different writers with reference to its aetiology and diagnosis—a diversity which has caused many cases to be placed in this class which do not properly belong in it. Professor Schwimmer saw only twenty examples out of five thousand cases of dis-

\* "Med. Times and Gazette," London, 1861, vol. ii.

† "Lancet," London, 1862.

‡ "Med. Times and Gazette," London, 1862, vol. ii.

# "Notes of an Unusual Abnormal Condition of the Mucous Membrane of the Tongue and Cheeks considered in Connection with Life Assurance," 1862.

|| *Loc. cit.*

^ "Papillary Tumors of the Gums," 1866.

◇ Paris thesis, 1873.

‡ "Diet. encycl. des sci. méd.," Paris, 1869.

↑ "Case of Cancer following Ichthyosis of the Tongue," 1870.

‡ Paris thesis, xlv, 1871.

\*\* "Lancet," London, 1872, vol. i.

†† "L'Union médicale," xvi, 1873.

‡‡ Paris thesis, 1873.

## "British Med. Jour.," 1874, vol. vi.

||| *Loc. cit.*

^^ "N. Y. Med. Jour.," vol. xxi, 1875.

◇◇ *Loc. cit.*, and "Transactions of the International Med. Cong.," London, vol. iii, 1881.

‡‡ "L'Union méd.," xxxv, 1883.

eases of the skin and syphilis, and many others have not seen so large a proportion as this; but doubtless many cases are not recognized, and pass for constitutional syphilis.

Most of the cases have been reported from Germany, France, and England, but some have been recorded in this country. So far the records show that the disease seldom affects any excepting males over forty years of age, though it has been observed as early as the thirty-second year, and a very few examples have been seen in women.

*Anatomical Characters.*—The patches are generally found on the dorsum of the tongue or the inner surface of the cheek and lips, but seldom, if ever, on the lower surface of the tongue or behind the anterior pillars of the fauces, and they are limited to the buccal cavity.

They may be seen in one or more small, irregular, or oval patches, or these may have become confluent. A considerable portion of the tongue alone may be involved, or the dorsum of the tongue, the buccal mucosa, and the surface of the jaw may one or all be affected.

The first appearance of the white patch is preceded by hyperæmia, and in the early stages a hyperæmic areola is found about its borders. Afterward the patch itself is more or less thickened, sometimes to the extent of six or eight mm., and the epithelium, which has become hard and dry, may be easily removed, or in spots it may have been spontaneously exfoliated, leaving the appearance of an ulcer.

The surface of the patch is marked by numerous fine lines or furrows, which intersect each other, dividing it into small polygonal spaces. Some of these may extend as deep fissures down through the thickened epithelium, and involve the mucosa in painful ulceration. In cases of long standing the papillæ may be much enlarged, giving the surface a warty appearance.

Under the microscope the epithelium is found greatly thickened, the papillæ enlarged and flattened, the blood-vessels dilated, with an accumulation of leucocytes about their walls. The superficial layer of the mucous corium is infiltrated with embryonic cells, and the deep layer is involved in vascular alterations.

According to Hulke,\* there is hypertrophy of the epithelial and papillary layer of the mucous membrane, similar to the condition of the skin termed ichthyosis.

In 1874, W. Fairlie Clarke† spoke of the disease as a chronic

\* *Loc. cit.*

† *Loc. cit.*



inflammation and papillary growth, but in later writings he does not strictly adhere to these views.

Mauriac\* says "it is certain that it is a chronic inflammation of the parts involved."

In the first stage of the affection, hyperæmia of the deeper layers of the epithelium exists, which is soon followed by exudation, and this consolidating causes induration.

The epithelial cells are increased and the papillæ enlarged, but later, when the affection merges into epithelioma, there is, according to Clarke,† an enormous increase of the rete mucosum at the expense of the papillæ, which are then reduced to mere threads.

*Causation.*—Excessive tobacco-smoking is ranked as one of the most frequent causes of the disease, but it is barely possible that prolonged irritation of any character may have a similar effect on those predisposed to it.

Thus, Mauriac‡ and Vidal# mention highly spiced foods and alcoholic stimulants as irritants which must be avoided.

Schwimmer|| calls the affection idiopathic, but both he and Mauriac think there must be some peculiar predisposition toward it in order that it may be developed.

Bazin,^ who has seen the affection in several members of the same family, believes that it is often, if not usually, the result of constitutional syphilis.

Mauriac believes that all psoriasis of the mouth and tongue supervening in syphilis is not necessarily syphilitic, and may not take part in the syphilitic disease.

Debove, Bazin, and Mauriac attribute it frequently to the arthritic or dartrous diathesis. Thus it will be seen that the cause of the affection is not definitely known, though it is commonly believed to be induced by smoking in most instances. It must not be forgotten, however, that several cases have been recorded in persons not addicted to the use of tobacco. In those who use tobacco to excess it is not necessarily the irritant effects of the smoke or heat that cause the disease, but, as in the case here appended, the noxious influence of the tobacco itself.

*Clinical History.*—It is also difficult to determine exactly the duration of the disease, for it has generally been discovered accidentally; but usually it will be found to have existed for months or years when the patient first presents himself. This is due to the

\* *Loc. cit.*

† *Loc. cit.*

‡ *Loc. cit.*

# *Loc. cit.*

|| *Loc. cit.*

^ *Loc. cit.*



fact that at first the affection causes no inconvenience. Usually the small patch first observed gradually increases in size until at length stiffness of the part occurs or painful fissures form, which cause the patient to seek advice.

In some cases the epithelial cells gradually pile up until a thick, horny mass is formed, which may then be thrown off spontaneously or pared off by the patient as he would cut off a corn or wart. After a time, varying from a few months to many years, the formation of fissures and ulcers causes pain, and finally, in a large percentage of cases, epithelioma results and runs its usual course. Sometimes the affection will remain stationary for months, or, under the influence of some irritant, it may rapidly progress, but may again become dormant if the irritant is removed. Occasionally unchanging erythematous patches remain in the surrounding mucous membrane for years.

In the cases associated with syphilis and in those that have developed into epithelioma the parts become greatly swollen, and deep, fungous ulcers occur which may erode vessels and cause serious hæmorrhage. In these same cases the lymphatic glands are involved, but this does not occur in the earlier stages of idiopathic leucoplakia.

Often the first symptom noticed by the patient is simply an uneasy sensation; but this may not appear until the disease has existed for years. In other cases the mucous membrane early becomes sensitive, so that spices, hot food or drinks, alcoholics, tobacco, etc., cause more or less pain. When deep fissures occur, the pain may become intense and almost constant, though in some cases it is present only at intervals. There are no constitutional symptoms until epithelioma is developed. Late in the disease, speaking, mastication, and swallowing sometimes become difficult, especially when epithelioma occurs. In such cases there is also profuse and very troublesome salivation, which continues both night and day.

Upon examining the mouth in the early stages, several more or less oval red or white patches are usually found which are apt to be mistaken for secondary syphilis. These in time become bluish, and finally, with increase in their epithelial covering, grayish or of a milky white color—like mucous membrane touched with nitrate of silver. These spots may remain distinct for a long time, but with the progress of the disease they become confluent, and at length form large, irregular patches. At first the surface of the patch is usually smooth, marked only by fine intersecting fissures, and is but slightly elevated above the surrounding mucous membrane. At this time the papillæ are often prominent and large, but, as the epithelial

cells accumulate, they atrophy and are buried out of sight, and the surface may become raised several millimetres above the healthy mucous membrane. In some instances we find that a portion of the horny mass has been thrown off, and has left a central depression which may be ulcerated. These latter changes take place only in those cases which have been exposed to great irritation or which are approaching the stage of epithelioma. About the younger and growing patches we find an erythematous border, but this finally disappears. In cases associated with syphilis, cicatrices and nodosities or deep fissures of the tongue are usually found, and, in those which have passed into epithelioma, induration and thickening of the subjacent tissues, with deep, unhealthy ulcers, are likely to be present.

*Diagnosis.*—Leucoplakia is liable to be mistaken for what Guinand\* has termed the “professional patches,” found in glass-blowers, for “smokers’ patches,” mercurial patches, psoriasis linguae, syphilitic patches, and epithelioma unconnected with leucoplakia. The “professional patches” occur only in old glass-blowers, particularly in bottle-makers, and are found symmetrically upon both sides of the mouth, on the lateral surface of the jaw, and around Stenson’s duct. “Smokers’ patches” are more irregular in seat than those of leucoplakia, and are commonly located near the commissures of the lips, but not upon the dorsum of the tongue or inner side of the cheek. Again, the epithelium covering their surfaces is thin and closely adherent, so that it can not be removed, as in the disease under discussion. Mercurial patches are not so thick as those of leucoplakia, are never quite white, and are found on all parts of the tongue, but particularly where it is pressed against the teeth. According to W. Fairlie Clarke,† psoriasis is an affection in which circumscribed patches of epithelium assume a white, opaque appearance, which, after a day or two, are thrown off, when the epithelium is speedily restored; but soon other patches appear and go through the same course, until, after a time, the whole surface of the tongue becomes denuded and of a uniform red color, with crescentic markings or depressions, which, it will be observed, is very unlike the course of leucoplakia. Syphilitic patches are not so white as those of leucoplakia; they are usually round or oval, and more regular in form, and they seldom occur on the cheek, but are found principally on the tip or margins of the tongue, and often on its lower surface, which is never invaded by leucoplakia. Syphilitic patches do not

\* *Loc. cit.*

† *Loc. cit.*

become so thick as those of leucoplakia, and in syphilis the lymphatic glands are soon involved, which is not the case in the latter unless it has become cancerous. The pain is more severe in leucoplakia than in the syphilitic disease, and anti-syphilitic treatment causes no improvement, but may aggravate the affection. When syphilis and leucoplakia co-exist, the diagnosis is difficult, and sometimes can only be cleared up by specific treatment. Cancer arising without previous leucoplakia is distinguished from the latter by its history. In cancer, the induration of tissues and the final ulceration are not preceded by the chronic white patch, and are attended by more constant pain, with profuse salivation and a very offensive odor.

*Prognosis.*—The duration of the disease is uncertain. One authority mentions two cases in which cancer supervened in less than six months. Sir James Paget\* mentions one case which terminated in cancer at the end of eighteen months, several of Mauriac's† were of eleven to thirteen years' duration, while of the two cases seen by Hulke,‡ which terminated in this way, one had existed twenty years. Others have mentioned cases of thirty to forty-five years' duration. Debove# and Bazin,|| who make no clear distinction between leucoplakia and syphilis, and Kaposi,<sup>A</sup> who speaks of leucoplakia as a universal product of syphilis, very naturally believe that the affection is frequent, that it does not terminate in cancer so often as we should suppose from the writings of others, and that it is very amenable to treatment. Schwimmer◇ says that the disease is frequently transformed into malignant formations and ends fatally, and the general belief is that it is very likely to end in epithelioma. Vidal‡ believes that one half the cases terminate in this way. On this point Mauriac↑ says that "transformation into epithelioma has often been noted, therefore it is important to cure the superficial affection, or it may pass into a deep, destructive, mortal disease."

The same author thinks that there are three varieties of leucoplakia (or, as he terms it, psoriasis linguæ). One, which he says is curable (due to syphilis), we do not think belongs to this class of diseases. The others he considers incurable. The variety which he attributes to the arthritic or dartsious diathesis he terms innocuous, while the third variety—the epitheliomatous—is incurable and malignant.

\* *Loc. cit.*† *Loc. cit.*‡ *Loc. cit.*# *Loc. cit.*|| *Loc. cit.*<sup>A</sup> "Syphilis der Haut," Wien, 1875, vol. iii.◇ *Loc. cit.*‡ *Loc. cit.*‡ *Loc. cit.*

Among the indications that leucoplakia is passing into epithelioma are: non-inflammatory enlargement of the lymphatic glands, with exfoliation of the thicker portion of the patch, the formation of an ulcer, the supervention of sharp pain, salivation, and at length induration of the subjacent tissues. Finally, great swelling in the region of the jaw is likely to occur, and death takes place from exhaustion.

*Treatment.*—In cases of leucoplakia all sources of irritation, particularly those resulting from the use of tobacco and alcoholic stimulants, should be at once removed, and if the digestive organs are deranged, as is frequently the case, they should receive proper attention. Aside from these measures, most authorities believe treatment of little or no avail. Schwimmer\* says that local treatment is not rational; that alkaline washes and the waters of Vichy and St. Christan, and other alkaline waters, though highly recommended by Bazin† and other French writers, are not satisfactory in their effects; and that, even if improvement does occur under their use, it is not likely to be enduring. Debove‡ and Bazin state that many cases of buccal psoriasis may be cured, but their favorable results may be due to the fact that they included many syphilitic cases in this class. By an examination of Debove's recorded cases, I find that, exclusive of the syphilitics, none of the patients seem to have been entirely cured, though many were treated by both Bazin and Debove, and a number are reported as "something better" after several months of treatment. Mauriac,§ who believes that there are three varieties of leucoplakia—viz.: 1, the dartrous and arthritic; 2, the syphilitic; 3, the epitheliomatous—recommends arsenic and alkalies for the first, mercury and iodides for the second, and surgical measures for the third; however, he urges great prudence in using any of these measures, and states that the internal remedies have been found almost useless, and that mercury and the iodides are dangerous in the absence of syphilis.

For local application, the caustics which have commonly been employed are nitrate of silver, chloride of zinc, tincture of iodine, and acid nitrate of mercury; but none of them seem to do any good excepting in syphilitic cases, which I do not include under the term leucoplakia. Soothing applications seem to have been most beneficial, but they give only temporary relief.

E. Vidal || says that "mercury and iodide of potassium aggravate

\* *Loc. cit.*

† *Loc. cit.*

‡ *Loc. cit.*

# *Loc. cit.*

|| *Loc. cit.*

the disease the more advanced it is," and that in the papillomatous state they precipitate epithelioma. When the affection has passed into epithelioma nothing can be of much benefit excepting thorough excision, but even this has not often been followed by happy results.

Henry Morris\* advises that, after other measures have been fairly tried, if the epithelium is constantly thrown off, leaving abrasions or ulcerations which are painful, the tongue should be excised without delay. He states that "the prospect of curing, or even much improving, ichthyosis by treatment is most unfavorable."

S. James A. Salter† reported a case, which seemed to have been leucoplakia, which was cured by extirpation and cauterization of the wound with the actual cautery. In the case which I report it will be observed that internal remedies did no good, and that local applications of tincture of iodine, nitrate of silver, and the acid nitrate of mercury greatly increased the patient's sufferings, and would doubtless have aggravated the disease had they been persisted in; but, as soon as the actual (galvanic) cautery was employed, relief from all pain was obtained, and by a persistent, careful use of it the disease was eradicated.

In considering this favorable result, of course we must not overlook the reported tendency of the disease to recur; but the fact remains that the belief in this tendency is based on a study of cases in the majority of which the diseased patch was never entirely removed. In my case the mucous membrane is perfectly healthy after a lapse of four months; therefore I believe the treatment adopted for it will prove curative in many cases if applied before epithelioma has developed.

From a study of the literature of this subject, and from my own small experience, I arrive at the following conclusions:

1. Leucoplakia buccalis is an idiopathic disease, distinct from psoriasis, "smokers' patches," and syphilis. It is largely confined to men past middle life, but it occasionally occurs in women.

2. The disease is so commonly found in inveterate smokers that the abuse of tobacco may fairly be considered as an exciting cause, though cases occur where tobacco has never been used.

3. The affection is chronic and, finally, in a majority of cases, terminates in epithelioma.

4. Internal treatment and the local application of sedative, stimulant, or caustic drugs are, in nearly all cases, either useless or injuri-

\* *Loc. cit.*

† *Loc. cit.*



ous, and the latter are sometimes disastrous by hastening the development of epithelioma.

5. The actual cautery or the galvano-cautery will probably enable us to cure many cases if they are treated sufficiently early, provided it is applied to only a small spot at each sitting, and carefully, so as not to destroy the healthy tissues beneath the changed epithelium.

*A Typical Case.*—L. C., aged forty-three, printer, came to me in September, 1884, complaining of a sharp pain in the left side of the mouth, particularly when eating. This, he said, began two years before, when he had a tooth drawn. Two months later he first noticed a small white patch on the buccal mucous membrane. Upon examining the mouth, I found a large, irregular, milk-white patch, extending from the border of the gums down through the gingivo-buccal groove, upward along the left cheek, and from the first bicuspid tooth, in front, to the last molar, behind. Altogether this was as large as a silver dollar; its surface was marked by fine intersecting lines, which divided it into numerous polygonal spaces.

At the center of the patch, on the buccal surface, was a depression about 3 mm. in depth and 1 cm. in diameter, surrounded by elevated, hard margins, which gradually became thinner toward the edge of the patch. This margin was deeply fissured in two or three places. About half an inch in front of the anterior portion of this patch, on the under lip, was a small, white, warty growth, about 4 mm. in height by 3 mm. in diameter.

A critical investigation of the case failed to discover any history or signs of syphilis or hereditary disease. The patient chewed tobacco to excess and had smoked occasionally. He stated that previous to the removal of the tooth, and until the pain became troublesome, he had been accustomed to carry his quid of tobacco in the left side of the mouth, at the location of the patch. His general health was perfect, and he had never suffered from rheumatism or eruptive diseases, and did not use alcoholic stimulants. During the first few months of the affection pain came on about once in two weeks and would last several hours, but the attacks gradually became more frequent, until seven or eight weeks before I saw him, during which time the pain had been constant and often severe. The patch had been cauterized occasionally with nitrate of silver, but was never benefited.

When I first saw the case, suspecting that it might be syphilitic, I ordered iodide of potassium in large doses and directed that tobacco be discontinued. I cauterized the patch with tincture of iodine, but the application caused such severe and protracted smarting that I began at once to be doubtful about the character of the disease. Three days later I applied the solid nitrate of silver to a small portion of the patch, with

similar results, and four days later the acid nitrate of mercury. This last application caused intense pain that lasted about seven hours, which, he said, drove him nearly crazy. I was now convinced that the disease was not syphilitic, and had the patient see Professor Hyde, who pronounced it leucoplakia. I next cauterized the central depressed portion of the patch with the galvano-cautery, which caused momentary smarting, but perfectly relieved the severe pains from which he had suffered for weeks, and they never returned. Two days later I destroyed the small, wart-like projection in front of the large patch, and subsequently, about every fifth or sixth day, I cauterized a small spot, nearly a centimetre in diameter, at the edge of the patch. These cauterizations were so superficial that only the epithelium was destroyed, the membrane beneath being but slightly burned; indeed, so light were they that a few times I was obliged to again cauterize the same spot before all the epithelium was destroyed. I found that as these cauterized places healed the mucous membrane appeared natural, and finally, after about thirty applications of the cautery, the entire surface presented the appearance of healthy mucous membrane, showing only two or three small cicatrices, where the cauterizations had been unusually deep. The iodide of potassium, which did no good, was discontinued soon after I began the use of the galvano-cautery. Now, at the end of four months after the last cauterization, the mucous membrane remains perfectly healthy.

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### *Second Day—Morning Session.*

#### BUSINESS MEETING.

The meeting was called to order by the President at ten o'clock, and the reports of officers and committees were presented as follows:

*Secretary's Report.*—The minutes of the last regular meeting, together with those of the meetings of the Council for 1884-'85, were read by the Secretary, who presented as his official report the Sixth Annual Volume of the Transactions of the Association.

The Secretary also reported that a proposition had been offered to renew the arrangement made last year with the editor of the "New York Medical Journal" for the publication of the Transactions.

The report, including the proposition of Dr. Foster, was unanimously adopted.

The Secretary presented to the Association an engraved steel plate representing the seal of the Association, and ordered by it at the last annual meeting. Accepted.

#### *Treasurer's Report.*—

AMERICAN LARYNGOLOGICAL ASSOCIATION, JUNE 25, 1885.

#### *In Account with D. Bryson Delavan, Treasurer.*

By receipts for 1885 . . . . . \$259.91

By expenditures . . . . . 222.88

Balance on hand . . . . . \$37.03

Audited and approved,

W. C. GLASGOW,

HARRISON ALLEN.

D. BRYSON DELAVAN,

*Treasurer.*

*Librarian's Report.*—The Librarian, Dr. Thomas R. French, presented the following report: The library of the Association was transferred to the present Librarian last December. It was found to contain 12 bound volumes and 133 pamphlets. On March 1, 1885, a circular was issued calling for further contributions to the library. This was sent to all the

Fellows of the Association, and to about three hundred other physicians, both in this country and in Europe, known to be interested in laryngology. In response to this circular, 13 bound volumes and 231 pamphlets were received. In many instances the donations were accompanied by letters containing lists of publications which could not be donated, inquiries in reference to the Association and its library, and promises of future assistance in the matter of contributions to the library. In the opinion of the Librarian, it seemed but reasonable to ask that the published works of the Fellows of the Association be deposited in the library, as it is the only institution of its kind in the world, and, if it could be made fairly complete, would not only prove of great service to workers in this field, but would also serve as an additional evidence that the Association is an active working organization. Without the means to make purchases the library could not be made complete, but it was certain that it could be made of very great value if the Fellows and friends of the Association would take an active interest in its formation.

Many of the best writings and most of the recent contributions to the department of laryngology are in pamphlet form. Much time and labor would be saved if every writer on diseases of the upper air-passages would send his publications to the library of the Association, where they could be consulted by all interested in the department of laryngology. Self-interest alone would naturally prompt authors to assist in the collection of all such material at one point.

Appended to the above report was a complete catalogue\* of the library, which was shown to contain 25 bound volumes and 364 pamphlets.

Dr. J. Solis-Cohen moved that the report of the Librarian be accepted, that the Committee on Publication be instructed to embody the catalogue in the next volume of Transactions, and that 150 extra copies (reprints) of the catalogue, interleaved with blank pages, be furnished. Carried.

*Committee on Nominations.*—The Committee on Nominations reported as follows:

*For President.*—Dr. HARRISON ALLEN, Philadelphia.

*For First Vice-President.*—Dr. H. A. JOHNSON, Chicago.

*For Second Vice-President.*—Dr. GEORGE W. MAJOR, Montreal.

*For Secretary and Treasurer.*—Dr. D. BRYSON DELAVAN, New York.

*For Librarian.*—Dr. THOMAS R. FRENCH, Brooklyn.

*For Member of Council.*—Dr. J. SOLIS-COHEN, Philadelphia.

Place and time of next meeting, Philadelphia, the last Thursday in May, 1886. The report was accepted.

*Miscellaneous Business.*—The amendment to the constitution, regularly presented by Dr. SEILER at the last annual meeting, was formally moved by him as follows:

\* For catalogue, see appendix to this volume.



1. Hereafter every candidate for membership to the Association shall be a graduate of at least three years' standing.

2. The admission thesis of each candidate, after having been accepted by the Council, shall be read at a regular meeting of the Association by the candidate, and discussed by the Association, before his election can take place.

Dr. COHEN moved that the words "by the candidate" be suppressed. Carried.

Dr. MACKENZIE desired to amend the amendment by substituting the clause, "that all active members be selected by invitation." He stated that by the present arrangement applications were made by men whom it was difficult to refuse, but who were, nevertheless, distinctly ineligible. The future of the Association depended upon the care exercised in the selection of candidates, so that it became a matter of the utmost importance to make the best appointments possible.

Dr. COHEN believed the thesis to be the best criterion of a candidate's ability, and objected to its abolition. Some discussion followed between Drs. SEILER, MACKENZIE, and the PRESIDENT as to the exact purport of the amendment.

Dr. H. A. JOHNSON explained the amendment and suggested that the first clause of Dr. Mackenzie's amendment be adopted and the present method be allowed to stand. After some further discussion, Dr. Mackenzie's amendment—"Resolved, That hereafter active Fellows of the Association be selected by invitation"—was carried.

Dr. SEILER's amendment No. 1 was carried. Amendment No. 2—the words "by the candidate" and "by the Association" having been stricken out—was also carried, said amendment reading: "The admission thesis of each candidate, after having been accepted by the Council, shall be read at a regular meeting of the Association and discussed before his election can take place."

The last business in order was the election of Corresponding Fellows. The name of Prof. WILHELM MEYER, of Copenhagen, the Chairman of the Combined Laryngological and Otological Sections at the Eighth International Medical Congress, having been proposed by the Secretary, Dr. Meyer was elected unanimously. The names of two other candidates for Corresponding Fellowship were laid upon the table.

Adjourned.

*Paper.*

## A CASE OF SUBMUCOUS LARYNGEAL HÆMORRHAGE COMPLICATED WITH CYST.

BY FRANK L. IVES, M. D.

HAVING been unable, after careful search, to find among the few recorded cases of cyst of the vocal bands anything resembling the following, it has seemed to me worth while to present it to your notice :

A robust man, about forty years of age, whom I had previously treated for a slight catarrhal affection of the larynx, called upon me on April 25th and gave the following history: The night before he had exerted his voice to an unusual degree at a public meeting. He felt no inconvenience after returning to his home, but, on waking the next morning, at first had great difficulty in making himself heard. Afterward his voice grew a trifle clearer. He had no pain or soreness in his throat, nor had he any difficulty in breathing. The only sensation was one of irritation, which caused him to "hack" almost continually. When he came to me he could only speak in a hoarse whisper. Examining his larynx, I found it to be normal in shape and color, except the left vocal cord, which was swollen uniformly throughout its entire length to about twice its natural size, and was a bright red in color, the coloring being perfectly even. My patient being forced to leave that evening, I directed him to use a soothing inhalation, and use his voice as little as possible. On May 2d he called upon me and stated that his voice had improved somewhat, but the irritation still remained. Examination showed the left cord to have returned to its normal size, and to be only slightly congested, but upon the edge and near the middle there was a smooth, glistening tumor, of about the size of a pea and light brown in color. It was not pedunculated, and its origin seemed to be merged in the substance of the cord. On touching it with a probe it was easily indented, but quickly returned to its original shape. Being convinced, from the appearance of the growth, that it was a cyst with sero-sanguineous contents, I proposed to my patient to make an incision into the growth, but also told him that the growth would disappear without any operation—how soon, I could not say. He preferred to wait. Four days after he called upon me and stated that the previous evening, while at dinner, he had a violent paroxysm of coughing, caused by some food going the "wrong way." When he recovered, he found to his delight that his voice was perfectly clear. Examination showed the growth to have disappeared.

*Paper.*

## SOME MINOR POINTS IN THE USE OF THE GALVANO-CAUTERY.

By HARRISON ALLEN, M. D.

I DESIRE to call attention to a novel means of application of the snare to the removal of hypertrophied tissue and polypoid growths in the nasal chambers. The single feature of interest in the instrument employed is comprised in the facility with which the loop is maintained in a heated condition. The general shape of the instrument is essentially that of the Jarvis snare. For the details and full description of the instrument, reference is here made to an article, by the writer, in the "Journal of the Franklin Institute," April, 1885, and a second in Pepper's "System of Practical Medicine," vol. iii.

The advantages maintained for the heated wire over the cold wire are as follows: First, the loop, being pressed against a swelling whose base is broad, can be completely imbedded in it. Secondly, the tissue embraced by the loop can be removed with rapidity. Thirdly, the operation is much less painful than the removal of growths with the cold snare. Fourthly, the bleeding is insignificant in amount.

Let me in addition speak of the manner in which an electrode can be manipulated so as to reach with accuracy points which are remote from the nostril, and which can not be readily seen by the operator. A perfectly straight instrument, when thrust directly back through the nose as far as it will go, will reach, as is well known, the vault of the naso-pharynx nearly at the spot at which inspissated mucus is so commonly found. If the platinum-loop of the electrode is bent at its middle to a right angle, and in this shape thrust through the nose, the main axis of the instrument will be found to touch the vault at its anterior curvature, while the deflected portion will reach a point more remote. When in this position, if the electrode is made part of the galvanic circuit, the loop of course becomes heated, and will imbed itself in the mucus, and the mass can subsequently be withdrawn through the nose.

To reach surfaces at the plane of the posterior nares, it is only necessary to withdraw the electrode from its position at the vault until it is seen by means of reflected light to rest upon the surface which it is desired to cauterize. It is always well to remember that

the applications can be made without the electrode being secured to the electrode-handle. When the electrode is in position, the free ends of the instrument, which project beyond the nostril, can be lightly touched by the electrode-handle without in any way endangering a change of position on the part of the loop. The slightest motion on the part of the patient will simply break the contact between the electrode and the connecting wires. The method just narrated is especially useful in cauterizing the membrane overlying the posterior surface of the middle turbinated bone.

*Paper.*

THE PRINCIPLES INVOLVED IN THE CONSTRUCTION OF SPRAY-TUBES.

By ANDREW H. SMITH, M. D.

THE Bergsen, or, as it is more commonly called in this country, the Sass spray-tube, having practically superseded all other forms, it is to this that attention will be confined in this paper.

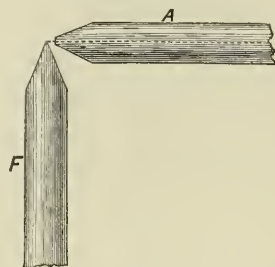
The instrument consists essentially of two tubes placed one above the other, the upper one, which for brevity's sake we will designate A, carrying compressed air or steam, while the lower one, which we will call F, supplies the fluid to be atomized.

The free extremities of these tubes, greatly diminished in size, are so arranged in relation to each other that the stream of air issuing from A passes at a right angle across the tip of F. The action of the spray-tube depends upon the fact that air possesses a considerable degree of adhesiveness, the different particles adhering to each other with no little tenacity.

We are familiar with this property in viscid fluids and to a less degree in plain water, a drop of which can be drawn along a table by the finger, but we are not apt to think of it as belonging to the atmosphere or to gaseous bodies. Yet it is owing to the fact that the air or steam which escapes from A clings to and drags with it the air at the extremity of F that a vacuum is produced in F. Into this vacuum the fluid rises, and in its turn is caught by the current from A and dispersed in the form of spray.

The greater the velocity of the air-jet escaping from A, the greater will be the exhausting force exerted upon F, and therefore the greater the efficiency of the atomizer. As the velocity of the stream of air is greatest at its center, where it is least retarded by

friction, it follows that the axis of the opening of A should be exactly on a line with the extremity of F.



The pressure being the same, the character of the spray will depend upon the relative size of the openings of A and F. Increasing the former permits more air to escape and gives a larger volume of spray with a greater carrying force and more power of penetration. Increasing the latter results in a larger consumption of fluid, forming a coarser spray, and, if carried too far, results in dripping.

A large opening for A with a small one for F gives a large body of very fine spray. A small opening for A with a large one for F gives a small body of coarse spray. A successful application of spray to the throat or to the posterior nares often requires that it be effected as it were by surprise, and before there is time for reflex action of the muscles. Hence it is necessary that spray should be formed the instant the air-valve is opened; for, if the arrival of the liquid at the point of F is delayed appreciably after air begins to issue from A, reflex contraction will have been excited by the contact of the air with the mucous surface before any spray is produced. Now, no fluid will reach the point of F until all the air in F is exhausted, and the amount of air and the length of time required for its exhaustion will be in proportion to the length and the caliber of the tube. Hence these should be reduced to a minimum in spray-tubes intended for making quick applications. And, as there is nothing lost in any case by this construction, it may as well be made the general rule for all tubes.

With a properly constructed spray-tube comparatively slight air-pressure will suffice for all purposes. Increase of pressure will compensate in a measure for defective construction of tubes, but it brings with it its own inconveniences, such as mechanical irritation of the surface to which the spray is applied, waste of compressing power, etc.



The indications for the use of coarse or fine spray do not come within the scope of this paper, and will vary in accordance with the views of individual practitioners.

#### PRESENTATION OF INSTRUMENTS, ETC.

DR. WILLIAM C. JARVIS, of New York, sent for exhibition a *cup-shaped cannula for removing adenoid vegetations from the vault of the pharynx with the cold wire*, with the following explanation:

Those who have had occasion to resort to operative procedures for the removal of the excessive glandular formations commonly found in the vault of the pharynx must gladly welcome any means which may facilitate the treatment of this condition.

After having experimentally employed several mechanical devices, I feel encouraged to offer a novel cup-shaped cannula-écraseur as a most efficient means for satisfactorily accomplishing this result. It is essentially an improvement upon the simple curved cannula, a modification of my nasal écraseur, suggested by Dr. Bosworth. Although the simple wire loop, properly arranged to include the redundant structures, can in many cases be successfully carried behind the palatal curtain into the naso-pharynx, its manipulation in this region, unaided by the eye, may prove unsatisfactory or extremely difficult. This is often due to the spasmodic contraction of the palatal muscles seizing the wire loop and altering its position during its introduction. Furthermore, the wire loop, by reason of its resiliency, can not always be directed by manipulating the handle of the écraseur. In other words, unless one successfully introduces and directs the loop at the very start, he will, in all probability, fail to find the particular spot he is in search of. Even after the growth has been excised, the labor of clearing away the fragments may consume more time than was required for the original operation. This last objection, it will be observed, is entirely avoided by employing the cup-écraseur, since the divided fragments of the growth are necessarily withdrawn, occupying the receptacle into which they have been forced. I do not desire to be understood as being in favor of abandoning the employment of the exposed wire loop, for I consider it, in a certain class of cases, especially in individuals having ample pharyngeal vaults, a most valuable means for the removal of tissue abnormalities in this region.

The cup rests upon the upper surface of the écraseur's main cannula, its distal portion being grooved to receive this tube, as high as the level of its posterior lip. Considerable constructive care was required to render the introduction of the cup into even the narrowest palato-pharyngeal space expeditious and painless. This was accomplished by flattening the metallic receptacle laterally, thus making the shortest diameter agree with that of the palato-pharyngeal opening. Its passage behind the palate is, furthermore, facilitated by rounding the lips of the cup, in order that it may act like a modified wedge, and space is also economized by flattening the free end of the cannula. When the smooth edge of this conical cup is placed behind the velum, the contraction of the palatal muscles will often suffice to force it completely through into the naso-pharynx; and in this space the *tactus eruditus* of the operator, aided by the eye fixed upon the retreating angle of the main cannula just beneath the cup, will enable him to accurately direct and place the instrument.

The *écraseur* is prepared for use by introducing a strand of No. 5 piano-wire in the usual manner, and securing the ends to the two retention-pins like a cleat-knot. The size of the loop is, of course, adjusted before the wire is fixed, and should be sufficiently large to loosely encircle the margins of the cup. In order to prevent the wire from slipping off the cup, the apex of the loop is forcibly depressed against the orifice of the cannula before placing it in position. This gives it a downward spring, insuring its fixity when properly adjusted.

The instrument either comes complete as it now stands, or the cannulated cup is made separate and adjustable to a universal handle. Cups of various dimensions can, of course, be made, this one representing a convenient size for the removal of adenoid vegetations in children. The instrument will be found particularly useful in just this class of cases, for, although children will often permit the first introduction of the simple wire-loop, they almost invariably resent its repeated employment.

In such a contingency it is only necessary to place the conical edge of the cup against the palato-pharyngeal orifice and firmly, though carefully, force it through this opening.

When properly placed, the cup should be pressed against the glandular tissue and the wire made to slide over its rounded edges around the included growth by simply drawing up the external or movable cannula. Excision is easily accomplished by turning the milled nut.

According to my experience, moderately firm and sessile enlargements, which ordinarily resist seizure by the wire-loop when applied in many different ways, are readily snared by means of this instrument.

Since my first employment of the instrument, in August, 1884, upon a post-nasal carcinomatous tumor, I have had ample opportunity to test its efficiency for the removal of adenoid vegetations from the vault of the pharynx, and hope to be able to give a history of the cases at the first convenient opportunity.

Those preferring the galvano-cautery can, of course, substitute platinum for steel wire, employing it in the same manner.

In concluding these remarks, I do not hesitate to recommend this method to the members of the Association, feeling confident that, if accorded a fair trial, they will find it most useful for treating a very trying class of cases occurring in their daily practice.

Dr. J. SOLIS-COHEN, of Philadelphia, presented an *electric accumulator*, with attachments for illuminating purposes, including an excellent laryngoscope and an otoscope, manufactured by the S. S. White Dental Association.

Dr. CARL SEILER, of Philadelphia, exhibited a *galvano-cautery knife and nostril*

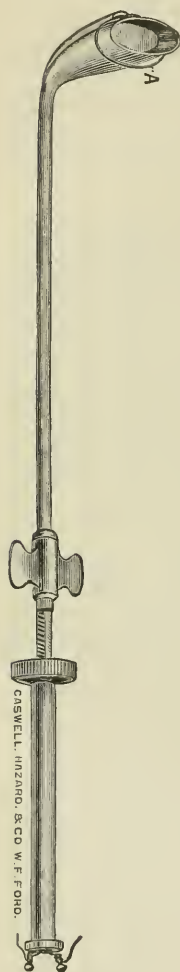


FIG. 1.

*shield* devised by him. The knife consists of two thick copper wires insulated from each other by a silk thread wound around them in figure-of-eight fashion. The ends are separated and bent so as to fit into the sockets of the ordinary handle, while the other extremities of the wires are in close proximity to each other and are drilled out with a fine drill to the depth of about half an inch. These holes



FIG. 2.

are slightly flattened by the stroke of the hammer, and serve to receive the ends of the platinum loop, also flattened so that the platinum wire can be easily and securely fastened to the copper without soldering. The advantages of this knife are that the operator can make the platinum loops himself, and of such a shape as may be required for any particular case, and can substitute one for the other quickly and easily. The shield shown with the knife consists of a metallic tubular speculum containing a slide which can be pushed forward when the speculum is in position, and thus the septum is protected when, for instance, an anterior hypertrophy is to be operated upon.

He also showed a *double screw-hook* (Fig. 3) for receiving portions of tissue to be removed by the wire snare, such as anterior hypertrophies, polypi, etc., and also for securing bleeding vessels in operations. It consists of two hooks, facing each



FIG. 3.

other in profile, attached to a slender steel stem. This is fastened in a light wooden handle, and has a screw-thread cut on its shaft near its insertion into the handle. A cannula with a bell-shaped end covers the hooks and shaft, and is held in any desired position by means of a milled nut running on the screw-thread of the shaft. When the instrument is to be used, the mill-head is run down to the handle and the cannula pushed after it, thus exposing the hooks. These are pressed against the tissue to be secured, and the handle of the instrument is given a slight twist toward the right, which causes the hooks to enter the tissue; the cannula is then pushed forward so as to draw the hooks and as much of the tissue as is held by them into the bell, when it is secured in its position by the milled nut. The loop of the snare can then easily be passed over the handle and cannula, and that portion of the tissue grasped by the hooks and drawn in the bell can be snared off; or, in case of securing a bleeding vessel, the ligature can be easily tied around the edge of the bell, thus compressing the cut vessel. After having released the cannula, a slight twist to the left instantly withdraws the hooks.

Dr. HOOPER presented a specimen of Lebon & Co.'s *clinical figures*, representing an outline for recording diseases of the larynx. The diagrams, each about an inch square, were furnished with a gummed back by means of which they could be made to adhere to any part of a given page.

Dr. DEBLOIS showed an *insufflator* which he had exhibited at the meeting of the Laryngological Association two years ago, but which had been subsequently modified so as to make it impossible to have the powder leak out. The instrument consisted of a bottle formed to receive the size of the air-bulb, and which had a screw-thread molded on the top. The mouth was closed by a plate and rubber washer forced down by a screw-follower. There was a curved attachment to the powder-tube, and also a perforated mirror for the larynx, as invented by Dr. Jarvis.

Dr. ASCH presented an *ostotome* for the removal of exostoses in the nasal passages. He also presented a modification of Jarvis's snare, by which the wire was secured by means of a clamp, instead of winding it around the usual post.

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*Second Day—Afternoon Session.*

*Paper.*

PARALYSIS OF THE LARYNX; WITH REPORTS OF THIRTY-TWO CASES.

By H. A. JOHNSON, M. D., LL. D.

THE following cases are presented with the thought that they may be useful in future studies. Only what seemed to be the essential facts have been transcribed from my note-books. I have no theories to suggest, but leave the record for the interpretation of those who may be interested in this class of derangements of the larynx. I have not included cases in which the derangements depended upon tumors, ulceration, and other structural alterations of the organ.

DISTURBANCES DEPENDING UPON HYSTERICAL CONDITIONS.

CASE I.—H. B., female, single, aged twenty-four. No change in the form or structure of the larynx. The vocal bands in the cadaveric position. Health in other respects fair, menstruation normal, appetite good. Was put upon iron, strychnine, etc., and advised to live as much as possible in the open air. I also applied the faradaic and galvanic currents, the latter interrupted. None of these measures produced any change in the function of the organ. After several months she went East, and finally to Europe, where she consulted a great number of laryngologists, with always the same suggestion of strychnine, electricity, and tonics.

These were tried with the thought that possibly under new conditions and in more expert hands they might be successful. After visiting California and the southern portions of our own country, she went to Europe again, spending a winter in Egypt. On her return she was under the

care of Dr. Hughlings Jackson, of London, who had the good fortune to hear her speak after about five years of silence. During three years of this time she did not even whisper. The cords remained as described till her return from Dr. Jackson. At that time she occasionally spoke aloud, but only a part of the time. Upon examination, I then found that in the effort to phonate the vocal processes were brought together, but there was a triangular opening back of their points—in other words, there was a paralysis of the arytenoids, leaving a space through which the air escaped, making phonation laborious and at times producing complete aphonia. From that time to the present, now several years, there have been periods, for several days and occasionally for a week or more, that she could not speak above a whisper. She is and has always been fairly nourished, but of a lymphatic temperament, and is easily fatigued. I have repeatedly examined the larynx during the last few years, and have never found any changes except as above stated.

That this was a case of hysterical aphonia I presume no one will for a moment doubt. The interest consists in the fact that the trouble continued so long and resisted all treatment till seen by Dr. Jackson.

Dr. Jackson's treatment did not in any essential respects differ from that which had already been tried. There could be found no evidence of those perturbations of the uterine or other organs which generally accompany these cases. I have said that I presumed this would be admitted to be a case of hysteria. I use the word not in the strict sense of uterine irritation, but for that class of neuroses generally grouped under this name.

CASE II.—Mrs. F., aged thirty, married, has had for the last eighteen months some difficulty in speaking, and for the last four months she has been completely aphonic. There has been occasionally dyspnoea, but this has seemed to be asthmatic rather than due to laryngeal stenosis. She has also been under treatment for some uterine trouble. Examination of the lungs reveals some vesicular emphysema; heart weak, but no murmurs; larynx normal in form and color; vocal cords immovable in the cadaveric position. There were no evidences of central trouble nor of any lesion along the course of the nervous trunks. The patient was sent to me by a gynecologist with the query as to the reflex nature of the laryngeal difficulty.

CASE III.—T. H., aged twenty-three, female, single. Nine months ago she took cold; is now aphonic; is short of breath upon exercise; emaciated. Physical examination of chest reveals no evidence of disease of the lungs or heart. She is emotionally depressed. Menses have not appeared for the last five months. No fever or other derangements to suggest organic troubles elsewhere. Tops of the arytenoid cartilages slightly swollen; no loss of motion of abductors; right cord does not come quite to the median line in the effort to phonate; it is lax, sagging, and hanging away from its fellow. This case seems to me to be a paresis



of the right thyro-arytenoid and probably also of the right crico-thyroid, hysterical in origin.

CASE IV.—M. C., aged seventeen, female, single. Was never strong. Has always been subject to colds and throat trouble. Had diphtheria four years and a half ago; had suppuration of the lymphatic glands of the neck seven or eight years ago; is now in school, but devoting herself mainly to instrumental music; is fairly nourished, but has dysmenorrhœa and signs of ovarian irritation; no lung or heart trouble.

Upon effort at phonation, the cartilaginous glottis is open; in other respects movement of the parts is normal. Says that she formerly was in the habit of singing, but was obliged to abandon all efforts to sing because, as she expressed it, her "voice rattled." There may be a doubt as to the ætiology of this case. The patient had diphtheria four years and a half before the consultation.

CASE V.—A. P., aged twenty-five, female, married. Has been aphonic for the last five months. Was referred to me by a gynæcologist. Has laceration of the cervix; has now an acute inflammation of the pharynx and larynx; the vocal cords are in abduction and immovable. No evidence of any central or local laryngeal lesion to account for the paralysis.

#### *Catarrhal.*

CASE VI.—E. B., aged sixteen, single. Has several times during the last eighteen months lost her voice, being able to whisper only. This has usually been treated by her physician by local applications of argent. nit., thirty grains to the ounce, and in a few days she has recovered. I find thickening of the mucous membranes above the glottic click, and in normal efforts at phonation the false vocal bands approximate so as to come in contact, shutting out the view of the true cords. In easy respiration the vocal processes are nearly in contact. There must be some paresis of the abductors. The patient was under the care of a physician in a neighboring city, and I learned that she entirely recovered with no other treatment than that mentioned. The health was in every other respect good. The impairment seemed to be the result of acute catarrh.

CASE VII.—J. G., aged thirty-eight, male. Three months ago was taken suddenly with hoarseness after getting wet. Very soon afterward the voice became extinct. This condition has continued to the present time. General health in every other respects good. No history of specific disease.

Vessels of the larynx large. Secretions excessive. Left vocal band in efforts at phonation remains midway between adduction and abduction. Motions of right band normal. The interrupted galvanic current was applied with an immediate improvement. The patient soon passed from my observation. The only cause that seemed probable was a catarrh from the cold.

## TYPHOID FEVER.

CASE VIII.—M. A., aged twenty-nine, female. Had inflammation of the lungs when a child. At the age of twenty had typhoid fever. Soon afterward the voice began to fail. Was unable to sing. Two years ago became very much frightened by an accident, and for two weeks was completely aphonic. Has been hoarse the most of the time since, except when aphonic for ten weeks about a year ago. For the last few weeks has had pain in the larynx and the left side of the chest, running through to the back. No chest trouble. No uterine or ovarian difficulty.

In efforts at phonation the vocal bands remained lax, allowing the air to be expelled between them without the production of sound. The muscles involved seemed to be the crico-thyroids. A marked improvement took place under treatment by the faradaic current.

CASE IX.—B. B. B., male, aged fifty-five. Thirty years ago had typhoid fever. After convalescence, became suddenly hoarse and then aphonic.

This condition continued eighteen months, when he recovered the use of the voice. Since then has had, when fatigued, and especially after speaking for a while, a sense of fatigue, which he locates in the supra-sternal region. When eight years old commenced the use of tobacco. Much of the time for forty years he smoked twenty-five cigars daily. Stopped on account of a heart difficulty. Has now post-nasal catarrh. There is also dysphagia, apparently from want of action of the constrictors. The surfaces of the pharynx are very tolerant to mechanical interference. The patient is well nourished, weighing 180 pounds. The action of the kidneys normal. No lung trouble. No organic heart trouble.

Chronic catarrhal inflammation of the larynx. At time of examination, no derangement of motion.

The case is presented for the reason that the patient had just recovered from typhoid fever when the aphonia occurred, lasting eighteen months. The excessive use of tobacco for so long a time in connection with anæsthesia of the pharynx gives additional interest to the history.

## SYPHILIS.

CASE X.—M. L., aged forty-two, female, married. Has had for eight years some difficulty in swallowing solid food. Says that six months ago "something broke in the throat." Says that the matter discharged from the throat at that time was not pus, but a "glairy, transparent fluid; it was like the white of an egg." Since then she has been able to swallow better, but there is now constant dyspnoea. This is especially marked when asleep, or when fatigued, or excited during the day. The difficulty is mainly in inspiration. Expiration is easy. General health is not good.

Has a family history of cancer and consumption. There was no evidence of thoracic trouble and no history of specific disease.

Examination revealed paralysis of the abductors of both vocal cords. There were no evidences of disease along the course of the nerve-trunks, so far as I could find. I suggested tracheotomy as a measure of prudence, and ordered pot. iod., with the thought that there might have been a specific intoxication. The subsequent history is unknown to the reporter.

CASE XI.—D. M., aged forty-seven, male. Had syphilis eight years ago. Six months ago began to have some trouble with the throat. Voice hoarse, but not lost. Secretions of pharynx and larynx increased. Health in other respects fair.

Chronic inflammation of the mucous surfaces of the larynx. Top of left arytenoid cartilage swollen. Left vocal band near the median line, and does not move upon deep inspiration. Right band normal in movement.

I am not quite sure that this is a case of paralysis; it may be an ankylosis of the cartilage.

CASE XII.—E. G., aged forty-six, male. Had syphilis in early life. Has had cough and difficulty of breathing for several years. This difficulty came on gradually. It was more marked when asleep than when awake. The appetite is good. No lung trouble. Heart sounds normal. No disease along the pneumogastrics or recurrences. So far as I can ascertain, there are no secondary or tertiary symptoms of syphilis, unless this laryngeal disorder be of that character.

Examination reveals a bilateral paralysis of the abductors of the vocal bands. During phonation the bands become normally tense, separating slightly at the cessation of the act of speaking. There did not appear to be any mechanical fixation of the arytenoids. The quality of the voice is little, if at all, affected. Soon after the first consultation tracheotomy was performed for the relief of a dangerous dyspnoea which occurred during the night. The patient was put upon constitutional treatment, with the thought that it might be syphilitic in origin. No benefit resulted from these measures, and he has worn a cannula now about four years. I am still inclined to think that the case is specific.

CASE XIII.—D. M., aged forty-seven, male; had syphilis eight years ago. Six months ago began to be hoarse. The voice is now rough, but not lost. Health in other respects good.

Secretions of the pharyngeal and laryngeal mucous membranes excessive in quantity. Top of left arytenoid cartilage swollen. Left vocal band near the median line, and does not move upon efforts at phonation or deep inspiration. Right band normal in movements.

It is possible that this is a case of ankylosis of the cartilage. The patient was put upon the use of iodide of potassium.

## DISEASE OF CENTRAL ORIGIN.

CASE XIV.—M. E. P., aged forty-two, male. Never sick till four months before consultation. While on the plains in western Kansas or eastern Colorado he suddenly became aphonic. There was no cause to which he attributed the loss of the power of speech. After a few weeks he partly, but not entirely, recovered, and this improvement was followed by complete aphonia, which has continued to the time of consultation. General health good. No evidence of any thoracic trouble.

Epiglottis pendulous, omega-shaped. Right vocal band normal in movement. The left is drawn close to lateral wall of larynx, so as to be seen with difficulty as a line in the mucous tissues. Upon efforts at phonation there is not the slightest movement of the band. Under the influence of the interrupted current there was a slight change of position. Surface of larynx hyperæsthetic. Subsequent history of case unknown.

CASE XV.—P. D., aged sixty-five, male. Five years ago had an injury from a fall, striking upon the right shoulder. Ten days afterward began to have difficulty in speaking. For three weeks could not make himself understood. Has not been able to speak easily since. Now there is something like stammering. There has never at any time been loss of consciousness, nor is there now any impairment of the intellectual functions. The arm and leg of the right side are weaker than those of the left. No deformity of the face or want of co-ordination. Bowels regular. The urine passes slowly. Has been treated during the last five years by various methods, including the use of electricity. Thinks nothing has done him any good. The appetite is now fair; sleep not good. Has headache every day.

Mucous membrane of the larynx slightly injected; otherwise normal. Movements of the left side of the organ very slight. In efforts to phonate, the right arytenoid cartilage is carried beyond the median line, its apex drawn forward of the apex of the left. The edge of the right band is higher than that of the left, and is also carried beyond the median line.

What is the explanation of the paresis of the right side of the trunk and extremities, and the left side of the larynx?

CASE XVI.—V. P., aged thirty-six, male. During the last two years has had at times a dull post-sternal pain. This has not been constant in character. Has never been sick since childhood till the commencement of the present trouble. There is no pain in the throat, nor is there constant dyspnœa, but within the last three months there has been shortness of breath upon taking exercise. Speaks now with difficulty; the voice is rough. Of late there has been slight dysphagia. Within the last few weeks there has been some numbness of the left leg. No perversion of the special senses and no ataxia. In other respects the

patient seems well. Physical examination of the chest reveals no lung trouble, and I can find no evidence of aneurysm.

Left vocal cord nearly immovable in the cadaveric position. No other alteration of the organ. At a subsequent examination there was the same condition so far as the motions of the parts were concerned. But there was in addition a marked anæsthesia of the mucous surfaces. The dysphagia was increased, and the laryngeal muscles on the left side did not respond to the faradaic current.

CASE XVII.—R. W., aged forty-eight, male. Not strong as a child. Had "brain fever" when twenty-one years old. Never had syphilis. About one year ago began to have dysphagia. It came on suddenly, and gradually increased during the year. Five weeks ago attacked with dysphonia. This also came on suddenly, and has remained without change to the present time. Was subject to headache for several years before the commencement of the present troubles. Not so much since the advent of the dysphagia a year ago. Has, however, frequent attacks of neuralgia of the right side of face and head. No evidence of lung or heart trouble.

Right vocal band immovable near the median line. In other respects the organ is normal. Can see no evidence of any disease along the course of the nerves. The headache, neuralgia, difficulty of swallowing, with the "brain fever," all point to some central lesion.

CASE XVIII.—E. N., aged fifty-four, male. Has had for the last ten years some discomfort in the throat. At times dyspnoea. During the last year the difficulty of breathing has been worse, especially upon taking exercise. Seven months ago had a slight hemiplegia of the right side. Is now able to use the right arm to some extent. The throat trouble is worse since the paralysis. Never had any specific trouble. Had typhoid fever twenty years ago. No thoracic trouble, lungs or heart.

Larynx normal in appearance. Upon effort at deep inspiration there is only a narrow opening between the bands. There is only a very slight movement of the bands in phonation. The paralysis of the abductors is not complete, but nearly so.

#### COMPRESSION OF THE RECURRENT NERVE.

CASE XIX.—O. A., aged twenty-four, male. Has had some cough for last six months. A slight hæmorrhage occurred about two weeks before consultation. Evidently deposits in apex of left lung. There has been for some time impairment of voice. Upon inspection, the left band is restricted in the range of movement. No other signs of laryngeal trouble. No swelling of the cartilages or thickening of the mucous membranes.

The interest of the case consists in the fact of paresis of the left side of the larynx in connection with tubercular deposits in the corresponding lung. It is stated by some authorities that such deposits



do, by their pressure upon the recurrent, produce paralysis. I think it must be very rare; but this case seems to justify the proposition.

CASE XX.—X. S., aged forty-nine, female. Has been hoarse for two years. In that time has lost twenty pounds in weight. Six months ago had rheumatism. No cough. No fever. Examination of the chest reveals a soft bruit at the outlet of the left ventricle with the first sound. This is propagated into the aorta, and heard with great distinctness in the supra-sternal notch. No evidence of any lung trouble.

Color and appearance of the larynx normal, except that the left band moves only very slightly. It is very near the median line, both in inspiration and in phonation. The right in phonation passes beyond the median line to meet its fellow. There must, I think, be a dilatation of the arch of the aorta, producing pressure upon the left recurrent. Saw the patient several months afterward. Found no material change.

CASE XXI.—E. B., male, aged thirty-seven. Has been hoarse for the last five months. Recently has been troubled with cough. General health till commencement of this trouble good. Upon examination of the chest, find aneurysm of the aorta at the superior and left portion of the arch. No lung trouble. Paralysis of the abductors of the left vocal band, which remains in the position of adduction in the median line. Motions of right side perfect.

*Query.*—Why is not the left band in the cadaveric position?

CASE XXII.—H. S., male, aged fifty-one. Had, four years ago, a kick from a horse, producing an injury to the back of the head and the right side of the neck. The wound of the neck was on a level with the fourth ring of the trachea. The cicatrix is well marked, and is close to the trachea. Since the injury he has been hoarse; speaks with difficulty. General health good.

Epiglottis large, wide, erect. Complete paralysis of the right side of the larynx. Left side normal.

CASE XXIII.—G. T. L., male, aged forty-eight. In early life was not in good health. Twenty years ago spit blood. For the last three years has had some difficulty in speaking when fatigued. This sometimes produced vertigo. Fourteen months ago had a severe strain of the muscles of the right side of the neck; said at the time that he "had broken his neck." Eight months ago began to experience pain in throat, and more decided difficulty in speaking. The voice is now low in pitch and feeble. No lung or heart disease.

Paralysis of laryngeal abductors of the right side, *the cord remaining in the median line*. Left side normal. Why is the cord not in the cadaveric position? Was there an injury to the pneumogastric or recurrent at the time of the "strain"? There had been some difficulty in speaking before that injury.

CASE XXIV.—J. C., male, aged sixty-two. Has had hacking cough for twenty-five years. Became hoarse ten months ago. For the last six

months has been aphonic. There is now difficulty in swallowing liquids. They pass into the larynx and produce cough and spasm. Appetite good, bowels regular. Kidneys normal. Emotionally despondent. Percussion note normal. Breath sounds harsh; rude over both apices; more marked in front than in back. Heart sounds normal.

Right vocal band immovable in the cadaveric position. Motions of left normal.

CASE XXV.—T. B. K., male, aged forty. Has always enjoyed good health till nine months ago, when he fell upon the right shoulder, upon which, for ten or twelve days, the head was drawn down. He rapidly recovered, however, and was as well as ever, except that when he took cold he had a stiffness of the right shoulder. About five months ago he took a severe cold, and had a hard cough with expectoration of white mucus. He recovered from this, and about six weeks ago was suddenly seized with a violent fit of coughing, and immediately the voice became rough and hoarse. There was difficult inspiration. The difficulty was greater while sleeping than when awake. At times there was spasm, making inspiration very difficult. Never had syphilis. Upon physical examination, the lung and heart sounds were found to be normal.

Complete immobility of the right vocal band in the cadaveric position. Left side normal.

#### UNCLASSIFIED.

CASE XXVI.—L. L., male, aged forty-seven. Ten years ago, while pitching hay on a very hot day, he took cold. Cough was severe at the time, and since then he has frequently had hoarseness and shortness of breath. Now the hoarseness is constant. He attributes it to the "cold" ten years ago. Never had any injury along the course of the laryngeal nerves. No specific history. Is well in every other respect. No lung or heart disease. Slight anæsthesia of the pharynx and larynx.

Left vocal band immobile in the cadaveric position. In efforts at phonation, the top of the right arytenoid cartilage passes in front of the left, and the right band is carried beyond the median line to meet its fellow of the opposite side.

CASE XXVII.—M. W., female, aged thirty-two. Has a uterine fibroma. Is now taking ergot. During the last three months has had a cough. Has now some dyspnoea. Is hoarse. Speaks with difficulty. No lung or heart derangement. Slight enlargement of the cervical glands, especially back of the left clavicle.

Paresis of the abductors and adductors of the left vocal band. In deep inspiration and efforts at phonation there is only a very slight movement of the vocal band.

Subsequent history unknown. I am not certain that this is not reflex in its origin, but the enlargement of the post-clavicular glands on the same side with the affected cord leaves a reasonable doubt.

CASE XXVIII.—E. W., male, aged five years. Well till eight months ago, when he had an attack of diarrhœa. Soon after began to be hoarse. About four months before consultation, became completely aphonic. No dyspnœa or cough; now well nourished; complains of no pain nor of any discomfort. Laryngoscopic examination reveals paralysis of the adductors of both sides. Electricity was used, interrupted current, with benefit, before a cure was effected. The case passed out of the knowledge of the writer.

*Query.*—What was the nature of the affection? There was no cerebral trouble, and I could find no cause of interference with the function of the recurrents. There was nothing except the diarrhœa as an antecedent.

CASE XXIX.—A. D. B., male, aged twenty-seven. Phonation has been difficult for the last four years. Health in other respects good. Previous to this, had been in the habit of singing, and had used the voice a great deal. Upon inspection, there was seen, in the act of phonation, a wide space between the vocal cords throughout their entire length, including the vocal processes. No other departure from the normal condition.

*Query.* Was the trouble the result of the over-straining of the tensors and adductors? The subsequent history is not known.

CASE XXX.—F. R. C., male, aged twenty-five. Always well until within the last year, during which he has noticed that he becomes easily fatigued by speaking. It is for this that he asks for advice. Says that he is in every other respect well. No specific history. No lung or heart disease.

A triangular opening in the cartilaginous glottis during phonation. Can find no cause for the difficulty.

CASE XXXI.—E. F. D., female, aged thirty-eight. In general good health. Ill two years ago, when she had pneumonia. Since then has been subject to cough. Is now hoarse, and has dyspnœa upon taking exercise. Complains of post-sternal pain. No history of any pelvic trouble. Lung and heart sounds normal.

Upon efforts at phonation there is left a wide triangular opening in the cartilaginous glottis. Membranous glottis normal. No thickening of the inter-cartilaginous tissue. Left ventricular band slightly larger than the right.

CASE XXXII.—X. M., female, aged twenty-nine. For the last two years has had cough, with expectoration of moderate quantity of mucus. No hæmorrhage. Appetite fair. Bowels regular. Menses normal. No emaciation. Slight dullness at the left top. Breath sounds rude over the same region. Heart sounds normal in character, but heard with unusual distinctness over the left apex.

Membranes and cartilages of the larynx normal. No impairment of

sensation. Upon efforts at phonation, a long elliptical opening is seen between the bands and including the cartilaginous glottis. Both vocal bands are in the same position. Could find no history or evidence of any trouble along the track of superior laryngeal nerve.

### *Discussion.*

Dr. COHEN: There is a point in connection with the first case which is interesting, and that is the difficulty of whispering, or the inability to whisper. This condition, to which I have ventured to give the term *ap-sithyria* (lack of whisper), corresponds with the word *aphonia*, or lack of voice. This patient I saw some ten years ago. She was under the care of a neurologist, who consulted me on account of her inability to speak and to whisper. She communicated with others entirely by pencil and paper. But she used to whistle, and had adopted a peculiar habit of expressing Yes by one whistle and No by two whistles, and so on. This showed that the paralysis of the muscles of articulation was not complete. As it was evidently a case of functional aphonia, I suggested the use of the electric current to the muscles of articulation, with the result of curing her whisper. She was exceedingly emotional, and the gentleman under whose care she was put her to bed for some intercurrent complaint, and sent her abroad, and I never had anything professional to do with her after that time. I saw her eight or nine years afterward; she was well, married, and the mother of a fine child. She told me she had never lost her whisper. I have met with a few other cases in which there was inability to whisper as well as inability to speak. I do not think there is a real paralysis in these cases—paralysis either of the voice or of speech. I think we have that condition in which these patients can not “will” to speak or can not “will” to whisper—the condition described by Sir James Paget, of London, in connection with diseases of the urinary organs. If you can control these patients, and get them to will to do what they ought to do, you can cure them. Some cases you have of inability to swallow. The patients can swallow, but they can not or will not will to swallow, and you have to manage them by having a skilled nurse to stand over them, give them confidence, and force them to swallow. I am very glad to see the author has been able to include in his cases one of extreme abduction of the vocal band. This will add two more to the cases on record.

Dr. GLASGOW: When Dr. Cohen commenced to speak I thought his case was due to a loss of will-power and not to an absence of muscular power. We often see these cases, and we can not always determine whether these persons can speak or not. It recalls an instance which occurred to me last year of a patient who was unable to speak, but was able to whisper; but this also was imperfect. Most of the conversation was carried on in writing. There was absolutely no change in the muscular powers of the larynx. Everything seemed to be perfect, so far as

we could see by examination. I dismissed her by saying she could whisper if she wished to. A cure of this case was effected by prayer. It was on Thanksgiving Day. I first saw her in August. The minister prayed that the afflictions of the family should be taken away, that this daughter should be relieved from her infirmity, and at the end of the prayer she spoke. Now, there was a deficiency of will-power, I really believe, in this case. This case was the sequel of a prolonged typhoid fever. I should think that weakness of the muscles followed, and she found a sort of difficulty in speech, and, as it worked upon her mind, she thought she could not speak. I had assured her she could speak if she would; and after this I think she was waiting for nothing but an opportunity. This prayer produced the opportunity. After the prayer she spoke well. I do not think it was deficient will-power, but perverted will-power. I think we see many cases in young women. I think this explains a good many cases of aphonia without organic muscular change or action.

Dr. HOOPER: I have always thought so-called hysterical aphonia purely functional. Although the patient is voiceless, the vocal bands are freely movable, as may be seen by asking the patient to laugh while being examined with the mirror. The statistics of the Throat Department at the Massachusetts General Hospital show that unilateral paralysis of the vocal bands occurs about once in two hundred and fifty cases. In the cases of paralysis which I have seen, I have never yet heard a patient with one vocal band immovable who was able to speak in a clear, natural voice, no matter what position the paralyzed band might be in. I can imagine, however, that in certain rare instances, as in one case of Dr. Johnson's, the voice may be good. I agree with Dr. Johnson in the difficulty of determining the ætiological factor of many of these cases.

Dr. RICE: In a number of cases of hysterical aphonia seen lately I have been impressed with the frequency of the inaction of the transverse or arytenoidæus muscle. I think this muscle is more frequently affected than any other in hysteria. This is frequently seen, too, in acute inflammatory troubles of the larynx, it being the first muscle affected, and the sole cause of dysphonia and temporary disability of the voice. There is one case of hysterical aphonia I will mention, since the cure was so remarkable. It was the case of a young woman twenty years of age. She had no constitutional trouble that I remember, and her general health was apparently good. She had been unable to speak for five or six months, and I found the loss of voice was caused by a paralysis of the transverse muscle. She had been treated by a physician, who used electricity and strychnine. I was unable to benefit her. I received a letter from her three or four months after my treatment, in which she stated she had met with a runaway accident, had been thrown from a wagon, and since then had spoken perfectly. I saw her a short time after, and there was no paralysis. Another interesting case to me was that of a man who had a syphilitic history, and who was, in addition, phthisical. One of the vocal bands was ulcerated all along its free border; the other much swollen.



Both arytenoids were in a state of ankylosis, the vocal bands being in the cadaveric position. The remarkable point about the case was this: when attempts at phonation were made, there was apparent a tremendous muscular exertion in the larynx, endeavoring to compensate for the non-movement of the vocal cords. The patient was able to produce a fair voice, husky in character. This was produced entirely by the approximation of the larynx above the level of the vocal bands—that is, by the action of the false cords.

*Paper.*

A CASE OF MELANO-SARCOMA OF THE NOSE CURED BY GALVANO-CAUTERIZATION.

By R. P. LINCOLN, M. D.

IN November, 1884, Mrs. L. presented herself for consultation, and supplied the following history:

In August, 1882, she first noticed an obstruction to free respiration in the right nostril, and about the same time was annoyed by a continual muco-purulent, blood-stained discharge from the same nostril. There was also matter of a similar appearance which was expectorated, and which evidently came from the posterior nares.

Her general health at this time was good, and there was little or no pain.

It was not till the following winter that this nostril became completely occluded, when operative interference was decided upon.

Dr. D. Hayes Agnew, of Philadelphia, removed the growth April 2, 1883. After a microscopic examination, he announced its character as "cancerous." After a period of about two months a repetition of the former symptoms manifested themselves; these continued to increase until November following, when Dr. Agnew repeated his first operation.

A few months of uncertainty succeeded the second operation, but frequently recurring hæmorrhages and renewed difficulty in breathing gave assurance of a recurrence of the tumor until February, 1884, when the growth seemed to increase very rapidly. At this time the patient placed herself under the care of a physician in Rome, in this State, a man of much repute among the people, who used, in the words of the patient, "plasters and pastes" for about two months, when he confessed his inability to remove the trouble. Notwithstanding this treatment, the tumor continued to grow.

On examining the patient, I found the right side of the nose, extending well up to the inner canthus of the eye of the corresponding side, enlarged, the fullness amounting to about four times the size of the left side of the nose.

The lower half of its ala was wanting, the remaining border being puckered, somewhat contracted, and of a purple color, which gradually

faded until the integument was of normal appearance half way up this side of the nose. There protruded from this nostril, about half an inch, a dark-colored, fleshy mass completely filling it; this was attached to the outer margin of the nostril as well as to its floor. A plum-colored discharge was constantly flowing from the nostril, and the lightest touch of the mass with a probe was followed by dark grumous blood. A further careful exploration showed the tumor to grow from the lower and middle turbinated bones, and from the floor of the nostril for a distance of two inches and a half. The septum was free.

A rhinoscopic examination disclosed the tumor protruding into the post-nasal cavity and occupying about half of it. I proposed a removal of the growth with the galvano-cautery *écraseur* and a subsequent cauterization of points of attachments as offering the best chance of relief.

November 18, 1884, the patient submitted to operation, Dr. Delavan and Dr. Goodwillie being present and kindly giving their assistance. The patient being etherized, I passed the platinum-wire loop of the galvano-cautery *écraseur* about the tumor at its attachments and thus separated it.

Immediately afterward the seat of the growth was thoroughly cauterized. The loss of blood was inconsiderable. For a week after the operation a solution of bicarbonate of sodium and carbolic acid was injected into the nostril many times a day; after this an ointment containing two grains of iodoform to an ounce of vaseline was applied to the healing surface three times a day.

Two weeks after the operation the patient was permitted to go to her home in Pennsylvania, with no diseased point discoverable and with perfectly free respiration through the nostril.

*May 27, 1885.*—The patient returned at intervals of one or two months, the last time on this date, for observation. No further treatment has been necessary, as the parts are perfectly healthy. The integument, formerly discolored, has assumed a normal appearance. The remaining deformity is hardly noticeable, far less than the most hopeful would have expected.

I present herewith a specimen of the tumor mounted for microscopic examination, together with a report of the microscopic appearance, both of which were made by my friend Dr. Frank Ferguson.

His report I quote:

“The cut surface is dark, with small areas of dark gray and flesh-colored tissue. Under the microscope the portion of the tumor which is flesh-colored is composed of round and ovoid cells of medium size. The cells are close to each other and distinctly nucleated. The darker portions of the tumor are hæmorrhages. The areas of dark gray are composed of large flat cells deeply pigmented. The cells are supported

by a stroma of fibrillated and granular material. There are numerous large vessels seen throughout the tumor, some of them with thick walls; also a few gland-ducts, probably the remains of glands belonging to the tissue in which the growth originated.

"There are numerous hæmorrhages throughout the entire tumor, in some places large, in other places punctate. Prognosis *grave*."

*Note*.—Information received from the patient October 1st showed that there were no indications of a return of the disease.

### *Paper.*

#### ANGIOMA OF THE NOSE.

By JOHN O. ROE, M. D.

ANGIOMATOUS growths in the nose, though more frequent than in the larynx, are of quite rare occurrence. By including in the list all growths in which the vascular element is the principal or predominating feature, such as erectile tumors or nævi, vascular tumors, angioma cavernosum, and the fibro-angiomata, I have been able to find records of but thirteen cases that have been reported.

Two by Dr. Clinton Wagner; one a vascular myxoma; the other combined in different portions of the tumor the structure of an angioma of the cavernous variety, a myxo-fibroma, and a myxoma, giving evidence of transition from one form to that of the other. ("Diseases of the Nose," New York, 1884, p. 149, *et seq.*)\*

One by Dr. Delavan of a vascular myxoma. ("Archives of Laryngology," vol. iii, p. 174, 1882.)

One reported by Dr. Seiler of erectile tumor of the anterior nares. ("American Specialist," Philadelphia, 1881, vol. ii, p. 7.)

An erectile tumor of the pituitary membrane is also reported by Verneuil. ("Annales des maladies de l'oreille et du larynx," t. i, p.

\* Dr. Wagner (p. 149) also mentions "a case reported by Beauchêne, which is referred to by Virchow." This case must have been included by mistake. Virchow ("Pathologie des tumeurs," Paris, 1876, p. 44) does cite a case of angioma of the nose in which the tumor was extirpated by Beauchêne, not Beauchêre, the latter being evidently a typographical error, but gives no details as to its situation. Alibert ("Nosologie naturelle," Paris, 1838, p. 335), who originally reported the case, and to whom Virchow refers, says: "M. de Beauchêne, chirurgien en chef de l'hôpital Saint-Antoine, en extirpa une qui était située *sur* le nez d'une pauvre femme." The tumor is also described by Alibert as being of a complicated structure and becoming erected whenever the patient got angry. It was situated on the external portion of the nose, and not in the nasal cavity.

169.) This case is referred to by Mackenzie. ("Diseases of the Throat and Nose," Lond., 1884, vol. ii, p. 384.)

Debris, in his "*Thèse de Paris*" ("*Des polypes fibro-angioma-teux de la région naso-pharyngienne*," 1882), has collected the records of eight cases of fibro-angiomatous growths of the nose that have been observed in the Parisian hospitals.

One case has recently come under my own observation, the details of which are as follows :

C. L. W., sixty-eight years of age, a retired naval officer, living in Mexico, N. Y., was referred to me by his son-in-law, Dr. Johnson, of that place, January 15, 1885. Six weeks before, he began to perceive an obstruction in the left nostril, and was soon after unable to clear the nostril of mucus or to breathe through it.

The discharge from the nostril was very profuse, which caused him to ascribe his trouble to nasal catarrh. Two weeks after he first observed this obstruction he began to have, nearly every day, nose-bleed from this nostril, which was frequently very profuse. About three weeks before I saw him, Dr. Johnson observed in this nostril a growth, and, supposing it to be a mucous polyp, attempted to remove it with a pair of polyp-forceps. On tearing off a small portion, an alarming hæmorrhage immediately occurred. The doctor at once tamponed the nostril, but did not accomplish it before quite a large amount of blood had been lost. This greatly reduced the old gentleman's strength, and when I saw him he was very weak and much debilitated.

On examination, the left ala of the nose was seen to be somewhat distended by a growth which projected just beyond the orifice of the nostril. It was quite firm to the touch, and had a bluish-red appearance. So much did it resemble a fibroid growth that I at first thought it to be of that nature; but afterward, on examining it more carefully preparatory to its removal, I discovered its real nature. Even the slightest manipulation of the tumor would cause it to bleed very freely. Firm and steady pressure would reduce it somewhat in size, and at the same time quite strong pulsation could be felt under the finger. A silver probe, passed into and allowed to depend from the nostril with its inner end tilted up against the lower side of the tumor, would vibrate very markedly and synchronously with the contractions of the heart. There was no pain, but a sensation of pressure was experienced in that side of the face, with congestion of the eye and stillicidium.

The tumor was sufficiently large to fill the nostril from the anterior to the posterior nasal openings, and to crowd the posterior end of the septum to the right, although that deflection might have existed before.

By very careful exploration with a flexible slender probe, wound at the end with a little cotton to avoid causing hæmorrhage, I found the growth was attached to the upper half of the septum, the vault of the nostril, the upper turbinated bone, and the upper side of the middle turbinated bone.

January 19th I removed a large portion of the tumor. To avoid dangerous hæmorrhage, I employed the galvano-cautery. After passing the loop of platinum wire into the nostril, I separated the two sides with two small cannulæ that were slipped down over the wire, in order to carry the wire around as large a portion of the tumor as its very broad base would permit. After having done so, and drawn the wire down quite snugly and connected it with the cautery electrode-handle, I turned on the current and very slowly cut off a portion of the growth. Contrary to my expectations, copious hæmorrhage followed that necessitated the immediate plugging of both the posterior and anterior nares. After removing the tampon, two days later, I attempted to cut the remainder of the tumor away at its base with the galvano-cautery knife. This also caused bleeding as soon as the electrode came sufficiently in contact with the tumor to burn through the enveloping mucous membrane, regardless of the degree to which the knife was heated, whether to a black, red, or white heat.

I then decided to try Jarvis's snare or cold-wire *écraseur*. This plan was eminently successful, and all further hæmorrhage was avoided. After encircling with the snare as large a portion of the tumor as was possible, I placed the patient in a reclining chair and cut the tumor off very slowly, occupying in the performance about three hours. Whenever tightening the wire (which I taught the patient to do himself) caused bleeding, further turning of the nut was stopped until all indications of bleeding had ceased.

Owing to the extensive attachment of the growth, and being unable to remove but a small portion at each operation, much time was consumed. Much additional time was also required for the reason that often four and five days would elapse between the removal of different portions, on account of the extreme weakness and enfeebled condition of the patient.

After the removal of the growth was completed I cauterized the base with the galvano-cautery electrode, which could now be used without causing hæmorrhage. The employment of cocaine rendered the operations with the snare, and also the cauterization, almost entirely painless.

After the tumor was removed, its texture was very soft and friable. The hard, firm feel and appearance which the tumor had before removal were due to the pressure exerted on it by reason of being crowded so firmly in between the resisting walls of the nasal passage.

A microscopic examination of the growth showed it to be composed of small blood-vessels, mainly enlarged and greatly dilated capillaries—at some places enlarged into small sinuses—held together by a reticulum of connective tissue, the characteristics of true angioma.

About seven weeks afterward, by my advice, he returned for examination. He had had no trouble in the nose, but I found that there was a recurrence of the growth on the upper posterior portion of the septum. It was sessile, and at its base about 20 mm. in diameter.



This I removed with the snare. In order to do so, owing to its flattened condition, I was obliged to use the transfixion needle. After the removal of the tumor I cauterized its base with the galvano-cautery. It was very noticeable that this latter growth showed much less tendency to bleed than its predecessor.

Upon microscopic examination of this latter growth, it was found to consist of several different forms of tissue. First, a network with meshes that communicated with one another and were filled with blood. The trabeculæ were lined with endothelium and consisted of connective tissue. Second, in other places these spaces were filled with mucoid tissue or polyhedral cells resembling epithelial cells. Some of these spaces were only partly filled with these cells, and some were empty.

The pathological character of this growth is of interest, and illustrates the transformation which angiomatous tumors often undergo during the process of their development and growth.

As we have seen, the portion of the tumor that grew first was composed entirely of dilated and greatly developed capillary vessels, held together by a reticulum of connective tissue constituting true angioma of the hypertrophic form, according to Ziegler. As the tumor continued to grow, it was found to contain, in addition to the dilated capillary vessels, cavernous sinuses of different sizes resembling greatly the corpus spongiosum of the genital organs, thus constituting erectile tissue. The walls of these cavities were lined with epithelium. Subsequently we find the growth developing into an epithelial formation, the blood-spaces being filled in with epithelial cells, constituting what is termed by Ziegler an endothelioma.

In other portions these blood-spaces were filled in with elements of a round-cell sarcoma, constituting what is termed angio-sarcoma myxomatodes.

In sections of some portions where some of the first tumor had evidently escaped removal, we have all these conditions combined in the same section, the one merging gradually into that of the other.

From the transition which this tumor is undergoing from that of a benign to that of a malignant character, as manifested by the microscopic examination and in its speedy return and rapid growth after removal, there is little doubt of its ultimate unfavorable termination.

NOTE.—Mr. W. died, from exhaustion, November 5, 1885. The tumor slowly grew again after its removal, and at the time of his death filled the nostril. An examination of this growth showed it to be an angio-sarcoma, the blood-spaces being almost filled with the elements of a round-cell sarcoma. It had been also noticed, for about two months before the patient died, that the tendency to hæmorrhage had disappeared—the

symptom that was most annoying and alarming during the early history of the growth.

Angiomatous growths may also undergo fatty, fibrous, cystic, and carcinomatous degeneration. A very excellent review of the transformations of the angiomata in general is given by Duchemin,\* and a very excellent contribution to the anatomy of angiomata is given by Monod.†

#### *Discussion.*

Dr. MACKENZIE thought that certain cases of angiomatous nasal growths might be referred to the category of hypertrophic enlargement of the turbinated bodies. Closely allied to the angiomatous condition, Dr. Mackenzie described a peculiar condition of hypertrophy or enlargement of the turbinated bodies associated with prolapse of these structures, forming a dense, dark reddish, hard, fleshy mass or tumor, which may hang free in the nostril or may rest on the floor of the inferior meatus. This condition, which has not been described by specialists, may possibly constitute, in some cases, the initial stage of the future angioma. Dr. Mackenzie related such a case, in which the prolapsed and hypertrophied cavernous body was removed by him with the galvano-cautery.

Dr. ROE: Angiomatous growths of the cavernous variety do resemble the cavernous tissue covering the inferior turbinated bones, and the lower posterior portion of the septum, and we should quite naturally expect to find that in many cases the growths originated in this tissue. On an examination of the fourteen cases that have thus far been reported, we do not find one in which the growth is described as arising from the inferior turbinated bone, the situation where this cavernous tissue is most abundant. Two were attached to the cartilaginous septum, while in the remainder of the cases in which the location was designated the growth was attached to the upper part of the nostril—to the vomer or the basilar apophysis, to the inferior surface of the body of the sphenoid, and to the vault of the nostril. In but two cases were the middle turbinated bones involved. It is also singular to note that in but one instance has the growth been located in the right nostril, and that in no instance have angiomatous tumors been reported as growing from both nostrils at the same time or alternately. In this case of my own the portion of the growth that contained the most cavernous tissue was located along the upper portion of the septum, where there is normally an entire absence of this tissue.

\* "Contribution à l'étude des transformations des angiomes." Thèse de Paris, No. 49, 1880. Par Paul Duchemin.

† "Contribution à l'étude anatomique des angiomes." Par le Dr. Charles Monod. "Bulletins de la société anatomique de Paris," 1873, t. xlviii, p. 531, *et seq.*

A TABULATED REPORT OF ALL THE CASES OF ANGIOMATOUS GROWTHS OF THE NOSE THAT THE WRITER HAS FOUND RECORDED IN MEDICAL LITERATURE, INCLUDING THE ONE REPORTED BY HIMSELF.

DATE.	OPERATOR—REFERENCE.	SEX.	AGE.	DURATION AND CHARACTER OF PREVIOUS SYMPTOMS.	SITUATION, APPEARANCE, AND EXTENT.	PATHOLOGICAL NATURE.	TREATMENT.	RESULT AND SUBSEQUENT HISTORY. REMARKS.
(1) Oct. 18, 1849.	Nélaton, "Thèse de Beauf," Paris, 1857.	Male.	21	One year. Affected hearing and respiration. Attacks of profuse epistaxis for two months. The last he lost one litre of blood just before coming to hospital.	Attached to inferior surface of body of sphenoid; size of pullet's egg; slightly pedunculated, and flattened from before backward; crowded palate downward and forward on to base of tongue.	On section, fibrous, pearly amorphous, and perforated by a multitude of small orifices — the open mouths of numerous vessels (angiomaticous).	Removal by Nélaton's method.	Two hours after, profuse hemorrhage, and two days later death from loss of blood.
(2) 1858.	"Thèse de Beauf," Paris.	Male.	16	Duration not stated. Blood profusely on the slightest touch.	Enormous naso-pharyngeal polyp.	Excessively vascular (angiomaticous).	M. Nélaton and Paul Dubois were unable to remove it.	No further report of case given.
(3) Feb. 4, 1860.	Hugnier; reported to the Société de chirurgie. Debris, "Thèse de Paris," 1882.	Male.	16	Two and a half years. Left nostril obstructed; palate pushed downward; no pain, but general discomfort.	Attached to left side of vomer; size of a nutmeg, and pedunculated.	Celulo-vascular, with loose meshes; very rich in vessels (angiomaticous).	A button-hole was made in palate, a pair of scissors introduced, and pedicle cut off.	Hemorrhage very slight. Patient recovered.
(4) Sept. 15, 1872.	Panas; communicated by H. Grépat to the Société anatomique, Oct., 1872.	Male.	16	Eight months. Left nasal fossa obliterated; distension and tumefaction of the left side of the face; exophthalmos; sight destroyed in left eye by pressure; double soufflé heard by stethoscope above inferior border of orbit; frequent and profuse hemorrhages from nose.	Left nasal fossa completely filled by the growth, which projected against orbit and into skull. It also perforated hard palate, and projected through the opening.	Cavernous angioma.	Operation: resection of superior maxilla, removal of the portion projecting through the perforation in hard palate, then attempted the removal of the portion behind the orbit, which seemed to penetrate it, and to be the seat of the bruit.	Fatal hemorrhage occurred, and patient died immediately. Autopsy.—The orbital portion penetrated the skull and was covered only by the dura mater; the arterial dilations communicated largely with the dilated cavernous sinuses of which it formed the anterior wall. This accounted for the soufflé and fatal hemorrhage.

A TABULATED REPORT OF CASES OF ANGIOMATOUS GROWTHS OF THE NOSE—Continued.

DATE.	OPERATOR—REFERENCE.	SEX.	AGE.	DURATION AND CHARACTER OF PREVIOUS SYMPTOMS.	SITUATION, APPEARANCE, AND EXTENT.	PATHOLOGICAL NATURE.	TREATMENT.	RESULT AND SUBSEQUENT MARKS.
(5) Jan. 25, 1873.	Guyon; communicated to the Société de chirurgie.	Male.	Not given (young man).	Not stated. Profuse nasal hemorrhages.	Behind palate and extended into the nasal fossæ; pharyngeal portion size of a pullet's egg, and bled freely on exploration.	Diagnosis, angioma.	By electrolysis.	Frequently repeated séances of ten minutes each produced sensible diminution of tumor and complete arrest of the hemorrhage.
(6) June 18, 1873.	Demenil; communicated to the Société de chirurgie.	Male.	13	Not stated. Frequent and profuse hemorrhages, arrested by ligation of left external carotid.	Attached to left basilar apophysis; extends into post. nares and zygomatic fossæ, causing swelling above zygomatic arch the size of an almond.	Angiomatous polyp.	Extirpated with curette.	Hemorrhage profuse—arrested by actual cautery. Left Hospital Hôtel-Dieu de Rouen Oct. 4, 1883, cured.
(7) 1875.	Vernueil, "Ann. des maladies de l'oreille, etc., t. 1, p. 366, et seq.; also referred to by Mackenzie, "Dis. of the Nose," Lond., 1884, vol. II, p. 384.	Male.	52	Frequent and abundant hemorrhages from nose since boyhood. Anæmic and much reduced.	On left side of septum, a dark-red swelling, round and sessile, the size of a cherry-stone. On second examination, the same condition was found, only in right side.	Erectile tumor.	Both sides of nose were laid open, and greater part of septum destroyed by actual cautery. Hemorrhage recurred from right side, and the cautery was reapplied.	Recovery. Two years after the operation the patient was well; four years later he died in a state of extreme cachexia.
(8) 1876.	Clinton Wagner, "Diseases of the Nose," N. Y., 1884, p. 149.	Male	39	Five years. Profuse acrid discharge from nose, and closure of right nostril.	Attached to cartilaginous septum, and to a slight extent to vomer on right side. Sessile, bright-red color, soft and yielding to touch.	Angioma.	Tumor removed with knife, using left index-finger as a guide.	But little blood lost, at operation. A few minutes later frightful hemorrhage occurred, causing syncope; arrested by tampon and Monsel's solution of iron. Patient cured; no return of growth after eight years.

(9) Jan. 12, 1881.	Bichet; communicated to Debris by Bazzy, "These de Paris," etc.	Male.	18	Three years. Oclusion of left nostril, and profuse mucous discharge; slight oozing of blood.	Sessile tumor in post. nares attached to superior portion of nose. Felt by finger in post. nares; not to be seen in anterior nares.	A fibrous angioma, or an angiomatous fibroma; very vascular; resembled a sponge; meshes irregular in form and size.	Removal by curette through an opening made in side of nose.	Profuse hemorrhage followed, and in three minutes 400 to 600 grammes of blood were lost. Nose tamponed. The second day after, tampon removed, hemorrhage as profuse as before; another tampon applied. Ten days later, tampon again removed, and hemorrhage as profuse as two preceding. Hemorrhage arrested by cauterizing base. On separation of eschar, hemorrhages recurred, and patient succumbed. Autopsiation showed that tumor communicated with cavernous sinus.	Hemorrhage slight. No return of the growth afterward.
(10) 1881.	Seller, "American Specialist," Phila., vol. II, p. 7.	Male.	20	Oclusion of nostril, together with anterior inferior turbinate hypertrophy.	On lower portion of cartilaginous septum, about size of a cherry, and slightly constricted at base.	Angioma, or cavernous fibroma.	It was transfixed with a needle, and removed with Jarvis's snare.		
(11) Aug. 20, 1881.	Clinton Wagner, "Diseases of the Nose," N. Y., 1884, p. 150.	Female.	23	Four weeks. Frequent and severe hemorrhages from left nostril; nose obstructed.	Attached to left middle turbinate bone; one inch and a quarter in diameter; size of an English walnut; end of nose distended to twice its size, and septum crowded to the right; tumor dark-red color, and pulsating.	It combined, in different portions, a myxoma, myxo-fibroma, and an angioma of cavernous variety.	Tumor removed with the snare.	Profuse hemorrhage followed, requiring the tampon; no further hemorrhage; patient cured.	
(12) 1882.	Delavan, "Arch. of Laryngology," v. III, p. 174.	Female.	30	Epistaxis since a child; for four years more frequent and profuse, and from anterior portion of left nostril, for two years bright red tumor seen in left nostril; whole nostril congested and sensitive.	In left nostril, at junction of septum with ala, $\frac{3}{4}$ in. from meatus. Diameter of base, $\frac{3}{4}$ in.; elevation or thickness, $\frac{3}{4}$ in. Surface nodulated; bled profusely on slightest touch.	Vascular myxoma.	Removed by a small cup-shaped curette; hemorrhage, four oz., arrested by application of chromic acid.	No return of tumor, but abrasion of septum refused to heal, and continued to bleed on the slightest touch.	



A TABULATED REPORT OF CASES OF ANGIOMATOUS GROWTHS OF THE NOSE.—Continued.

DATE.	OPERATOR—REFERENCE.	SEX.	AGE.	DURATION AND CHARACTER OF PREVIOUS SYMPTOMS.	SITUATION, APPEARANCE, AND EXTENT.	PATHOLOGICAL NATURE.	TREATMENT.	RESULT AND SUBSEQUENT HISTORY. REMARKS.
(13) 1882.	Richet; communicated by Bazzy, "Thèse de Paris," etc.	Male.	17	Two years. Oedema of left nostril and moderate epistaxis; for six months exophthalmia, left side, and swelling in temporal fosse.	Large tumor attached to vault of left nasal fossa and to basilar apophysis. A portion extended forward through left nostril, another penetrated the pterygo-maxillary fissure, another extended up under the zygomatic arch, and formed a tumor in the temporal fossa.	Angioma. Numerous large and small vessels communicating with each other; fundamental fibrillary tissue interlaced; no elastic fibers, but embryonic and fusiform cells.	Attempted to remove tumor with forceps.	Profuse hemorrhage followed; nose tamponed; exploration of tumor with finger through posterior nares caused profuse hemorrhage, requiring a tampon; repeated hemorrhages followed, and patient died twelve days afterward of blood poisoning, with typhoid symptoms.
(14) Jan. 19, 1885.	Roe, <i>vide</i> report above.	Male.	68	Six weeks. Profuse catarrhal discharge from nose; for four weeks profuse epistaxis nearly every day from left nostril.	The tumor was attached to the upper half of septum, the vault of nostril and to upper and side of middle turbinate bones; it filled the left nostril from posterior nasal opening forward, and projected slightly beyond anterior nasal opening. It distended the nostril, was of a bluish-red appearance, pulsated under the finger, and bled profusely on the touch.	Angioma, which, as it continued to grow, was transformed into an endothelioma, and into an angiosarcoma myxomatodes.	Attempted its removal by galvanocautery wire, which caused profuse hemorrhage; it was then removed in portions by Jarvis's snare, without hemorrhage, by cutting it off very slowly. Base cauterized by galvanocautery electrode; same operation repeated on the return of the growth.	After thorough removal and destruction of base, the tumor soon began to grow again, and in seven weeks had returned sufficiently to require removal as before, though this time it was confined to septum. The second growth indicated a tendency to malignancy, which will undoubtedly cause a fatal termination. (See note in report of case.)

*Paper.*

DEFORMITIES OF THE NOSE AS A FACTOR IN NASAL CATARRH.

By J. W. ROBERTSON, M.D.

EVERY physician who has paid any attention to diseases of the nose has noticed that a large proportion of the applicants for his professional services have some deformity of the nasal organ, varying from a slight deviation of the septum to a complete obstruction of one or both nostrils.

Many noses which to all external appearances are perfectly straight are often found, when examined internally by the aid of a nasal speculum or rhinoscope, to be deformed to an extraordinary extent, and in a large majority of these cases the patients suffer from the various forms of catarrh.

Now, it becomes us as specialists to give to the general medical profession the results of our researches into the causes of these deformities and their relation to the catarrhal diseases of the nose and throat.

With this object in view I have been investigating some of the causes of the so-called catarrhal inflammations, and have come to the conclusion that deformities of the nose stand at the head of the list.

But we must needs go further back than the mere fact that deformities exist. Immediately many questions arise.

1. What are the causes of the large number of deformed noses?
2. At what age do these deviations from the normal take place?
3. In what way do these deformities produce catarrhal diseases?
4. How can these abnormal conditions be prevented?

It will not be the province of this paper to discuss all the various questions that may arise in this connection, or go into any extended debate in regard to them, but simply to give the observations made and the deductions therefrom.

1. Causes of deformities.

Of one hundred and sixty patients (males) examined, thirty-seven gave histories of injuries received before the age of twenty years; nineteen others were injured after attaining that age, having fractures, dislocations, etc., due to external violence. Sixteen deformed noses were the results of tertiary syphilitic manifestations.

Twelve cases of congenital deformities were consequent upon

improper development in hereditary syphilis, scrofula, etc. Three perforations of the septum resulted from necrosis during typhoid fever. One case of necrosis of the vomer and turbinated bones followed injury and long-standing suppuration of the lower extremities. One case of perforation of the septum followed vaccination in a tubercular subject, afterward culminating in general tuberculosis and death. Two cases of perforation of the cartilaginous septum resulted from ulceration due to injury of the mucous membrane by the finger-nail. One case of congenital occlusion of one nostril was caused by attachment of the posterior portion of the vomer to the inferior turbinated bone. The remaining cases gave no histories of injuries having been received; quite a number had high-arched, irregular palates, which were undoubtedly congenital, and nearly all were suffering more or less from catarrhal difficulties.

Of fifty-seven patients (females) examined, five had had recent fractures, the results of blows, falls, etc., upon the nose. Twenty-two gave histories of injuries from violence. Eleven cases were due to tertiary syphilis and congenital non-development. Two were cases of lupus. Three were cases of asymmetry of nasal cavities, probably congenital; partial obstruction to one nostril since early childhood; no histories of injuries. The causes of the deformities were not known in the remaining cases, but nearly all the patients were troubled with the various catarrhal diseases.

Of two hundred and forty persons of both sexes examined, two hundred and seventeen had deformities of the nose. Of the two hundred and seventeen, eighty-three gave histories of injuries received; and, of the ninety-seven remaining, having no histories, in all probability one half of them had had injuries early in life and had forgotten them, because many of them had dislocations of the cartilages and fractures of the nasal bones, which could only have been the results of external violence. It would appear from the foregoing that a large percentage of the deformed noses were directly due to injuries received—syphilis, scrofula, tuberculosis, and allied diseases, causing necrosis, ulceration, and congenital improper development, coming in a good second in the production of these abnormal conditions.

2. At what ages do these deviations from the normal take place?

Through the kindness of Dr. E. A. Chapoton, I was enabled to examine at St. Vincent's Orphan Asylum and the Home of the Friendless two hundred and thirty-three children, ranging from two to eighteen years of age, the object being to determine, if possible,

at what age these deformities began to be made manifest. I have tabulated the following:

Ages.	No. examined.	Normal	Abnormal.	Deformed.	Syphilitic, Scrofulous, Imp. Dev.	DEFORMED NOSES.	
						Histories of injuries	No histories of inj.
2 to 5 .....	46	36	10	1	5	1	..
5 to 10.....	115	91	24	6	9	3	3
10 to 15.....	64	35	29	20	9	5	15
15 to 20.....	8	5	3	2	..	1	1

From the foregoing it will be seen that in a total of one hundred and sixty-one children, at ages ranging from two to ten years, only seven deformities existed, and four of them gave histories of injuries. In a total of seventy-two children, between the ages of ten and twenty years, there were twenty-two deformed noses; six gave histories of injuries, while in sixteen the causes were unknown, although five had dislocation of the septum and one had disarticulation and depression of the nasal bones; four had narrow superior maxillary bones, high-arched palates, crowded teeth, and deviation of the nasal septum. Quite a number gave histories or indications of syphilis, scrofula, or tuberculosis. In a total of thirty-two children under ten years of age examined in private practice, only one had any deformity of the nose. It would appear from this that between the ages of ten and twenty years a large proportion of the deformities manifest themselves either through the receipt of injuries or improper development due to malnutrition.

3. In what manner do these deformities produce catarrhal diseases?

Nearly every person is subject, more or less, to frequent attacks of coryza, influenza, etc. Ordinarily these attacks last only a few days, and the patient eventually recovers with no untoward symptoms; but, when these diseases occur in persons afflicted with any of the numerous deformities of the nasal organ, there will always be some interference with the proper drainage therefrom.

The secretions accumulate to a certain extent in some portion of the nasal tract, thereby causing an irritation by drying or undergoing decomposition. This irritation is kept up for a greater length of time in these cases than where no abnormal conditions exist; a subacute catarrhal inflammation supervenes, leaving the patient liable to subsequent attacks of coryza with increased irritation, repeating itself until eventually a chronic inflammation, with its concomitant

symptoms, results. In the same way individuals having deformed noses, who are obliged constantly to breathe air impregnated with irritating substances, are liable to have chronic inflammations of the nasal mucous membrane, on account of an inability to dislodge the irritating particles because of the abnormal projections and cavities.

Again, in those unfortunate children who have inherited syphilitic and scrofulous diseases, where there is an interference with the proper nutrition of the entire system, there seems to be particularly a condition of malnutrition of the nose and throat, usually a lack of proper bony growth, the nasal bones being short and small, the vomer resting upon a flat palate, the bridge of the nose slightly sunken and broad, the point tilted up, the nostrils large and open, allowing in many cases too free a circulation through them, which has a tendency to dry and harden the secretion in the nose and upon the membrane of the pharynx, producing ultimately ozæna, pharyngitis atrophica, or diseases of a severer character of the upper air-passages and lungs. These children usually exhibit a tendency from birth to chronic discharges from the nose, and eczematous eruptions of the lips and nostrils, the nasal passages being deformed and allowing too much air to pass through them, as stated above, causing the secretions to dry upon the surface of the mucous membrane, producing considerable pressure and atrophy of the underlying tissues. In this way many of the cases of atrophic catarrh may be accounted for.

#### 4. How can these abnormal conditions be prevented?

It devolves upon the medical profession to instruct the people that the time to prevent catarrh and its concomitant diseases is during the growing period of childhood.

We can not prevent children from falling down stairs or boys from playing ball and fighting, but the resulting deformities can be, to a certain extent, relieved; for during early life the cartilages and bones can be more easily molded into shape, and fractures and dislocations more easily reduced, and they should be looked after with as much care as fractures and dislocations of the arms and legs. The nose should have at least as much care as the teeth, for it is far more essential to health, and, should its functions be impaired or destroyed, no false one can replace it.

In those cases of syphilitic and scrofulous diseases where the secretions are profuse and inclined to adhere to the mucous membrane, it is usually necessary to cleanse the nostrils constantly with some bland fluid, and apply oil by means of a spray, which will pre-



vent, to some extent, the constant irritation. In children the utmost care must be had in regard to the hygienic surroundings, and an attempt made, by proper treatment and feeding, to develop, if possible, the bony structures of the nose.

*Discussion.*

Dr. MACKENZIE referred to the custom of the ancient Persians with reference to securing symmetry of the nasal chambers in the children of the royal blood. No man was allowed to sit upon the throne who had a crooked or deformed nose, and the eunuchs who had charge of the royal offspring were accustomed to mold their noses into perfect shape. Cyrus, it is said, had an asymmetrical nose, which was made a thing of beauty through the kind interference of his emasculated attendants. In regard to the undue arching of the palatine vault, first advanced by Duplay and subsequently elaborated by Jarvis, Dr. Mackenzie was inclined to regard it as an inconstant aetiological factor, although he fully recognized the importance of asymmetrical conditions of the nasal fossæ as factors in the production of septal deflection.

*Paper.*

ADHESION OF THE SOFT PALATE TO THE WALL OF THE  
PHARYNX.

BY CLARENCE C. RICE, M. D.

IN reviewing the literature relating to this class of cases, one must conclude that very little has been accomplished for their relief. It would appear that, where this unfortunate condition has existed, as a rule no surgical measures have been attempted. In the records where the line of treatment has been indicated, nothing more than temporary benefit seems either to have been sought or obtained. In the histories of a considerable number of these cases, where there was almost complete occlusion of the middle pharynx, we find the lesion accurately described, but no allusion made to operative procedure. Many of the systematic treatises on surgery refer to partial destruction of the pharynx by ulcerative process, but no mention is made of resulting adhesion of the mucous surfaces. The difficulty of reaching the affected part, dangerous hæmorrhage from an inaccessible quarter, and the strong tendency to recurrence after the adhesions were separated—these were sufficient obstacles to deter the surgeon, and to make the prognosis of successful operation doubtful. Fifty or even thirty years ago—before the days of the rhinoscopic mirror, when little could be seen, the operator working in the dark

and mapping out landmarks with his finger—it does not seem strange that surgeons avoided post-nasal operations whenever the demand for interference was not imperative.

Writers of to-day present a prognosis hardly less gloomy. Verneuil\* remarks that “nothing is easier than to separate adhesions, and nothing more difficult than to prevent their recurrence.” Mackenzie† says that “great relief can be afforded to the patient as long as he remains under treatment; but no cure can be predicted, as the stenosis always returns when mechanical measures are suspended.” Sémon’s‡ opinion is, “that attempts at dilatation are only of service so long as used.” Cohen# says that “the tendency to reunion is very great; that he has seen a number of these operations performed with very little benefit.” And Bosworth: || “It must be confessed that at present we possess no means of remedying this frequently distressing condition; all that lies in our power is simply to palliate some of the most prominent symptoms.” In view of such opinion, the operator will hardly welcome this class of patients to his office. But such prognosis, I think, may be misleading. The same verdict should not be applied to all cases, since the lesions caused by inflammatory ulceration in the upper and middle pharynx differ so greatly as to location and extent. It is not to be expected that a pharynx in which all semblance of mucous membrane has disappeared, and the muscular tissue been replaced by a fibrous structure, can ever give its owner much happiness. Comfort may be left out of the reckoning; but that such a pharynx may be made available for the passage of air, that the nasal voice may be corrected, and the sense of smell partially restored, is quite possible.

In considering the prognosis, these cases should be divided into two classes:

1st. Where the *sole lesion is the adhesion of the soft palate to the walls of the pharynx*, and

2d. Where, in addition to this, *extensive cicatrization has narrowed the normal caliber of the naso-pharynx*. In determining the probable success of surgical treatment it is most important to ascertain to which of these classes the patient belongs. Has the ulcerative pro-

\* Verneuil, “Bul. et mem. soc. de chirurg.,” 1876, p. 308.

† Mackenzie, “Diseases of the Throat and Nose,” vol. i, p. 107.

‡ Sémon, “British Med. Journal,” April 17, 1880, p. 589. In discussion of T. Gilbert Smith’s paper.

# Cohen, “Diseases of the Throat and Nasal Passages,” p. 212.

|| Bosworth, “Diseases of the Throat and Nose,” p. 151.

cess extended above the level of the soft palate? and have the deeper tissues been involved? These are the questions to be decided. My own experience would lead me to believe that in the majority of instances the deformities are occasioned by superficial rather than deep ulceration. Union of the soft palate and pharyngeal wall may be a result of simple erosions, and that, too, when only one surface is involved. Here the cicatricial stricture is, of course, less formidable and more amenable to treatment than where there is deeper destruction.

Belonging to the second class is a case reported by Dr. William Turner,\* and referred to in Dr. Cohen's† book. It was one of almost complete occlusion between the middle and superior pharynx. An autopsy showed that very extensive changes had taken place. The anterior pillars were normal, but the uvula had disappeared, and the posterior pillars had become absorbed in the union of surfaces. On removal of the pharynx from the vertebral column, the deep muscular structures were found to be almost wholly altered. Subsequent contraction had greatly diminished the diameters of the pharynx. Although about normal at its superior extremity, it gradually became narrower below, until at the level of the hamular process the lateral diameter was not more than half an inch. This point corresponded in location with the junction of palate and pharynx. Below, the tube became enlarged. Dissection demonstrated that the muscular fibers of the superior and the upper portion of the middle constrictor muscles were entirely replaced by connective tissue. The palatal muscles were not changed.

This autopsy teaches the importance of an early diagnosis, that the ulcerations may be controlled before they involve the deep structures and produce lasting deformity. To my mind, the contraction of the pharynx above the line of adhesion is the most discouraging feature in the treatment of these cases. I believe it is much easier to separate adhesions and to prevent their recurrence than to enlarge the cicatrized pharynx. In searching for the cause of nasal dyspnoea and pharyngeal discomfort, too much stress has been placed on the adhesions, which are to be plainly seen in the back of the mouth, and too little on the narrowed tube above, which can not be so readily observed. It is for this reason that the operator is frequently disappointed in the small improvement in nasal

\* "Edinb. Med. Journal," January, 1860, p. 612.

† Cohen, "Diseases of the Throat and Nasal Passages," p. 212.

breathing after he has freed the adherent surfaces. The trouble above remains.

The highest grade of contraction occurs in hospital and dispensary practice, where we find those unfortunates who, in addition to an hereditary scrofulous or tuberculous diathesis, have acquired the syphilitic poison. Ulcerations under such conditions are rapid and destructive, and frequently have attacked all the soft parts before the patient comes under medical supervision. Extensive disorganization often takes place behind the soft palate or pharyngeal pillars before physician or patient is aware of anything more serious than an ordinary sore throat, pain not being always a prominent symptom. The physician should be suspicious of any painful affection of the pharynx the cause of which is not apparent and which does not yield readily to treatment; such a case should have the benefit of a rhinoscopic examination at once.

Ulcerations of the pharynx have gained the reputation of being insidious, because they often attack primarily parts which are not easily seen. The angle of the pharynx behind the posterior pillars is a favorable location for the commencement of ulceration, which in this hidden pocket is apt to escape observation. I have seen a number of cases where this was the first point of attack. I remember an interesting example of this kind where the progress of inflammation was easily studied on account of a wide cleft in the palate. The child was suffering from scrofula or congenital syphilis. The mucous membrane showed a constant tendency to degenerate, and the posterior surfaces of the pillars were always the first localities to succumb. Constant friction between the mucous surfaces at this point and the retention of irritating secretion are exciting causes. Superficial ulcerations undoubtedly occur here during attacks of simple pharyngitis which are repaired without adhesion. It is in those cases where the syphilitic or tuberculous dyscrasia are present that we find the evidence of a destructive process.

Erosions or superficial ulcerations may escape detection even when located in plain view. There may be so little change in color, and the depth of the ulceration may be so slight, that loss of tissue is determined more by the fact that the surface bleeds when touched than by its gross appearances.

In addition to adhesion and cicatrization, another pathological change takes place which renders these cases difficult to treat satisfactorily, and this is the formation of new connective tissue. Not only is the normal structure replaced by it, but there is actual hyper-

trophy, which diminishes the diameters of the pharynx in all directions. This condition compromises the success of operative measures.

The process of inflammation and cicatrization is an interesting one. The soft palate, almost wholly a muscular structure, is so constantly in motion that it would seem impossible for it to become adherent to neighboring structures; but this result follows quite easily and naturally. The pillars of the pharynx, as has been said, are first involved, and later the soft palate is drawn to the posterior wall of the pharynx. This is accomplished in two stages: the first is the retraction of the palatal muscles, which have become shortened by the loss of tissue, consequent upon ulceration, and the second is the union of the pillars to the wall of the pharynx. The palate is thus forcibly drawn backward, little by little, until it rests upon the back of the mouth. The ulceration extends to it from the sides, and the mischief is done. The unsymmetrical appearance of the palate indicates where the disease began and the course it followed, for all the tissues are drawn toward the point first attacked. The tendency to adhesion is increased whenever the muscular tone and mobility of the palate are diminished. This is true also in perforations of the palate, since the current of air passes through the artificial opening and no longer diverts the uvula from the back of the mouth.

The occlusion between the middle and upper pharynx is frequently nearly complete, only a small communication remaining. Dr. Bosworth\* says: "A perfect closure never occurs"; and my observation tallies with his. But Dr. William Turner, at the time of writing the article already referred to, stated that he had just had a case reported to him by Dr. W. H. Flower, assistant surgeon of the Middlesex Hospital, where there was complete occlusion.

The ætiology of pharyngeal ulcerations is well known. They rarely occur in the simple varieties of pharyngitis, but are a frequent complication of the eruptive fevers and typhoid, diphtheria, scrofula, syphilis, tuberculosis, lupus, phagedæna, epithelioma, etc., and sometimes result from post-pharyngeal abscess, caries of the vertebræ, and traumatism.

It is unnecessary to enlarge upon this, but it is wise to appreciate these well-known pathological changes, because the prognosis will depend wholly upon their nature and extent.

It is not an uncommon occurrence to find patients, in the throat-

\* Bosworth, "Diseases of the Throat and Nose," p. 150.



wards of hospitals, suffering with pharyngeal adhesions. Usually they obtain little relief and remain as long as they are permitted. I am unable to speak definitely of several cases which I saw in the hospital, as they did not specially interest me at the time. In private practice they are much less frequently seen.

The first case I had the opportunity of studying was at the office of the first president of this society, the memory of whose good works we honor and whose loss we to-day lament. I am confident that the cheerfulness and assurance with which he operated, and the good results he obtained, grounded me in the belief that much could be done for the relief of these unfortunate ones. In the case referred to, Dr. Elsberg used the blunt-pointed staphylorrhaphy knife in separating the soft palate from the pharynx. He made forcible dilatation with his finger, and, to prevent reunion, gave the patient a hard-rubber palate-retractor, and instructed him to draw the palate forward many times each day. This procedure was successful in largely benefiting the patient.

The operations performed to separate adhesions have differed but little. Before the day of the galvano-cautery most surgeons seem to have preferred gradual dilatation by means of bougies, sounds, sponge-tents, air-bags, etc., and rapid dilatation with the finger, to the use of the knife. The danger of hæmorrhage was deemed a strong argument in favor of non-cutting instruments. It was the general opinion, too, that, if cut surfaces were made, they would again become adherent, with an increased amount of contraction. Rothenberg\* made an advance step when he recommended that a portion of the cicatricial tissue be excised, and so, after separating the surfaces, he dissected off the rough edges with forceps and scalpel.

Diefenbach passed ligatures through the soft palate, drew it forward as far as possible, and held it away from the pharyngeal wall by fastening the cords around the ears.

Dr. A. P. Cook, of Kentucky, describes, in the Philadelphia "Medical and Surgical Reporter" of March, 1873, an interesting and, at that time, an original plan for keeping the ulcerative surfaces apart. The case was one of syphilitic ulceration. The entire palate was adherent, with the exception of a minute opening, through which only a small probe could be passed. He used specially devised knives, the blades at right angles to the shaft. With the handle of a tablespoon, introduced behind the palate, he measured the extent of separated surfaces; he then hammered out a piece of sheet lead to

\* Rothenberg, "Wien. Medicin Presse," 1876, No. 33.

the required size, and suspended it behind the veil of the palate by two strings which were passed through the nostrils. The patient wore this constantly for six weeks. The writer says: "It did not interfere with deglutition, and successfully prevented readhesion." If such an interposing medium can be worn without too much discomfort, it is certainly more efficacious than pieces of lint, and is more comfortable than forcible traction by means of ligatures.

At times it has been deemed advisable to guard against hæmorrhage by preliminary tracheotomy. Dr. T. Gilbert Smith,\* of London, arrived at the following conclusions: (1) Tracheotomy; (2) divisions of adhesions with guarded knife; (3) a number of notches are preferable to a long incision; (4) cutting should be done from above downward, that the whole wounded surface may be seen. These instructions are more pertinent to strictures of the lower pharynx. J. William White,† in Holmes's "Surgery," recommends that an artificial opening be made through the soft palate in cases where there would be great difficulty in preventing readhesion. The main object, he says, in such operation is to restore the sense of smell. It is also suggested that, after severing attachments, longitudinal incisions through the palate be made, to counteract muscular contraction and to prevent the palate, as a whole, from being brought against the pharynx. But the condition established by operations of this kind is hardly preferable to a closed naso-pharynx.

An article by von Lesser,‡ of Leipsic, having the attractive title "A New Procedure for the Separation of the Soft Palate from the Wall of the Pharynx," describes the following operation:

"Patient was syphilitic; surfaces were adherent, except at small opening near uvula. This free portion was split parallel to its surface; the anterior plate was divided into halves by a median longitudinal section; the lateral halves were detached from pharyngeal wall; the freshened surface of the triangular apex of posterior plate was united with the wounded angle of the anterior plate. Finally, each detached half of the anterior plate was duplicated, the medial edge of the wound being turned backward and outward, and fixed by sutures in this position. The mucous membrane of the lateral portions of velum thus faced the wounded surface of the pharynx. Reunion was in this way prevented."

In closing, I will briefly report the history of a patient I saw at

\* Smith, "British Med. Journal," April 17, 1880, p. 588.

† White, "Holmes's System of Surgery," vol. ii, p. 542.

‡ "Berlin. klin. Wochensch.," No. 23, 1879.

my office. The plan of treatment followed presents but few original points. In fact, there seems to be little opportunity for new surgical methods here, but I believe that persevering work will do much for these patients, and they will not be condemned as incurables :

CASE.—Mrs. J., aged thirty-eight, married in her twenty-second year, mother of five children, consulted me in March, 1883. Her husband was a prosperous business man. She occupied a good social position at her home in a Southern city. She was of healthy parentage, though there had been several deaths from phthisis in her father's family. Patient was of average height, pale, somewhat emaciated, and I was impressed with her careworn expression. She breathed noisily through the mouth ; sense of smell gone ; voice nasal. She complained of a feeling of great dryness and discomfort at the back of the nose and mouth. She was unable to clear the pharynx of tenacious mucus, which always collected there, and which constantly annoyed her. She swallowed with some difficulty, and liquids frequently passed into her nose. She was extremely nervous, a condition exaggerated by tinnitus of the left ear. Hearing was impaired on both sides. She had a hacking cough, and had lost fifteen pounds in weight.

She gave this history of her malady: Her health was good until the birth of her last child, three years previous. Confinement was followed by pelvic cellulitis. She recovered after serious illness, lasting several months. It was while convalescing that she was attacked with sore throat. She remembered only that swallowing was painful, but there was not much discomfort when her throat was at rest. These symptoms lasted two weeks, and interfered but little with her recovery. Her physician prescribed gargles, and she supposed that her throat was entirely well. It was some weeks later, when she found it difficult to breathe through the nose and there was a feeling of constriction in the back of the mouth, so that she suspected something was wrong. She says that neither the physician nor herself was aware of any ulceration, and this is to be credited because there were no cicatrices below the junction of the mucous surfaces. The physician who attended her died two years later, so that I was wholly dependent upon the patient for these facts. In regard to causation, the most careful inquiries of the patient and her husband produced no evidence that it was a syphilitic lesion. I could find absolutely nothing to base such an opinion upon. The character of the people was such that their statements were to be believed.

The type of the ulceration was probably either scrofulous or tuberculous, since the patient was suffering from bronchial catarrh, and there was consolidation at apex of left lung. Her respirations, about thirty per minute, seemed unduly increased, considering the amount of pulmonary trouble, but the frequency was due to the necessity of mouth-breathing and the discomfort of a dry pharynx. The back of the mouth presented

a very unsymmetrical appearance; all the soft structures were drawn to the right. The right pillars were blended in one mass, and on the left the pillars, as well as the uvula, had been drawn half an inch out of position before they had become adherent to the wall of the pharynx. An opening, one fourth of an inch in diameter, at the right of the uvula, was the only communication with the posterior nares.

The patient was under treatment for two months. The plan adopted was as follows: I dilated the passage with steel sounds until it was large enough to admit the finger (which, after all, is the best dilator). Traction was then made until the opening measured three fourths of an inch across. A small curved sound was passed for the purpose of exploring the lateral attachments. On the right side the point of the sound could be carried downward behind the posterior pillars for a considerable distance. Using the sound as a guide, I burned through to it, with the galvano-cautery knife, at the junction of the mucous surfaces, establishing a second communication. A platinum wire was passed through the opening just made, and drawn out through the original aperture into the mouth. The loop was threaded through an insulated cannula attached to a cautery battery. The adhesions included within the wire were separated by shortening the loop and passing a current through it. The cannula was bent at right angles, point upward, so that the snare was tightened in a direction parallel with the posterior wall of the pharynx.

I repeated the same procedure in dissecting off the uvula, and twice more in detaching the left side of the velum. Here it was necessary to burn through more tissue, as the adhesions extended higher up. Division of the bands near the left Eustachian orifice relieved materially the tinnitus. There was no hæmorrhage. Traction was constantly made with the finger by the patient as well as myself. In addition, she used a hard-rubber palate-hook every few hours. For a time I had the patient wear at night a plate of hard rubber of proper size, one eighth of an inch thick, with rounded edges, suspended by cords through the nostrils. It gave little discomfort, and may have aided in keeping the surfaces apart, though I consider continued traction of the soft palate the most important means of preventing readhesion. There is far less danger of secondary union when the tissues are separated with the galvano-cautery loop, as the edges are thus thoroughly cauterized. The patient was able to breathe through the nose comfortably, and the sense of smell was restored to a large extent.

I treated a case last winter very much like the one here reported.

A man, thirty-five years of age, in good health. The soft palate was adherent to the wall of the pharynx along the greater part of its border, the result of syphilitic ulceration. The tissues were separated in the same manner by the galvano-cautery loop, and reunion was prevented by the same method used in the former case. But here I had the benefit of

the use of cocaine, which is of immense advantage, not only in the relief of pain, but in a much more important particular—the control of muscular action. By a free use of cocaine the soft palate can be made nearly immovable, so that, after being freed from the pharyngeal wall, it hangs directly downward, and does not continually invite reunion by being in contact with the neighboring mucous surfaces. A third advantage is that it diminishes the inflammatory reaction necessary to repair.

#### *Discussion.*

Dr. MACKENZIE: I question strongly the diagnosis of tubercular or scrofulous ulceration in the class of cases reported by Dr. Rice. The localization of tubercular ulceration in the naso-pharynx, especially when associated with cicatrices, if it exist, must be the rarest of pathological events. I regard the large majority of these cases as syphilitic, although the same result may be brought about through the ulceration which follows diphtheria, the essential fevers, and other forms of blood-poisoning. The social standing counts for nothing in the diagnosis.

I would like to say, in reply to Dr. Ingals, that, while it would be a great pity to call all destructive ulceration in the naso-pharynx syphilitic, it would be a still greater pity, in uncertain cases, not to give the patient the benefit of the doubt. I should like to call special attention to the peculiar tendency of syphilitic lesions to isolation in some portion of the upper respiratory tract, and this long after the disease has apparently run its course; or, in another class of cases, where there has been no previous history of syphilis. In such cases a tertiary ulcer in the nose, on the palate or in the larynx, or even trachea, may be the first thing to call attention to the existence of syphilis.

This tendency of the syphilitic virus to crop out in some portion of the upper air-passages, without pre-existing syphilitic lesions in other parts of the body, or long after the original disease has apparently spent its force, is a point of considerable interest. In this connection, too, I may cite the case reported by me in the "*Wiener medicinische Jahrbücher*" in 1881, in which the trachea was the seat of isolated syphilitic lesions; and another reported last year in Baltimore, where, on autopsy, the only evidences of syphilis were unmistakable signs of that disease in the nasal passages.

Dr. ROBERTSON: This high-arched condition of the palate and its frequent occurrence in syphilis have been explained as being due to the loss of permanent teeth. From this, contraction of the jaw results and arching follows. The same would occur in congenital syphilis from the frequency with which the teeth are lost.

Dr. DE BLOIS: I think Dr. Mackenzie's remarks are too sweeping, for, in my limited experience, I have had three cases of ulceration under the velum and in the position to produce adhesions. I know these cases were tuberculous, for the patients died of tuberculosis, and post-mortem



examinations were made. Adhesions had not taken place, but there is no reason why they should not have.

Dr. DELAVAN: The subject of Dr. Rice's interesting paper was presented to this association several years ago in an elaborate article by Dr. A. H. Smith. In this Dr. Smith referred to a case of syphilitic adhesion which I reported to him, in which I had operated successfully by separating the attachments of the velum with the pharynx and immediately applying to the incised surfaces pure mono-chloroacetic acid. Healing took place without adhesion, and the result was remarkably good.

Dr. INGALS: I believe that most of the cases are syphilitic, as has been claimed, but it is too bad to call all patients syphilitic in whom we do not know what is the matter. I have recently seen a case in which the mode of operation was easy and satisfactory, at least for the time being. The patient had adhesions both of the palate and tongue to the pharynx. The opening below was so small as to greatly interfere with swallowing and breathing, being not more than three eighths of an inch in length by an eighth of an inch in breadth. I attempted to divide the adhesions, which were very extensive, by cutting through them with the galvanocautery knife; but the proceeding was very slow, and, after a couple of applications, the patient was allowed to sit aside while other patients were being seen. He soon sent word that he was choking. I then found that there had already been swelling as the result of the canterization, which was so great as to make it unsafe either to leave the patient in his present condition or to repeat the operation. I then incised the adhesions with a knife bent at a right angle, cutting about an inch on one side and nearly as far on the other, with the result of making an opening through which the largest œsophageal bougie (more than half an inch in diameter) could be passed. The adhesions above had been easily divided by means of bent scissors such as are used by gynæcologists. The patient left the city for his home within a couple of weeks, so that the ultimate result was unknown.

Dr. RICE: I am always pleased to be able to satisfy myself of the absence of syphilis in a case, because I believe that many physicians are overfond of finding this disease, and that it is already burdened with lesions frequently due to some other malady. It is the duty of every physician to place the blame where it belongs. The majority of the cases of adhesive inflammation are syphilitic. My first case, so far as could be ascertained, was not. A pelvic cellulitis, following a severe confinement, was the exciting cause. The predisposing causes were a moderately bad family history, a severe grade of catarrhal inflammation of the upper air-passages, and the first stage of phthisis of one lung. I believe such a combination of pathological conditions sufficient to occasionally cause a post-nasal or pharyngeal catarrh to assume an ulcerative and adhesive form—the so-called scrofulous inflammation. The use of the galvanocautery knife, as described by Dr. Ingals, is very tedious, so lit-

the tissue can be separated at one time, and readhesion rapidly takes place. The use of the platinum loop, as described in this paper, is very satisfactory. There is but slight inflammatory reaction.

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*Third Day—Morning Session.*

*Paper.*

ALIMENTATION IN LARYNGEAL PHTHISIS.

By BEVERLEY ROBINSON, M. D.

IN all the diseases in which tubercle is present, sufficient and suitable food is extremely important. So essential is it, in fact, that, unless it be taken by patients thus afflicted, the chances of recovery, or even amelioration for a time, are much lessened. Enough is already known, through the excellent work of Dujardin-Beaumetz, Debove, and Millard in this direction, to make us all more sanguine than formerly in regard to curative results in phthisis pulmonalis. Why may not equally encouraging results proceed from somewhat similar management, if begun at an early period, in phthisical disease of the larynx? Personally, I am convinced that, if faith in the method of artificial alimentation in this disease can be aroused, similar results may be obtained. By applying our knowledge of the latest and best method of feeding patients with evidences of pulmonary phthisis to those who suffer from phthisical laryngitis, primary or secondary, we can more easily formulate a judicious system; in other words, we must support these patients by super-alimentation. By this term is meant, not excess of feeding, as might be wrongly interpreted if the expression be literally translated, but simply making our patients take and assimilate a much larger quantity of food than would at first thought seem indicated, or indeed than their natural appetite could possibly crave. This is frequently accomplished at present in cases of pulmonary phthisis, and when there is no laryngeal complication, by forced feeding with the œsophageal tube, preceded or not by a thorough washing of the stomach itself with tepid water slightly alkalized by borax or bicarbonate of soda. By means of the preliminary washing, the patient gets rid of all catarrhal secretions, all fermentative products which line or fill the stomach and interfere so much with its powers of digestion and assimilation. Following the use of repeated washings, the patient acquires the ability to

digest a variety and quantity of food which, previous to treatment, was wholly impossible. The method of washing and forced feeding seems to me almost equally adapted to the *initial* stage of laryngeal phthisis, at the period when dysphagia, dyspepsia, and marked local changes in the larynx are not yet present. The frequent passage of a soft tube through the œsophagus would not be painful, and the dread of being fed in this manner, except at first, would not be great, and could be readily overcome by gentle persuasion. The objection which immediately arises to feeding with the tube is that it is unnecessary. If these patients can still swallow without discomfort, why distress them by artificial feeding?

The answer to this objection is simple. A very frequent complication of laryngeal and pulmonary phthisis is relative inappetence. Sometimes the appetite is merely diminished, and patients take an insufficient supply of food on this account, despite the urgent appeals of friends and relatives to eat oftener and more abundantly. Occasionally there is positive disgust for all food, and so great is this repulsion that patients can with great difficulty be persuaded to eat even very small quantities. They live from day to day upon a mere nothing, and consequently waste away in a rapid and deplorable manner. Nor is this all. The food may be taken readily and with marked relish, but soon it causes a painful weight or uneasiness at the epigastrium, nausea or vomiting, and the patient's suffering from these causes is so great that he is unwilling again to eat unless compelled by the pangs of hunger, or rather by those feelings of faintness and goneness which indicate the absolute necessity of nutriment. Unless these conditions be removed, it is evident that improvement can not take place; and not very long ago, in the experience of us all, such patients invariably died. Within the past four years, happily, the aspect of things has changed, and at present these sufferers can usually be relieved for a time, and occasionally, perhaps, in a permanent manner. It has been conclusively shown that food introduced into the stomach by means of the stomach-tube is sometimes retained when everything taken directly by the mouth is rejected. Already I have been an observer of this fact upon several occasions, and have been gratified to learn that patients who would vomit the simplest food when directly swallowed, and although given in very small quantities at a time, would retain a pint or more of similar food taken into the stomach through the sound.

Frequently artificial alimentation with the tube is sufficient itself to arrest nausea and vomiting, and, indeed, to increase the patient's

nutrition in a very striking manner. Occasionally, however, this method will not be entirely satisfactory unless preliminary washing of the stomach be performed. Such statement is usually true whenever the meals remain partially undigested many hours and undergo fermentative changes in the stomach after they have been taken. When the preliminary washing is undertaken, the stomach should be rinsed thoroughly, at least once every day, until the patient has much improved. The early morning is the preferable time, before any nutriment whatever has been taken and when it is empty, or at least comparatively free of all remains of food which would possibly choke the tube and thus render the operation more objectionable. After this preliminary washing, the morning meal, consisting at first of a few ounces of milk, milk and egg, milk, egg, and powdered meat, may be gradually poured through a funnel inserted in one extremity of the soft-rubber tube. Of course the quantity of food given at first should depend very much upon the tolerance of the patient's stomach, but must never be considerable until this condition is carefully tested, so that we may not risk disgusting him thoroughly at the initial trial. Later, and as the stomach improves, the bulk of food administered by the tube on each occasion should be increased, and the ingredients varied somewhat. Ordinarily *one* washing of the stomach each day is sufficient, even during the first weeks of treatment, to restore much of its tone. Occasionally, however, the case may be so obstinate that it is indicated to repeat the washing before the afternoon meal. After a while the washing is unnecessary oftener than every other day, or once or twice a week, and finally may be discontinued temporarily, and resumed only if previous stomachal intolerance should return. It is evident, therefore, it seems to me, that our plain duty in these cases is to commence a regimen of super-alimentation so soon as the signs of local disease are discovered, or even strongly suspected, and though the intra-pulmonary changes are still obscure. Nor should we be deterred from insisting upon its necessity through the erroneous belief that slight irritation or morbid changes of the larynx may be thus increased, but recognize this as the stage of disease when our best efforts should be made. To none of our different means of treatment can we look for more success than to the one here indicated. If, however, the auspicious moment for urging the adoption of this treatment be allowed to pass uncared for by us because we lack faith in its utility, or if the patient comes to us only when the disease is already advanced, and after dysphagia has become a somewhat prominent and distressing symptom, what

then remains to be done? In reply to questions, we are told, with scarcely an exception, that each effort of deglutition occasions pain, or cough, or both. Patients dread the hour of meals, and often would not attempt to swallow were it not for the necessity of preserving life itself. I shall not describe the harrowing picture—with which you are all, alas! familiar—presented by the poor beings if they reach the final stage when, literally speaking, if left to themselves, they would die of *starvation* rather than undergo the torture of eating or drinking. For such patients in their extremity we have, unfortunately, but two *practical* methods of feeding—the one by the means of the œsophageal tube, the other by rectal enemata. I leave out of the question the idea of supporting life in these conditions by means of hypodermic injections of food, as being not worthy of serious consideration. By study of the remaining methods, I hope to show clearly their several indications and objections.

Somewhat more than one year ago Dr. D. Bryson Delavan read a very interesting paper before the New York Academy of Medicine “Upon the Alimentation of Patients suffering from Dysphagia.” In this article a method of feeding is strongly advocated which has as its basis the two following principles:

First, the employment of a tube of the smallest possible caliber, and, second, the introduction of this tube, not into the stomach, but merely into the œsophagus and past the point of obstruction, or else past the pharyngeal constrictors. Soon after reading Dr. Delavan’s paper I had an opportunity to make a trial of his method, with an apparatus arranged according to the description which he has given of it, in a case of advanced laryngeal and pulmonary phthisis in which dysphagia was extreme. After several attempts I was obliged to give up the use of Dr. Delavan’s instrument for the reason that it occasioned so much distress that my patient preferred to endure the pangs of hunger, or the suffering of deglutition, rather than bear the pain occasioned by the “English flexible-woven catheter.” Later on last autumn I had again occasion to try forced alimentation in a case of laryngeal phthisis. In this instance, which I here briefly report, the soft, “velvet-eyed” stomach-tube, in red rubber, manufactured by Tiemann & Co., was employed in preference to Dr. Delavan’s apparatus. As will be noted, the attempt to feed the patient in this manner was abandoned, after a few days’ trial, on two occasions, on account of the discomfort caused by the passage of the tube, and in view of the patient’s great weakness:

CASE I.—H. A. L., a Swede, aged twenty-two years, a janitor, admitted to St. Luke’s Hospital, September 5, 1884. History reveals that patient



suffered from persistent cough for five months. He had marked dyspnœa, some hectic fever, loss of flesh and strength. No hæmoptysis, no pain in the chest. Voice had been husky for three months. On admission to the hospital, patient was almost aphonic.

*Physical examination* showed cavities at both apices.

*September 18th.*—Patient began to complain of laryngeal pain. Iodoform applied, and gave some relief.

*October 2d.*—Severe pain on deglutition; œsophageal tube employed, but abandoned on October 5th, on account of the great discomfort on passing it.

*10th.*—Attempts were again made to feed the patient by the tube, but, after two or three days, the tube was again abandoned because of the discomfort and weakness of the patient.

*18th.*—Died.

*Autopsy—Lungs.*—Cavities in both; numerous tubercles. "The base of the tongue, epiglottis, and larynx are the seat of extensive ulceration of tubercular nature."

CASE II.—M. G., aged thirty, native of Germany, book-keeper, was admitted to St. Luke's Hospital, July 30, 1884. Abstract of history reads as follows: Cough for seven months, no hæmoptysis, has had pain in chest, dyspnœa, some hectic, loss of flesh and strength.

*Physical examination* shows a cavity at the right apex, pyo-pneumothorax on the left side.

*August 5th.*—Patient began to complain of pain and difficulty in deglutition.

*September 23d.*—Examination of the larynx reveals "swelling of both arytenoids and of the epiglottis, with an ulcer in the left pyriform fossa. There was also an ulcer on the left pillar of the fauces and one on the posterior pharyngeal wall." Attempts were made to feed the patient by the stomach-tube on account of the extreme pain in deglutition, causing him to abstain from food almost entirely; but the pain and discomfort caused by the passage of the tube were so great that it was used only once or twice.

*26th.*—Patient died.

*Autopsy—Lungs.*—Right showed cavities, tubercles, and cheesy masses. Left showed similar lesions. There were gas and pus in the left pleural cavity.

*Larynx.*—"There is extensive ulceration of the mucous membrane, with especially well-marked involvement of the left ary-epiglottidean fold. The ulcerations extend down into the trachea and large divisions of the bronchi, and in places the tracheal rings and cartilaginous plates are also eroded. The mucous membrane is also intensely congested."

In Case II it will also be remarked that "the pain and discomfort caused by the passage of the tube were so great that it was used only once or twice."

In both these cases there were numerous ulcerations, not only of the laryngeal mucous membrane, but of the pharynx. While the ulcerations of the epiglottis and ary-epiglottidean folds may therefore have been partly accountable for the pain of deglutition, it is probable that the pharyngeal condition also contributed to it. At the time the first two cases reported were observed, for one reason or another, applications of cocaine were not made to the diseased surfaces, and it is not known certainly what the effect of such applications would have been. It is, however, presumable—in view of the patients observed, since the date to which I refer, by Mackenzie, Lefferts, and others—that painful deglutition would at once have been greatly allayed, or perhaps wholly removed, by the topical use of this agent. In any event, it seems proved that exceptionally, at least, neither Delavan's catheter nor the "velvet-eyed" catheter will serve to feed *painlessly* patients suffering from laryngeal phthisis unless some local anæsthetic be previously employed. Although many physicians have written latterly in regard to the local use of cocaine in cases of laryngeal phthisis and pointed to its usual or universal success, other practitioners have made known its failures. As an example of the latter kind, Goodhart reports a case of laryngeal phthisis accompanied by extreme dysphagia in which local applications of a four-per-cent. solution of cocaine diminished the pain of swallowing at first, it is true, but within one hour its effects passed off and swallowing produced the former irritation ("Brit. Med. Jour.," Dec. 6, 1884, p. 1133). Besides, in this instance, at a later period, cocaine appeared to lose in part its local effect, and "the cough was very troublesome on attempting to swallow."

According to an observation of Morell Mackenzie, it would appear that during the first few moments after the topical use of cocaine the patient is unable to swallow at all, "owing to the complete abolition of all nervous sensibility." After an interval of about ten minutes, however, the patient is able to swallow with perfect ease and comfort. In my own experience I have encountered one case, at least, in which the comfort resulting from the applications of cocaine to the pharynx and larynx in phthisical changes of these organs was very slight and only lasted a short time. Indeed, after a short time, as in Goodhart's case, cocaine lost much of its primary local anæsthetic effect, and was discontinued on this account. In another case, the notes of which were kindly given me by Dr. W. C. Campbell, while a spray of a four-per-cent. solution of hydrochlorate of cocaine gave much relief to the local pain, it seemed to produce

threatened suffocation with every attempt at swallowing solids or fluids. "As starvation seemed imminent, nourishment was about to be given through an œsophageal tube, when it was discovered that the patient could take food comparatively well on the discontinuance of the spray." Lefferts has noticed not only that cocaine diminishes the pain of deglutition in laryngeal phthisis, but also quiets dyspnœa by producing a tetanic contraction of the muscular fibers surrounding dilated blood-vessels, and in this manner lessens the swelling and infiltration which occasion stenosis of the larynx. The experiences of both Mackenzie and Lefferts seem to be confirmed in great part by those of Elsberg, Knight, Kinnicutt, Bosworth, Major, and others. Without the use of a local anæsthetic, such as cocaine, it is admitted, however, that in some cases of laryngeal phthisis, when deglutition otherwise is painful, the patient may be sustained for weeks and months by means of injections of food into the stomach through an œsophageal tube. That these tubes had better be small, Dr. Donaldson seems to have recognized two years ago (*Phil. "Med. News,"* May 26, 1883), and previous to the development given to the subject by Delavan. In those cases of marked dysphagia accompanying laryngeal phthisis, in which the passage of the œsophageal tube occasions considerable pain, dyspnœa, or nervous exhaustion, and despite the previous local use of cocaine, recourse may be had as heretofore to the use of nutrient enemata, judiciously managed.

This latter method of treatment is particularly imperative whenever the patient has been obliged to give up eating solid food on account of the distress in swallowing, as indeed when he is able "only with great irritation and coughing to take a very small quantity of liquid food." There are cases also of laryngeal phthisis in which the tube can not be tolerated, the stomach is unable to retain the simplest food when swallowed *directly*, and in which all ordinary means for checking vomiting have been ineffectually employed. Under these circumstances, an immediate unfavorable prognosis must be pronounced, unless nutrient enemata be employed to sustain life while the stomach is regaining in a certain measure its tolerance for food. At the beginning of rectal alimentation it may be essential to interdict the use of all food by the stomach during four or five days. Later, small quantities of liquid food, frequently repeated, may be swallowed, and the nutrient enemata reduced in number from being administered every five hours to three times in twenty-four hours. Later still, and so soon as the stomach supports food fairly well, nutrient enemata should be given but twice in

twenty-four hours. In order to establish tolerance for rectal alimentation, or to prevent unpleasant odors arising from the patient (A. H. Smith), it is important to add either a few grains of chloral or a few drops of laudanum to each rectal injection. The precautionary measure of washing out the rectum once in twenty-four hours by means of warm water should also be attended to. Despite strict observance of these indications, the rectum will be apt to become sore and irritable in many cases, and, after a week or two of rectal alimentation, we shall be obliged on this account to abandon these injections, at least for a time.

Under the influence of rectal alimentation, in some instances, patients have become stronger, have increased notably in weight, their appetite has returned, and for a limited period, ranging from one to several months, their general condition has been so much improved as to make us hopeful for the retrograde march of the dread disease. Unfortunately, such cases are rare, and ordinary clinical experience shows that, although temporary improvement in many symptoms may follow closely upon the adoption of rectal alimentation, this amelioration does not usually endure, and, despite either rectal alimentation or artificial feeding with the œsophageal tube, both on different occasions or properly alternated, the deposit in the lungs and larynx will remain stationary, or steadily progress. To illustrate this statement in regard to rectal alimentation, permit me to refer merely to the following cases taken from the records of St. Luke's Hospital, New York:

CASE I.—G. M., forty-one years, clerk, United States, Dr. George G. Wheelock attending physician, admitted March 10, 1881.

*Symptoms.*—For four months a dry cough, hoarseness, and dyspnoea. On admission, stridulous breathing, dysphagia, aphonia, markedly emaciated.

No examinations recorded. Given enemata of beef-blood (three ounces) every four hours, but these were not well retained. No local treatment. Died March 12th. No record of autopsy found.

CASE II.—M. C., admitted October 25, 1879, Dr. Beverley Robinson attending physician. Laryngeal phthisis; enemata of beef-blood (five ounces) three times a day. Discharged, unimproved, October 29th.

CASE III.—M. R., admitted August 15, 1879. Dr. Davis attending physician to September 10th, then Dr. Robinson to November 1st, then Dr. Smith. Pulmonary and laryngeal phthisis. Enemata of beef-blood after September 26th. Died November 13th. No autopsy.

CASE IV.—J. C. B., admitted November 11, 1879, Dr. A. H. Smith attending. Pulmonary and laryngeal phthisis. Enemata of beef-blood. Died December 24th. No autopsy.

CASE V.—W. T. E., admitted November 6, 1879, Dr. A. H. Smith attending. Pulmonary and laryngeal phthisis. Enemata of beef-blood. Died December 29th. No autopsy.

On the other hand, the following was a case in which improvement followed rectal alimentation, but it is not known if the improvement refers only to symptoms of disease, or includes physical signs as well :

W. J. L., admitted December 5, 1879, Dr. A. H. Smith attending. Pulmonary and laryngeal phthisis. Enemata of beef-blood. Discharged, improved, January 8, 1880. It may be interesting to remark that there are several cases of pulmonary phthisis recorded on the books of St. Luke's Hospital in which there were no marked laryngeal complications, and in which rectal injections were followed by relief of symptoms, and apparently by some favorable changes in the pulmonary condition.

As showing the important fact how artificial alimentation by means of the tube in pulmonary phthisis may be followed by considerable increase in weight, and yet the local conditions remain unchanged, I desire to report the following case :

E. J. S., Ireland, painter, entered the hospital June 2, 1884, under the care of Dr. F. P. Kinnieutt.

*Diagnosis.*—Consolidation at left apex. Weight, 118½ pounds. All rational symptoms of this condition present great stomachal intolerance of food.

*June 5th.*—Alimentation by means of the tube attempted, but vomiting occurred.

*6th.*—*Washing stomach* and *feeding* with œsophageal tube begun, and continued with very great benefit to patient's stomachal condition.

*14th.*—Total amount of food taken by patient: "Five pints of peptonized milk; 1 boiled egg and 5 raw eggs; 1 ounce of beefsteak; 1 ounce of beef peptonoids; 4 ounces of boiled mutton; 4 ounces of Graham bread," washing the stomach twice during the day and but little food removed.

*November 7th.*—Patient under Dr. Beverley Robinson's care. Weight, 128½ pounds, thus showing an increase in weight of 9¾ pounds from the time, five months previous, when super-alimentation, washing the stomach, and artificial feeding were begun. Despite this fact, the left lung still showed undoubted signs of pulmonary phthisis at its first stage. In view of this condition, I commenced the use of antiseptic inhalations and intra-pulmonary injections. Patient was discharged, slightly improved locally, after the latter treatment, on November 27th.

At first, when rectal alimentation by means of defibrinated blood was begun some years ago by Dr. Andrew H. Smith, of New York,



as much as four ounces of the prepared blood were employed for each rectal injection. After a short time it was shown, in some cases at least, that this quantity was not tolerated by the rectum, and it was reduced one half. When this latter amount had been used for a while, the former quantity could be returned to with advantage, for the rectum retained it without difficulty or discomfort. In many instances there is, as I have stated, considerable increase of weight following the use of rectal alimentation; in others this is not true, for, although the improvement in the patient's condition is obvious, the weight remains unchanged. On the other hand, as in the case reported of pulmonary phthisis, although feeding by means of the stomach-tube may be persisted in for many weeks, and be followed by considerable increase of bodily weight, the pulmonary condition, instead of improving, will remain manifestly stationary; indeed, it may be an open question whether it has not become decidedly worse. There is one danger of rectal alimentation by defibrinated blood which has not been referred to, so far as I know, by writers on this subject, and it is the impaction of the cæcum with a consistent tarry mass which coats the bowel inside, distends the gut so as to destroy the contractile power, and thus in one case, in which I was present at the autopsy of the patient, had evidently been the cause of uncontrollable vomiting during life. As this case seems to me to be one of especial interest in regard to the subject in hand, I beg leave to report it succinctly.

CASE.—L. G., aged thirty-six, single, Ireland, nurse, admitted to St. Luke's Hospital, January 24, 1880, Dr. A. H. Smith attending physician. Three months before admission began to feel a choking sensation at night which prevented her from sleeping. Has had soreness over the stomach, worse after eating. Has had nausea and vomiting, occasional headaches, no pyrosis, but much flatulence, anorexia, diarrhœa, etc.; insomnia; urine negative. Vomited a little blood six weeks before admission. Examination showed no tumor, no enlargement, of the spleen. There was no pain shooting into the back. Despite the use of different remedies by the mouth, attacks of vomiting persisted.

*February 24th.*—Beef-blood enemata, three ounces every night, were ordered. Vomiting continued.

*March 2d.*—Increased enemata to three daily.

*12th.*—Beef-blood enemata given three times daily.

*15th.*—Four ounces more of beef-blood given, three times a day, by the rectum. Vomiting continued and the matter vomited contained some blood.

*16th.*—Ordered enemata of brandy, milk, and egg every day. Hydro-

cyanic acid and carbolic acid were given by the mouth. No effect on vomiting.

21st.—Stopped enemata of blood. Increased nutritive enemata as above (March 16th) to four times daily.

24th.—*Note.* "Ever since patient has been getting enemata she has always received two or three simple injections daily, previous to the administration of the nutritive injections."

26th.—Died.

*Autopsy.*—"The intestines were bound together in places by old adhesions. The small intestine was quite empty and in some places intensely congested. The cæcum was packed with hard, black masses of faeces of the consistence of putty. The mucous membrane of the cæcum was stained with bile. The walls of the rectum were pale and congested in places. The gall-bladder was greatly distended with bile. The stomach-walls were atrophied, and the mucous membrane was covered with spots of ecchymosis. The liver weighed  $37\frac{1}{2}$  ounces, contained a little fat, and the left lobe was very thin and long." Autopsy otherwise negative.

In this case of death taking place during the course of cirrhosis of the liver, vomiting which could not be arrested was the assignable immediate cause, and this vomiting was kept up partly at least by the impacted condition of the cæcum from undigested beef-blood. As I remember the case distinctly, I would add further to the recorded statement of the autopsy that a very small passageway existed in the center of the inspissated blood, through which the bowels were in part relieved, and thus led to the erroneous belief that there was no actual intestinal obstruction of grave import. This case has demonstrated to me how important it is, when injections of defibrinated blood are employed, to see that the bowels are thoroughly emptied from time to time, not merely by warm-water enemata but also by suitable purgatives. In this connection I may state, as being an interesting fact related to rectal injections, that Dr. A. H. Smith has observed (Case XVI, "*N. Y. Med. Jour.*," vol. xxiv, p. 406) that after an injection of four ounces, which was insufficient to half fill the rectum alone, "yet the large intestine from the anus to near the hepatic flexure was found evenly lined with thickened blood." In these instances retrostalsis has unquestionably carried the nutrient fluid back in the large gut. Sometimes it may stop at the hepatic flexure. Sometimes, if the injection be large and given with force, it may go to the vicinity of the ilco-cæcal valve. There a portion may remain undigested after each enema, and these repeated additions may finally distend the cæcum very much and become the cause of uncontrollable vomiting and death. The recorded experiments of Hal. C. Wyman

and C. L. Dana upon living dogs, as well as the previous statements of Campbell, of Georgia, and the reported case of Moffat, support the probability of my affirmation ("N. Y. Med. Record," January 6 and 20, 1883).

Other enemata than beef-blood have been employed in latter years in these cases, just as they were before the introduction of this improved restorative injection. In their favor, however, there is not the same number of ameliorated or cured cases, and, therefore, whenever rectal alimentation is tried, defibrinated blood is apparently the most satisfactory injection to use.

The following is the formula constantly used by Dr. Morell Mackenzie during the past two years:

"Cooked beef, mutton, or chicken, 3 ounces 7 drachms; sweet-bread, 1 ounce 7 drachms; fat, 6 drachms; brandy, 2 drachms; water, 3 ounces."

"These ingredients, mixed together, will measure nine ounces. The meat, sweet-bread, and fat must be first passed through a fine mincing machine and then be rubbed up, with the water gradually added, to make a very thick paste. The enema should be given at a temperature of 90° to 95°, and ought not to be administered more than twice in twenty-four hours."

If defibrinated blood can not be obtained, or is objected to for other reasons, this formula should be tried, as one of the best with which I am familiar. I am also told that by chopping finely raw beef, or mutton after freeing it from fat and tendon, then adding to it one third in bulk of pancreatin emulsion, stirring briskly, and placing in a warm place for a while, we can have enemata of the most nutritious kind. Indeed, I believe this form of enema is much used at the Woman's Hospital of New York city. Even in cases in which rectal alimentation is indicated it is not always well borne, but occasions constipation or diarrhœa, severe and persistent, abdominal colic, irritability of the bowels, and fœtidity of the dejections. The latter objection can usually be removed by diminishing the quantity of the enema, or the addition to each injection of a small quantity of chloral. The former objections are such that occasionally the enemata have to be discontinued for a while or given up altogether. The question now to determine is, Which is the most satisfactory method to employ in alimentation, feeding by means of the œsophageal tube, or alimentation through the rectum? In reply to this, I would say that this question can not always be determined in advance. Whenever the patient can only swallow with considerable difficulty and pain,

and on this account is prevented from taking a sufficient amount of nutriment, applications of cocaine should be made to the larynx, so as to facilitate swallowing by diminution of the pain. From the recorded observations of others, it is evident that in very many cases this simple method will produce the desired effect, and, for a longer or shorter period of time, deglutition may be rendered easy and painless. There are, however, cases in which cocaine will undoubtedly relieve at first and fail to relieve later on. There are also examples in which the actual pain of deglutition may be removed by the repeated use of cocaine applied locally, and yet the distressing paroxysms of cough caused by food "going the wrong way" are not thus prevented, and when, on this account, it is necessary to recur to the use of the tube in order that life may be prolonged by feeding by this means. Unfortunately, there still remain instances in which the stomach is so intolerant that food can not be retained even when it is carried to it, but almost immediately an effort of vomiting occurs and the entire meal is rejected. Under these circumstances we are obliged to adopt the method of alimentation by means of nutrient enemata. Alimentation by the rectum, in those instances in which the stomach can retain no food of any kind, is of necessity the only practicable manner of feeding. When, however, the local condition of the stomach has improved, and it can tolerate small quantities of easily assimilable food, it is frequently wise to diminish the number of rectal injections and to feed the patient, in part at least, by the mouth. Unless we do this, we are likely to produce eventually intolerance on the part of the lower bowel which would be difficult to overcome, and in that case we should be obliged to rely solely upon feeding by the mouth as a means of preserving life. Under these circumstances, if the case of laryngeal phthisis is far advanced, and, in addition, cocaine does not relieve the paroxysms of cough which are brought on by swallowing, or, indeed, the pain of deglutition itself, we are compelled to rely solely upon nourishment given through the stomach-tube as the plan of sustenance for the patient. Fortunate is it if in the hypothetical case we are able to preserve moderate tolerance on the part of the stomach and throat during any considerable time for the repeated use of the œsophageal tube, which should be strictly enforced.

#### *Discussion.*

Dr. J. SOLIS COHEN.—I have been in the habit of feeding patients by means of small tubes, and have found the method entirely practical and capable of giving much relief. I can commend it as a success.

Dr. INGALS.—I almost hesitate to say anything about local anæsthetics as applied to the larynx. I think, however, it is a matter of some importance how cocaine is used. I find it can not be retained upon the mucous membrane whenever the patient desires to eat, but I think it may be applied in a powder to advantage, and probably as satisfactorily. I have not had satisfactory results in using it in laryngeal phthisis, but in laryngeal cancer the results have been satisfactory by combining four grains of cocaine with four grains of subnitrate of bismuth, allowing it to go well into the throat. In one case I applied it fifteen minutes, and again ten minutes, before the meal, and it gave almost complete relief, although nauseating. In those cases where it seems necessary for the physician to make the application, something which will last very much longer than this agent is necessary. A combination of glycerin, tannin, and morphine I have found better. It will relieve the sensitiveness for from twenty-four to twenty-six hours. I don't know whether the tannin actually increases the sedative effect, but I believe it does in this combination. If glycerin is applied to leather, for example, where tannin has been used, it very soon becomes hard, and frequently the use of tannin with the glycerin renders the effect upon the surface somewhat different from that of carbolic acid with glycerin alone.

Dr. GLASGOW.—In discussing this question there are very many points of view from which it must be considered. In the first place, the condition of the stomach itself; then, again, the condition of the upper air-passages. I have never used the tube in feeding, although I have adopted other means. For the relief of dysphagia I have always used iodoform with morphine, and have always found it successful. It relieves the cough and the pain, and very often, after using it for a short time, the patient will be able to swallow. I generally leave it with the patient and have him apply it himself by means of the tube. I have tried cocaine, but it is not satisfactory. There is a certain amount of anæsthesia produced, although it is transient. The worst part is the taste, which seems to add to the distress of the patient and to the stomach disturbance. It is nauseating, and leaves a peculiar metallic taste. I have never used it in the way described by Dr. Ingals, but it seems to me to be a very good suggestion.

In regard to rectal alimentation, I have had very poor results, and in cases where the stomach seems to be deficient in digestive power I have found better results from prepared milk according to Fairchild's method. Very often patients will take this and thrive upon it. Ordinarily, in cases where immediate disposition to vomiting occurs upon taking food, the method I speak of has been very successful.

Dr. ASCH.—I have found, in cases of dysphagia, great success in the insufflation of one third of a grain of morphine mixed with sugar of milk. I have been in the habit of using morphine, tannin, and iodoform; still, I think that, where there is simply inflammation, the morphine alone answers all purposes, because I think none of us will make use of local



applications for curative purposes—at least it has not been my good fortune to see any of these ulcerations get well. I may be unfortunate in this respect, but I have never, from the remedies used, gained more than palliative results. I have been in the habit of leaving the morphine mixture with the patient, allowing one of the family to insufflate it through a bent-glass tube with a rubber tube attached. The old formula, iodide of potassium with glycerin, will also give relief, although it is not so good as morphine.

Dr. DELAVAN.—The writer of this paper, Mr. President, seems entirely to have misconceived the fundamental idea upon which my method of alimentation was founded. In the article to which he refers I stated, with as much emphasis as possible, that dysphagia was due, in ulcerative conditions of the throat, to the irritative action, either chemical or mechanical, upon these surfaces of matters swallowed in the ordinary process of deglutition. I insisted that such irritation must of necessity be as injurious to these ulcerations as it would be to similar lesions in other situations, and that, therefore, they should be protected, not only for the prevention of present pain, but also for the avoidance of permanent injury. No amount of local anæsthesia, whether produced by cocaine or morphine, iodoform or carbolic acid, will secure the necessary protection of the diseased surfaces, or prevent the food from getting into the larynx. Imagine, for example, the condition of a stump after excision of the tongue, first painted with cocaine, and then subjected to the indiscriminate use of food. If there be any virtue in the principle of rest as applied to the function of respiration in these cases, a method so ably and successfully advocated by the author of the paper himself, it is certainly rational and just to apply the same principle in the matter of deglutition. The tube should be used not only for present relief, but for the removal of irritation and the securing of rest.

The two cases selected by Dr. Robinson were, according to his statement, the most unfavorable ones possible, for one was an advanced case in which dysphagia was severe, and the other patient was practically moribund. I have never maintained that in every case the tube could be used painlessly and with success, but have plainly stated that the passage of the tube would not always prove an easy or a painless operation. I have also urged for the method a fair, patient, and intelligent trial in cases suitable for its employment, when, in a large proportion at least, it will succeed.

As to the question of priority raised by Dr. Robinson, my original paper upon the subject was based upon the experiments of several years, and it was presented to the Council of this association as a candidate's thesis in the spring of 1880, as will be remembered, doubtless, by the gentlemen then composing that body. In this article, of which I still have the manuscript, the whole matter is fully presented. Again, I must protest against the charge of having advocated the exclusive use of the English flexible-woven catheter. In the article quoted by Dr. Robinson

I recommend the use of the soft instrument as well, only insisting that, whatever variety of tube be used, it should be *of small caliber*. In the hands of the reader of the paper, however, both the English catheter and the soft tube seem to have been alike unsuccessful. The large tubes of Dujardin-Beaumetz are entirely unnecessary for simple feeding. As long as relief in the passage of the tube can be obtained by the use of cocaine or other local anæsthetics, by all means let them be employed. They can not, however, be expected to take the place of the tube. I have spoken at some length upon this subject, because I want to defend a method which, theoretically, is entitled to respect, and which, having tried for over six years and in a large number of cases, I feel that I can conscientiously recommend.

*Paper.*

AN ADDITIONAL NOTE ON THE THERAPEUTIC ACTION OF COCAINE.

BY F. H. BOSWORTH, M.D.

PROBABLY no new remedy which has ever been discovered has been received into such immediate and universal favor as cocaine.

In the New York "Medical Record" for October 11, 1884, Dr. Noyes made known to the profession in this country Koller's great discovery of the anæsthetic properties of the drug. With that alertness and enthusiasm which is a prominent characteristic of the American physician, the remedy was taken up, its properties were studied, and its field of usefulness was investigated until, at the end of a few months, our journals had become so crowded with contributions on the subject that it seemed there could be little more to add.

In the New York "Medical Record," November 15, 1884, I first made public an entirely new action of the drug as follows: "In using a solution of cocaine in the nasal cavity for its anæsthetic effect, I have observed an action which, as far as I know, has not been recorded. When the solution is applied to the mucous membrane it is followed in about twenty or thirty seconds by a very notable contraction in the venous sinuses underlying the part which it reaches, and, as the application is continued over the whole membrane covering the lower and middle turbinated bones, these sinuses become so rigidly contracted that all the blood which they may have contained is absolutely expelled, and the membrane clings closely to the bony structures beneath, which then become visible in absolute outline. This action of the cocaine was so entirely unexpected to me in the

first case in which I observed it that I continued my observations in a number of cases, and in no single case, out of over forty observed carefully, has it failed to produce the same result. Every drop of blood was expelled from the erectile tissue in each case. The strength used was a 2-per-cent. solution, and it was applied by means of a pledget of cotton wrapped on a small probe. The effect was usually observed in a few seconds, and the entire depletion of the sinuses of the whole cavity accomplished in about three minutes, the production of anæsthesia, as a rule, requiring a longer time."

In the same communication I indicated the value of cocaine as a local agent in the treatment of acute rhinitis, hay fever, acute bronchitis, and as a valuable aid in the diagnosis of intra-nasal disorders, as opening up the cavities for a clear inspection.

In a later communication on this subject\* I recorded the fact that this action of cocaine was equally marked on all blood-vessels—arteries as well as veins and capillaries—and offered the explanation that a solution of cocaine *produces a rigid contraction of unstripped muscular fibers wherever it comes in contact with them.* We thus understand how it acts to completely empty the large venous sinuses of the nasal cavities, while it only diminishes the caliber of the capillaries and smaller blood-vessels; for in the intra-venous spaces of the nasal mucous membrane are found large bundles of unstripped muscular fibers, which act in contraction not only on the periphery of the sinuses, but also to contract the membrane itself, and draw it down upon the turbinated bones. On the other hand, contraction of the small muscular fibers in the coats of the small blood-vessels, no matter how rigid, can only serve to diminish their caliber without obliterating them, as is the case with the venous sinuses.

I further argued that this action must be by immediate contact with the muscles, rather than through the nervous system, since this action is observed in a much shorter time than the anæsthetic action, and was also closely proportioned to the absorptivity of the membrane.

In this latter communication I wrote further: "*We thus have in cocaine a remedy upon which we may rely, with absolute certainty of its action, that, when applied in solution to the surface of a mucous membrane, it penetrates its epithelial coat, and, reaching the coats of the blood-vessels, produces rigid contraction of their muscular fibers, and thereby marked diminution in the caliber of the blood-vessels.*"

\* "Cocaine and its Use in Ophthalmic and General Surgery," H. Knapp. G. P. Putnam's Sons, 1885.

And further: "If the prime factor of inflammation or its first phenomenon be dilatation of blood-vessels from paralysis of their muscular fibers, we have in cocaine a remedy which directly controls this element in the inflammatory process."

Cocaine as a local anæsthetic is one of the most remarkable drugs that have ever been introduced into our Pharmacopœia. Add to it this marvelous action on the blood-vessels, and we have a remedy which it seems to me savors largely of the "Arabian Nights." Its action in my hands has been of such inestimable value, and its uses so various, that this must be my excuse for bringing this subject before you after so much has been written on it. And, moreover, after so many years' experience of the uncertainty of the local action of drugs applied to the upper air-tract, we finally have one at least which never fails us. Whatever may be its value in general and ophthalmic surgery, certainly in our specialty I think it is incomparably the most valuable and most reliable remedy we possess. I think I may safely go further and say that were it a question with me whether I should abandon cocaine or the whole of our Pharmacopœia besides, I would unhesitatingly prefer to retain the cocaine. Many of you will undoubtedly say this is an extravagant assertion, but I make it with all due consideration. In the case of an acute inflammation of a mucous membrane, whether a rhinitis, pharyngitis, laryngitis, or bronchitis, we have been for years using our vegetable and mineral astringents, our anodynes and alteratives, alkalies and acids—all locally, and with what result? We have used them in a somewhat tentative way, and few of us have much faith in their use. Certainly our observations have not shown them to be of any great value. In no case of any of these affections which has come under my care has cocaine failed me; the inflammatory process has been arrested for the time. The action of the drug is not permanent. It lasts from four to twelve hours, but, when the inflammatory process recurs, it comes on in a much mitigated form, and is again arrested by the application of the drug. Each recurrence is after a longer interval and with less violence.

In chronic catarrhal affections of the upper air-tract the local action of cocaine is to markedly mitigate the symptoms. It does not cure, nor will any local remedy cure. This conclusion, I think, we most of us have now arrived at. Chronic pharyngitis, chronic laryngitis, and chronic tracheitis are always secondary to some disorder in the nasal cavities, and can only be reached by treating these parts. Chronic disorders in the nasal chambers are not cura-

ble by local astringents. I believe that at the bottom of all these disorders lies some organic change which can only be reached by radical measures—the snare, the knife, or caustics.

As Dr. Daly very well put it at the Copenhagen Congress: “When we become more throat surgeons and less throat doctors, we shall get better results in the treatment of our cases.”

The great value of the cocaine in the treatment of chronic disorders in the nasal cavities lies in its property of completely emptying the blood-vessels, thereby enabling us to thoroughly inspect the cavities with the element of venous turgescence entirely eliminated. We are thus enabled to nicely locate small polypi, polypoid thickenings, or true hypertrophy, as well as to thoroughly inspect that most frequent of all causes of nasal catarrh, a deflected, broken, or deformed septum. With this nicer diagnosis, which is thus obtained by a full inspection, our remedies can be applied with an amount of accuracy which gives us far better results than we have ever before obtained. Certainly, were I to sum up my experience of the past eight months, I should have no hesitation in saying that I have been far more successful in the treatment of my cases than ever before, and that this has been due entirely to the better diagnoses which cocaine has enabled me to make, and to the greater accuracy with which treatment could be directed, caustics applied, and the snare adjusted.

It is to be understood that, while I wish fully to give appreciation to the anæsthetic value of cocaine, what I say now is mainly with reference to its therapeutic value, or its action on the blood-vessels, and that it is this action which I consider really of the greatest value to us in the treatment of diseases in the upper air-passages.

Before closing this brief note I wish to add a word in regard to hay fever. When I made my first communication last November hay fever was out of season. I had, however, seen a few cases in which the symptoms were present in a mild degree. In these cases the local application of cocaine gave entire relief. Since that article was written, our “rose colds,” which usually commence about June 10th, have come on. I have seen a number of these cases, and have treated them as follows:

I applied first the 2-per-cent. solution of cocaine until the relaxed membrane in the nose was completely contracted and the nasal passages were entirely clear. This was done with a fine spray (I prefer Delano's), and required perhaps three minutes. Then a few drops of Magendie's solution of morphine were thrown into each passage



by the spray, and finally the membrane was covered by liquid vaseline thrown in by spray. *In every case the relief was complete*, and lasted several hours. These patients were all directed to provide themselves with a Delano atomizer filled with cocaine solution, and to use it whenever these symptoms recurred. They were thus enabled to keep these attacks under excellent control, and to render them a source of but little discomfort.

I have not seen, of course, any cases of autumnal catarrh, but I see no reason why these cases should not be quite as controllable as the vernal form of the disease, though I am disposed to think the particular pollen which provokes those attacks is rather more active than that which provokes the attacks of rose cold.

In those cases of hay fever which are accompanied by asthma, the asthma in every case has *completely* disappeared with the relief of the nasal turgescence.

Since my first paper on this subject the action of cocaine on acute rhinitis has been questioned. I repeat what I then said, and base the assertion on a very large number of observations. A 2-per-cent. solution of cocaine thrown into the nasal cavity by a fine atomizer will arrest a cold in every instance. I have seen no failures. It may be necessary to repeat in a few hours, but this is a very simple matter. The small Delano atomizer can be managed easily by any patient. There is no longer an excuse for any one suffering from a cold in the head.

NOTE.—Since the foregoing was written, nearly a year ago, three statements have been made in regard to the local action of cocaine: 1. That its local use is followed by a reaction which leaves the membrane in a worse condition than before the application. An experience covering now, I may safely say, several hundreds of cases, has failed to show any such action, except possibly in two instances. 2. That after long-continued use it fails to produce any effect. I have never seen any such failure. 3. That it often fails to relieve hay fever. Last autumn I saw a very large number of these cases, and recorded no single instance of its failure to relieve when properly used. It of course does not cure.

*Paper.*PERSONAL EXPERIENCE WITH SOME RECENT ADDITIONS TO THE  
MATERIA MEDICA OF LARYNGOLOGY.

By SOLOMON SOLIS-COHEN, M. D.

IN order to be as brief as possible, this paper will set forth results rather than detail cases. The drugs to be reported upon are the tincture, fluid extract, and concentrated infusion of erythroxyton, hydrogen dioxide, resorcin, aconitine oleate, morphine oleate, and ethyl iodide.

ERYTHROXYLON PRODUCTS.—Following the publication of Du Cazal's \* recommendation of tincture of coca for the production of local anæsthesia of the pharynx, resort was had to that preparation, which was, however, soon abandoned for the fluid extract.

This gave way in turn to an aqueous extract of equal strength. After the introduction of erythroxyline hydrochloride, Dr. Jurist brought to my attention a concentrated infusion of erythroxyton, one minim of which represented two grains of the drug. This preparation, which is made by Mr. F. W. E. Stedem, pharmacist, of Philadelphia, is the one we now employ.

To be efficient it must be recent. It is useful to blunt sensibility in all cases of hyperæsthetic inflammation, whether acute or chronic, of the mucous membrane of the nose, pharynx, or larynx; to relieve odynphagia in acute amygdalitis; to mitigate the slight pain following the application of the electric cautery or the evulsion of adenoid vegetations in some subjects; and to reduce turgescence of the turbinated bodies in acute coryza, both idiopathic and influenzic. It is also of benefit in chronic coryza, after the application of spray or douche, to relieve the feeling of stuffiness sometimes present. In some cases of tuberculosis of the larynx it has proved an efficient substitute for erythroxyline hydrochloride in the relief of odynphagia; and in one case of odynphagia, apparently dependent on acute circumscribed inflammation of a cluster of glands on the lateral wall of the pharynx, it proved equal to the occasion. It may be applied in spray; preferably, however, with brush, sponge, or cotton-wad; or in the nose by instillation. It can often be efficiently applied at home by the patient. The taste is disagreeable to many patients, but to some it is pleasant. Trial has been made

\* "Rev. méd. franç. et étrangère," July, 1881.

of coca lozenges, manufactured by a number of pharmacists, but they have not been found very satisfactory.

HYDROGEN DIOXIDE was introduced into medicine by Dr. Benjamin Ward Richardson some twenty years ago, and has been widely used as a local application, especially within recent years. The writer's observations extend over a period of about two years. It is usually furnished by the druggist in what is called a ten-volume solution in water—about a three-per-cent. aqueous solution of  $\text{H}_2\text{O}_2$ . Owing to the process of manufacture, a small percentage of hydrochloric acid is contained in the solution. When recently prepared, it is too pungent for ordinary use, and should be diluted with one or two parts of distilled water, as may be. Its properties as a local application are detergent, disinfectant, and stimulant. It is therefore of much value used as a spray to tuberculous or syphilitic ulcers. It effectually cleanses them of pus and detritus, leaving a clean surface for the application of iodoform or other remedies, if desired. In many cases it seems competent of itself to stimulate healthy granulations and to promote cicatrization. When brought in contact with pus or effete products of any kind, liberation of oxygen takes place, giving rise to a white froth resembling soap-lather. Solution of hydrogen dioxide is particularly valuable as a local application to the nose in those troublesome cases of chronic rhinitis characterized by the accumulation and retention of masses, often foetid, of desiccated mucus and epithelium. Better than any other agent of which the writer has knowledge, it softens, disintegrates, and detaches the masses, which are brought away at first in quantities astounding to the patient. The frothy "soap-suds" appearance is most marked in these cases, and the progress of amelioration can be observed in the gradual subsidence of this phenomenon. It is well to follow the application of hydrogen dioxide by a spray or douche of a weak solution of borax or some other sodium salt in warm water, for the purpose of removing superfluous froth and the few disintegrated masses which here and there remain attached to the tissues like flecks of lather.

The drug seems of value in these cases not alone as a detergent, but also as a corrective of the local morbid conditions. This action appears to be due to two causes: first, improvement of local nutrition, and, second, stimulation of the absorbents. There can be little doubt that the offensive masses which accumulate in the nasal fossæ in the class of cases under consideration, and especially in those instances where the term *atrophic rhinitis* is applicable, are largely composed

of epithelium desquamated in an immature condition. In addition to the thorough riddance of irritation from pent-up and decomposing masses, which it effects, the solution of hydrogen dioxide seems to exert a beneficial influence upon the epithelial covering of the mucous membrane, stimulating the cells to a healthy growth and thus restraining their early death and desquamation. The belief is entertained, though the hypothesis lacks demonstration, that the normal processes of absorption and removal of effete materials are likewise stimulated, both mechanically by the impact of the finely divided spray and chemically by the local action of the drug.

ACONITINE OLEATE is employed in the form of a two-per-cent. solution in oleic acid. It may be applied with brush, sponge, or cotton-wad. In acute and subacute superficial laryngitis it has proved of great benefit in conjunction with the other measures usually relied upon in the treatment of these affections. It relieves pain and subdues inflammation, its effects being more lasting than those of the erythroxylin products. It has also been employed with benefit in chronic laryngitis, pharyngitis, and rhinitis, where pain has been a prominent symptom, or where there has been a condition of super-sensitiveness. In one case of neuralgia of the pharynx two applications to a couple of red spots on the posterior wall of the pharynx afforded permanent relief, a concomitant neuralgic pain referred to the inner canthus of the left eye disappearing at the same time. In some cases of odynphagia without discernible adequate cause its persistent application has given great relief.

MORPHINE OLEATE, in the form of a four-per-cent. solution in oleic acid, has been employed in a few instances as a topical sedative and analgesic application. It is inferior to erythroxyline for immediate action, but its effects are more lasting in those cases where it is competent to relieve pain, and it appears to exert somewhat of a curative influence. Systemic effects have not followed its local application, though an extended series of observations directed toward this point is wanting. It appears to be a convenient form in which to exhibit morphine when a local rather than a constitutional influence is desired.

RESORCIN, in fine powder, diluted with starch, tannin, bismuth, or acacia, and sometimes combined with morphine, has been used chiefly as an application to tuberculous and syphilitic ulcers. It was used in but a small number of cases, and, appearing to be inferior to iodoform, was abandoned some time before the publication of Andeer's observations. At first, being applied in too concen-

trated a form, it had an escharotic effect, great pain ensuing at the moment of application, soon followed, however, by a sense of relief. In one case of tuberculous laryngitis the drug did appear to promote cicatrization, but the patient disappeared from observation, and notice of his death was seen in the newspapers some six months after he had placed himself under the care of a practitioner of homœopathy. The resorcin did not appear to exert any influence upon the progress of the disease. The calmative effects of resorcin which have been obtained by Andeer have not been observed in the writer's experience. Powdered resorcin diluted with acacia has recently been employed as an insufflation in fœtid coryza (ozæna). Observations upon the value of this method of treatment are not yet sufficiently numerous to warrant the formulation of a positive opinion, but thus far seem favorable to the method.

ETHYL IODIDE, the use of which was recommended in syphilitic cases by a writer in the "*Lancet*" whose name has escaped recollection, is administered by inhalation, ten or more minims being dropped upon the sponge of a Yeo respirator, which is worn for an hour or two at a time, as circumstances may render desirable. In some cases of laryngeal tuberculosis it has apparently been beneficial. In syphilitic rhinitis and pharyngitis curative results have been obtained, though in cases attended with much ulceration exclusive reliance has not been placed upon this plan of treatment. In fœtid coryza, not specific, ethyl iodide has seemed to exert a beneficial influence in diminishing the quantity of the discharges and in correcting their character. In one case the use of the drug had to be abandoned, despite its apparent good effects, because the patient's occupations prevented her from wearing the respirator during the day, and its use at night induced unpleasant dreams.

While the use of the drug in bronchial and pulmonary affections does not come within the scope of the present paper, casual allusion may be made to the happy results sometimes obtainable in bronchorrhœa and fœtid bronchitis.

In connection with the subject of continuous inhalation, the writer would also briefly call attention to the value of a number of volatile drugs thus administered in chronic rhinitis, chronic pharyngitis, chronic laryngitis, and laryngo-tracheitis, and especially to control irritative cough in the chronic laryngitis of phthisis. Those substances most generally useful are, in the order of merit, creasote, terebene, and eucalyptol, admixture with chloroform or spirits of chloroform usually increasing their efficiency.



*Discussion.*

Dr. RICE.—Before the discovery of cocaine I was in the habit of using several preparations of the *Erythroxyton coca*, made by Mariani, of Paris—a syrup, a fluid extract, and the lozenges. Their use seemed to be particularly indicated in painful affections of the pharynx. They have the same effect, though in a much less degree, that cocaine produces—contraction of capillaries. The fluid extract of erythroxyton had something of a reputation as an agent to abort suppurative amygdalitis. Cocaine seems to be more than a substitute for these preparations. I have found the dioxide of hydrogen, in four-per-cent. solution, a valuable disinfectant in ozæna and chronic nasal catarrh. It cleanses the mucous membrane and diminishes secretion in a remarkable manner.

Dr. ASCH.—I have used cocaine in tracheotomy with remarkably good results. Six minims of a four-per-cent. solution, according to the statement of the patient, caused anæsthesia. It was injected upon one side of the larynx, and the operation performed five or six minutes afterward. If I were to employ it in this way again I would inject it on both sides. I have also removed papillomata with apparently no discomfort to the patient.

Dr. J. SOLIS-COHEN.—There are two or three points in regard to the use of cocaine to which I would like to call attention. One of my assistants, in applying cocaine to the pharynx of a hay-fever patient, produced as violent an attack of asthma, so far as the eyes and nose were concerned, as any the patient had ever experienced. On another occasion my assistant applied cocaine to the larynx with the result of almost asphyxiating the patient. I immediately caused the lady to inhale chloroform, and in a very short time the spasm was relaxed. Several of my patients have declined to have cocaine applied a second time. They have an uncomfortable sensation, as of something in the throat which can not be expelled. Others complain of feeling as if “something were gone.” Some have had vertigo; others an intense disposition to syncope. In some cases the pain undergoes exacerbation after the benumbing effect subsides. In the majority of instances, however, no deleterious results have been manifested. I have used strong solutions; never less than four, and sometimes as much as twenty per cent., as I wished to produce positive results.

Dr. MACKENZIE.—I have found that the continuous use of cocaine in the nasal passages and throat begets after a while an increased irritability of the structures, which is due, I fancy, to the constant lashing and fatiguing of the muscular fibers in the small vessels and in the erectile tissues, which brings about in the end a subparalytic condition of these elements, with, it may be, consequent puffiness of the membrane. Just as the habitual use of cathartics will eventuate sooner or later in constipation, so the prolonged use of cocaine will result, in a large proportion of cases, in a hyperæsthetic condition of the throat and nasal passages. My experience with

the drug in laryngeal tuberculosis, though limited, is favorable, although its effects are very transient, and, after a while, are lost altogether. In a medical friend I have known repeated sprays of the four-per-cent. solution for the relief of coryza to give rise to serious interference with the pulse and respiration, consisting chiefly in a slowing of both.

*Paper.*

A CASE OF MEMBRANOUS NASAL CATARRH.

By G. W. MAJOR, M.D.

MEMBRANOUS nasal catarrh is of sufficiently rare occurrence to merit its being placed upon record when met with.

M. A., aged eighteen years, came to me for advice early in January of this year. The patient was well nourished and above the average weight. Her general health was good and, excepting a muddy-looking complexion, would not call for remark. She was unable to carry on respiration by the nose, which was completely obstructed. On examination, the nasal chambers were found to be lined by a grayish-white membrane freely bathed with moisture. This exudation was susceptible of removal in small detached pieces, and left a bleeding surface. It was with difficulty that a small probe would enter the passages, and attempts at washing the cavity with sprays or a stream proved useless. The membrane occupied both chambers equally, covering the septum, and the lower and middle turbinated bodies, ceasing anteriorly at the junction with the skin and posteriorly at the margins of the choanæ. It did not enter the pharyngeal vault to any extent, though traces of it were observable, of diminished thickness. The anatomical relations of the nose were normal, if we except pressure of the middle turbinated bones against the septum nasi, and it was at these situations that the disease was most difficult to overcome. After removal by whatsoever means, the membrane would reform in forty-eight hours, so that daily treatment became necessary.

A microscopic examination developed the fact that the membrane varied in thickness from two to three millimetres, and consisted entirely of round exudation cells with well-developed nuclei. The cells toward the upper surface were rounder and larger than those near the base, which latter appeared compressed and flattened by the weight of those above. In a few places an attempt at organization could be noticed in the shape of a few fibrous-looking strands. Whether these strands were formed of true fibrous tissue, or were simply the edges of flattened cells, would be difficult to determine. No micrococci were found. Treatment of the case was carried out on general principles. Iodide of potassium was administered internally in doses of ten grains three times daily. A

cleansing and disinfecting spray was ordered for use four times in the twenty-four hours. Local applications of chromic, acetic, and nitric acids were made, at intervals of twenty-four or forty-eight hours, in the order in which they are named. The condition, though improved, did not yield materially under any of them, though they were applied very carefully and thoroughly and at several successive sittings, each.

The galvano-cautery gave the best and most permanent results, and ultimately overcame the tendency to proliferation. It was found necessary, however, to sear deeply, as superficial action was of no practical benefit. The duration of treatment was three months.

How long the condition described had existed it was impossible to say. The young lady had always suffered from nasal complaints and inherited a disposition to catarrhal affections.

Two months have now elapsed since any local or constitutional treatment has been followed, and no tendency to recurrence has been observed. The specimens of membrane exhibited were removed immediately after the application of a solution of chromic acid ( $\text{Dj}$  to  $\text{Zj}$ ), which latter facilitated the removal of the exudation, but did not, even when employed at full strength, tend in any way to a cure. The microscopic section shown was cut after hardening in a one-per-cent. solution of chromic acid, and was colored by picro-carmin.

### *Paper.*

#### MILD MEASURES IN THE TREATMENT OF SO-CALLED "NASAL AND NASO-PHARYNGEAL CATARRH."

By J. SOLIS-COHEN, M.D.

I HAVE always entertained the idea, Mr. President, that the two great principles in the treatment of naso-pharyngeal catarrh were to keep the parts clean, so as to let them have a chance to get well of themselves, and to take care of the patient's general health; and that is the plan I have for many years pursued in preference to boring, cutting, snaring, and cauterizing the tissues; and I may say that the results, in the main, are at least as good as when boring, cutting, snaring, and electric cauterization are practiced. There are cases, it is true, in which the tissues are very thick, hard, and firm, where certain changes have been undergone, which can not be cured by milder means than those alluded to, and I throw these cases out of the question in this discussion; but I have seen cases treated in that way similar to those which I have relieved, in many instances permanently, by mild measures—cases in all respects equally severe with those so often treated by ruder methods. One great difficulty

we long had to encounter seems to have been overcome recently by the use of erythroxyline chlorohydrate, the anæsthetic effect of which favors getting at the tissues for any local application. Sometimes the parts are so swollen as to present difficulty in cleansing them; but by the use of cocaine or of a concentrated infusion of erythroxyllum there is such a contraction of the succulent tissues that we are able to make applications at once. The plan I have long used for getting at concealed parts for the purpose of cleansing them, and for the purpose of making any local applications that may be necessary, is to take a small piece of compressed sponge, cut it very thin, moisten it, and place it between the septum and the turbinated bones. The patient sits a while with this sponge in position, so that, by compression as it imbibes moisture, it is possible to reduce the swelling of the tissues and thus get a considerable passage for further manipulation. Through the passage thus gained I then use compressed laminaria tubes, the same kind as are used for dilating the neck of the uterus. These are employed for the purpose of exercising as equable compression on the parts as possible, on exactly the same principle that you exercise pressure by bandaging. They are first to be softened in water and then to be flattened from side to side, so that they shall become adapted to the shape of the passages. Of course, the size is to be regulated in accordance with the size of the passage. The tent or tube is then allowed to dry after having been flattened, and of course it becomes much smaller. The one herewith shown and just prepared will not be of one fourth the size to-morrow morning that it is now. When you wish to use the tube, after having made a little start in dilating the passage with your compressed sponge—or in suitable cases without using the compressed sponge—you grease it well with cosmoline, insert it into the passage with the string outside, so that it can not get loose, and you let the patient wear it for an hour or so, according to circumstances. Every half-hour the patient moves the tube a little, and when he finds it resists ready removal he informs me. This testing is continued until I find there is some difficulty in the removal, and then I withdraw it entirely. It is necessary for this to be done promptly, because these tubes swell up so behind the compressed parts, if left too long, that you may have a great deal of difficulty in removing them, and so produce much unnecessary pain. Therefore, just so soon as there is any difficulty in removing them, they have to be taken out. This manipulation is repeated from day to day, and just as soon as the patient has learned it, as he



readily does, he does it daily at home. After the first two or three times this compression goes on a great deal better, and then with your sprays, douches, washes, or what not, you cleanse the parts, and, if necessary, you make such an application to the surfaces as you think proper. In the treatment of naso-pharyngeal catarrh where there is a good deal of secretion, the syringing is done partly through the nose and partly through the mouth. I think usually you can wash those parts as well through the nose as through the mouth. But the great point is the cleansing of the parts from the secretions and keeping them clean, for the same reason that you would keep the teeth clean. It sometimes consumes a great deal of time. I have often, in the first interview with the patient, occupied an hour in getting the parts cleansed. There are only two things that will stop me from cleansing the parts thoroughly: one is my own exhaustion, the other is the exhaustion of the patient. The parts must be examined from time to time anteriorly and posteriorly to make sure they are cleansed. Once thoroughly cleansed, the treatment consists in keeping them clean. I have had patients who have told me their malady was of forty to forty-five years' standing, and who have been relieved and have remained relieved for a number of years. Of course exacerbations take place. You know well enough what is meant by a perfect cure. Even this may be reached if the patient takes care of himself after being relieved. Whenever there is slight exacerbation from exposure or something else, he must cleanse the parts from the secretions, and he will get on very nicely. I would like to say that Dr. Morell Mackenzie has been of late years in the habit of using flexible dilators of different sizes, made out of the gum-catheter material. He uses round ones, but flat ones adapt themselves better to the parts. I would also mention that for a number of years Dr. Asch has been using metallic bougies.

#### *Discussion.*

Dr. DE BLOIS.—I have been greatly interested in Dr. Cohen's views, and believe that he is right. There has been far too much surgical interference in many of these catarrhal cases. Among the large number of them which have come under my observation there have been very few in which operation has been necessary. I agree as to the importance of keeping the parts well cleansed. As sprays propelled into the nose under heavy pressure are sometimes painful, I recommend a syringe for the patient's own use at home, to be used with ordinary tepid water, to wash the nose in part, and to keep it cleansed in the same way as he would cleanse his teeth or wash his face. The catarrh



may not be cured—it seldom is permanently—but it is generally relieved. I have used plugs both of glass and of rubber. We should aim to produce as little cicatricial tissue as possible, and avoid also turning an ordinary moist catarrh into the dry form.

Dr. HOOPEE.—In the days when, as tradition has handed down to us, there used to be opponents to specialism, one argument advanced against it was that it would lead to too much self-conceit. I think a stronger point would have been that it would lead to too vigorous and too prolonged local treatment. If specialism is to mean that we must regard the body not as a whole but as a piece of mosaic made up of separate parts cleverly stuck together, and that each part must be treated independently of the other, the sooner it falls to the ground the better. In throat affections especially it is important, before we start on any line of treatment, to inform ourselves of the exact condition of the other organs of the body. We must accurately determine whether the throat complaint depends upon general or local causes, and whether it requires general or local treatment, or no treatment at all. It is a subject about which very little has been written. I think Dr. Cohen's remarks very timely and valuable.

Dr. ASCH.—The remarks of Dr. Cohen are extremely valuable at the present time, because, I think, the tendency of late has been too much in the direction of surgical treatment in catarrh. I have been using my own measures for a number of years, as the doctor has mentioned, and I have no cause to be dissatisfied with the result. I have used metallic bougies, and have also made use of the same means he speaks of—laminaria tents. The difficulty with the latter is that it takes too much time, but as to its efficacy there is no doubt. I have not given up entirely the galvanocautery, but find that the patients come back dissatisfied, and think I shall return, except in rare cases, to the safe and conservative method. I have had patients come to me who had been under the care of other men where harsh methods were adopted, and they were dissatisfied; and I have found that simple measures occasionally cured. There is one symptom of naso-pharyngeal catarrh which is very difficult to cure. It is the spasmodic cough occurring in the morning. These cases I have seen after having been bored and cut, and the cause has remained. In such a case a simple application with a brush of a forty-grain solution of nitrate of silver has resulted in an entire cure. It was not a case of long standing. I find also in laryngeal patients that mild methods are the best. Weak solutions answer better, and it is only once in a while that it is necessary to use anything but a simple application. I think that rule will hold good except in cases of neoplasms, or where it is necessary to take rapid measures to prevent death.

Dr. RICE.—Dr. Cohen's maxims—1. Keep the surfaces clean, and 2. Allow nature to perform a cure—are excellent ones, but should not be depended upon to a too great extent in the cure of catarrhal trouble. It is true that cutting, burning, and slashing, done by inexperienced hands,

have tended to throw these methods of treatment into bad repute; but it is equally true that the use of the snare and galvano-cautery has accomplished wonderful results in nasal treatment. We know that the same remedy may produce quite different effects, according to the skill with which it is applied, and more harm may be done a patient by a douche of salt and water, used in a bungling manner, than by nitric acid carefully employed. In my opinion, there is more danger from the indiscriminate use of sprays than from surgical methods as they are to-day employed. In ordinary nasal catarrh, accompanied as it usually is with hypertrophy, the galvano-cautery is indispensable and will accomplish far more than dilatation by tents or sounds.

Dr. MACKENZIE.—In my paper of the day before yesterday I endeavored to insist upon the necessity of not regarding the nasal passages as anatomically isolated from the rest of the body, upon the necessity of the study of the individual in his various relations, and upon the systematic exploration of his every function. It seems to me that two factors enter prominently into the treatment of nasal affections—cleanliness and surgery. Of course, the latter implies the former, but, in those cases in which surgery is unnecessary, cleanliness and other hygienic measures play the most important rôle. In the "Medical News" of last April I endeavored to simplify the treatment of these affections by a practical classification of the stages of chronic nasal inflammation, and by the foundation of general rules of treatment based thereon. The latter depends entirely upon the stage. In the early part of the first stage it is almost wholly hygienic; in the large majority of cases the nose itself had better be let alone. At this period local treatment is often unnecessary and sometimes harmful. We should endeavor to search for and remove the cause of the affection. In other cases, at this stage, great benefit may be derived from the judicious use of medicaments to the nasal passages. In a certain number of patients the administration of medicines to control reflex excitability of the turbinated tissues is productive of good. The treatment of the second period of the first stage (characterized by puffiness of the membrane, due to permanent dilatation of the erectile cells) is to be carried out on the same general principles. Remembering the condition of the intercellular walls in this stage, measures should be taken to restore their loss of power, and, failing in simpler means, the cautery or electrolysis should be resorted to. In these two periods the use of medicines in solid form is, in my judgment, contra-indicated, as prone to increase the irritation and hasten the coming of the hypertrophic stage. The treatment of the latter combines the measures adopted in the periods of the preceding stage. In its second period the treatment is essentially surgical, and consists in the removal of the obstruction, in thorough cleanliness of the passages, and attention to the general principles which govern the management of the preceding stage. It is useless to temporize in such cases with local applications, or to endeavor to promote absorption by pressure; sooner or later the case must be dealt with

by surgical means. The general management of the third stage is hygienic and tonic; the local is palliative, and consists in keeping the parts thoroughly cleansed and lubricated.

Dr. HARRISON ALLEN.—I think that in the cases related by Dr. Cohen the catarrh must be located upon the inferior turbinated body. In many cases, perhaps the majority, the middle turbinated body is also involved. I am not desirous of attempting to defend the galvano-cautery. On the other hand, I have resorted to all local means suggested by the authorities, but have always returned to the galvano-cautery. I believe that it is the best single agent at our command to relieve the nasal disease, depending, of course, upon how it is used. It may be applied lightly without destroying the surface, or a deeper eschar may be produced, having a purely destructive effect. But between these two extremes there is ample proof that various therapeutic effects are secured.

Dr. SHURLY.—Many of you will remember a paper which I presented last year, calling attention particularly to the point which has been incidentally mentioned, namely, the production of scarred tissue. We can not be too careful about this, nor should we lose sight of it for a moment in the use of the galvanic cautery or any other caustic. I served an apprenticeship at the method advanced by Dr. Cohen, and on the recommendation of some one in Europe, Schnitzer I think, using slippery elm instead of laminaria. I was always unable to bring this instrument in apposition with anything but the lower turbinated body. My patients were not so tractable, I fancy, as Dr. Cohen's, for I never could get them to follow out the method of treatment, and, therefore, through several years the results were always either indefinite or absolute failures. I have also had the same experience that Dr. Mackenzie speaks of in regard to making strong applications to the nasal mucous membrane; I have never been able to get any good effects from strong applications. I thoroughly believe that the galvanic cautery, when properly used, is a mild measure, and I would challenge anybody to prove the contrary. If the galvanic cautery is improperly used, its result is the same as that of the use of any other method. A very large knife may be thrust into the passage, or a strong current of electricity may be kept up until the tissues are destroyed, and, of course, neither is a proper method of treatment. Such practice should not be recognized for a moment, but we should keep in mind the necessity of using the cautery in a skillful manner, and then, as Dr. Allen has very pertinently remarked, it is as mild a measure as can be adopted for any of the diseases named.

Dr. COHEN.—My object in calling your attention to the efficacy of mild measures was simply that I felt it important to allude to the discrimination necessary to be used in the treatment of these cases. That is the point. Now, the cases which are amenable to the treatment I spoke to you about are the cases of turgescence and inflammatory thickening. It is not hypertrophy. Some practitioners see a swelling in the nose, and they immediately put a snare around it, or apply the galvanic cautery.

I am perfectly well aware that there are cases that need this treatment, but, so far as my own experience would show, they are in the minority, not in the majority. I believe that at the present day naso-pharyngeal catarrh is treated too frequently by this method. I have nothing to say about the methods adopted in proper hands. In proper hands they are the proper thing. But I think that there is not sufficient discrimination made between the classes of cases, and that a more general resort to milder measures will prevent what seems to me an error of the present day, a tendency in the wrong direction. For the last two or three years I think we have paid too much attention to heroic methods. There is no particular skill in the use of the method I have advocated. Its applicability is by no means limited to disease in the lower portion of the passages, and it is in this connection that I lay special stress upon flattening the tubes. Even when we can not get a small tube into the passage, a little piece of compressed sponge may be inserted, and thus exercise an equable compression upon either the lower or the middle turbinated body, or any other structure in the passage.

#### *Business Meeting.*

DR. HOOPER offered the following resolution: Mr. President, as we are soon to separate and return to our homes, I am sure we shall all carry with us very pleasant recollections of our meeting at Detroit. It seems to me that more has been done here to cement good feeling between ourselves, and to inspire friendly sentiments to the rest of the world, than at any meeting we have yet held. I do not refer alone to the efforts—the untiring efforts—of our respected and genial president, but it has been proved that the warm words of welcome which greeted us upon our arrival here have been realized to the fullest extent. I propose, therefore, that the thanks of this Association be extended to the Detroit Medical and Library Association, to the medical profession of the city in general, and to the Detroit press, for the cordial hospitalities they have extended to us.

Carried unanimously.

The Association then proceeded to a ballot for officers, with the following result:

HARRISON ALLEN, M. D., of Philadelphia, President.

H. A. JOHNSON, M. D., of Chicago, First Vice-President.

G. W. MAJOR, M. D., of Montreal, Second Vice-President.

J. SOLIS-COHEN, M. D., of Philadelphia, Member of the Council.

T. R. FRENCH, M. D., of Brooklyn, Librarian.

D. BRYSON DELAVAN, M. D., New York, Secretary and Treasurer.

The president appointed Dr. DeBlois to conduct the newly elected president to the chair, where he was welcomed by Dr. Shurly, who, having thanked the Association for the uniform courtesy which had been extended to him, retired.

Upon taking the chair, Dr. ALLEN said: "I feel very highly honored, gentlemen, in being selected for the ensuing year as your presiding officer. I assure you when I left home for this meeting I had only the expectation of participating in your deliberations, and of sharing with you the hospitalities of Detroit. But it is an old saying that 'it is the unexpected which happens,' and this position is quite unexpected to me. I fully appreciate my inability to fill it. I believe that it is the first time that the presiding officer has been chosen from among those who were not of the original fellows of the Association, and in this sense I appreciate the honor very highly. I assure you, however, that, although not an original Fellow, there is no one present whose interest in the success of this body can exceed mine. I sincerely trust we will meet under most happy auspices in Philadelphia next year, and that I may be able to hand over to my successor the Association in as good condition as I find it. Again, I thank you."

The president then declared the Seventh Annual Congress of the Association adjourned.





## APPENDIX.



## APPENDIX.

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### *Additional Papers.*

#### A CONTRIBUTION TO THE PATHOLOGICAL HISTOLOGY OF ACUTE AND CHRONIC CORYZA.

By JOHN N. MACKENZIE, M. D.

IN the "Philadelphia Medical News" of October 4, 1884,\* I gave an account of the changes found in the different stages of intra-nasal inflammation, which was based upon the anatomical study of a large number of neoplasms removed from the nasal passages by means of the cold-wire snare. The object of the present communication is to call attention to some additional points in the pathological anatomy of that affection, which I trust may prove of general interest, both from a clinical and histological point of view.

The first specimen that I submit to your examination (Fig. 1) represents the microscopical appearances of a section through the inferior turbinated body of a man dead of Bright's disease, the result of long-standing mitral regurgitation and insufficiency.†

Among the ordinary visceral changes usually found in such cases there were traces of old infarctions in both kidneys and spleen. The nasal passages presented the appearances commonly observed in the condition known as coryza, and in the permanent puffy condition found in more chronic inflammation, the most noticeable being intense engorgement of the cavernous tissue, especially well marked over the lower half of the middle and posterior portion of the inferior turbinated body. Upon cutting into the engorged bodies

\* "Some Notes on the Pathology of Intra-nasal Inflammation."

† I am indebted to Dr. W. T. Councilman, Associate in Pathology in the Johns Hopkins University, both for the beautiful section and notes of the post-mortem examination upon which these remarks are based, and for the accurate drawings which illustrate the text.

with a scalpel, the blood, which flowed freely, could be squeezed from them as water from a sponge. The mucous membrane of the maxillary sinuses was not in the slightest degree tumefied, and presented simply a more or less cyanotic appearance.

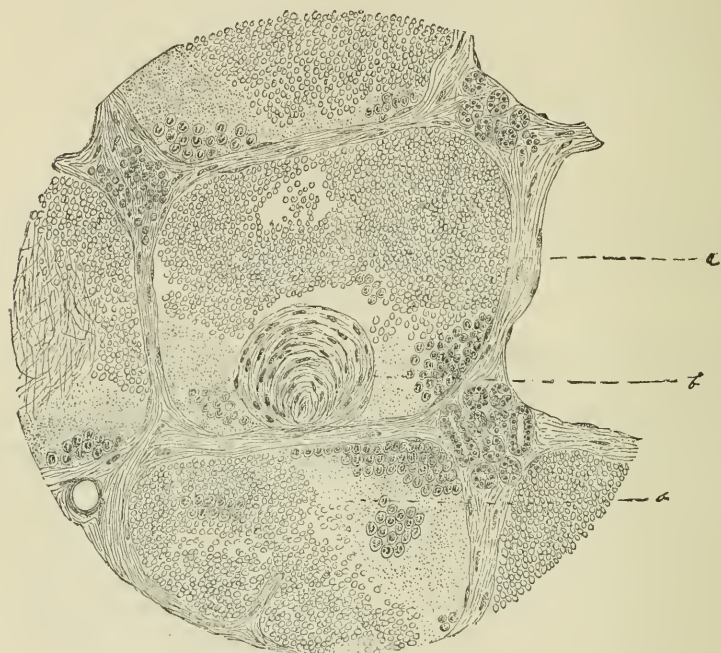


FIG. 1.

Under the microscope, the condition which at once attracts the eye is the enormous dilatation of the erectile spaces and the extreme tenuity of the intercellular walls. Here and there rupture of the latter has occurred from the enormous blood pressure, and two or more spaces in this way communicate. Along the inner walls of the dilated spaces are seen congregations of lymphoid corpuscles, and in some of them collections of fibrinous exudation.

The mucous membrane proper presents no noticeable pathological change. The epithelial layer is intact. At some places it seems slightly thicker than at others, but, beyond a moderate amount of cellular infiltration of the tissues beneath the basement membrane, there is nothing in the mucous layers to call for special remark.

Jutting out from and attached to the wall of the central sinus (in



the diagram) is a well-formed parietal thrombus, to which I would like to call particular attention.

I bring this case before you for discussion as one of peculiar interest, for it is instructive in many ways. So far as I am aware, the histological appearances in acute coryza have never been investigated. In this specimen we have the probable microscopical picture of that disease. Here, too, is illustrated the minute anatomy of the puffy condition or state of permanent dilatation of the erectile spaces which characterizes the second period of the simple inflammatory stage before hypertrophic changes have developed, and to which I have called attention elsewhere.\*

Of great interest, too, is the formation of the parietal thrombus, as illustrative of a mode of obliteration of the erectile spaces heretofore unrecognized.

In connection with the negative post-mortem appearances found in the maxillary sinus I would like to offer some suggestions on the relation of inflammatory affections of that cavity to intra-nasal processes.

While I am convinced that the chronicity of certain forms of nasal disease, the persistency of a fair proportion of neuralgic (and other reflex neuroses) affections of the head and face, are traceable to latent or unsuspected chronic antral inflammation, while it is doubtless true that affections of the maxillary sinus often run their course unrecognized during life, the *secondary* implication of that cavity in acute and chronic inflammatory processes originating in the nasal passages is, comparatively speaking, rare.

Inflammation of the maxillary sinus may result from congenital or acquired defect of the naso-antral aperture, or from its closure by the swollen and hypertrophied nasal tissue, polypi, crusts, etc., conditions which may favor the retention and decomposition of the antral secretion. Inflammation from this cause, however, occurs less frequently than is universally taught by inference from purely theoretical considerations. I base this assertion not only on clinical observation, but also on the results of post-mortem investigation. Those of you who choose to investigate the anatomical aspect of this question will be amazed to find how infrequently the mucous covering of the sinus participates in the inflammatory condition of the nasal fossæ. It is the rule to find the most marked hyper-

\* See article referred to, and also a paper in the "Medical News" of April 4, 1885, entitled, "Notes on the Classification, Diagnosis, and Treatment of the Stages of Chronic Nasal Inflammation."

trophy of the nasal tissues, and even complete atrophy, associated with a normal condition of the sinus. What is the explanation of this fact?

On the nasal aspect of the naso-antral opening is a duplication of the erectile tissue of the turbinated bodies, which in all probability serves the useful purpose of excluding from the cavity of the sinus, by means of the anatomical barrier involved in its erection, various irritants derived from the external world and nasal passages. This tissue ceases abruptly at the antral aperture. On the other side of the opening lies the peculiar loose, vascular membrane of the sinus. In the majority of cases this zone of erectile tissue constitutes the extreme anatomical limit of the nasal inflammation. The thin, loose, serous-looking membrane of the sinus differs essentially from the nasal mucous membrane, and especially that portion which surrounds the entrance into the maxillary sinus, and the abrupt transition of the one tissue into the other would therefore militate, on theoretical grounds, against extension of the inflammatory process into the antrum. In other words, I believe that the so-called extension of inflammatory action from the nasal passages to the antrum—the secondary inflammatory implication of that cavity—is of comparatively infrequent occurrence; and that, when inflammation of the sinus from extension is assumed, the condition will be found, on post-mortem examination, to be one of simple congestion, with possibly some accumulation and retention of the antral secretion from mechanical causes. Even if the amount of secretion be temporarily increased, the great power of absorption possessed by the membrane of the sinus will usually suffice to make it a matter of secondary importance.

I am inclined to believe that too much stress is laid upon the decomposition of antral secretion as a factor in the production of inflammation. Take, for example, a simple coryza. With the general erection of the turbinated tissues the orifice of the antrum is completely closed, congestion follows, with possibly an increased secretion of the antral fluid. Whether this secretion, thus hermetically sealed, so to speak, in the antrum undergoes decomposition before the patency of the opening is restored and the air gains admittance, is questionable; but, on the other hand, that decomposition does occur is beyond dispute, for, when the swelling from the acute rhinitis subsides, the aperture becomes free and, in some instances, the fetid antral secretion is discharged into the nasal passages, a fact which accounts for the peculiar factor of the expired

air from the nostrils which is sometimes observed at the close of a severe coryza.

In the second specimen (Fig. 2) are shown the microscopical appearances in the hypertrophic stage of chronic nasal inflammation before complete obliteration of the erectile spaces has taken place.

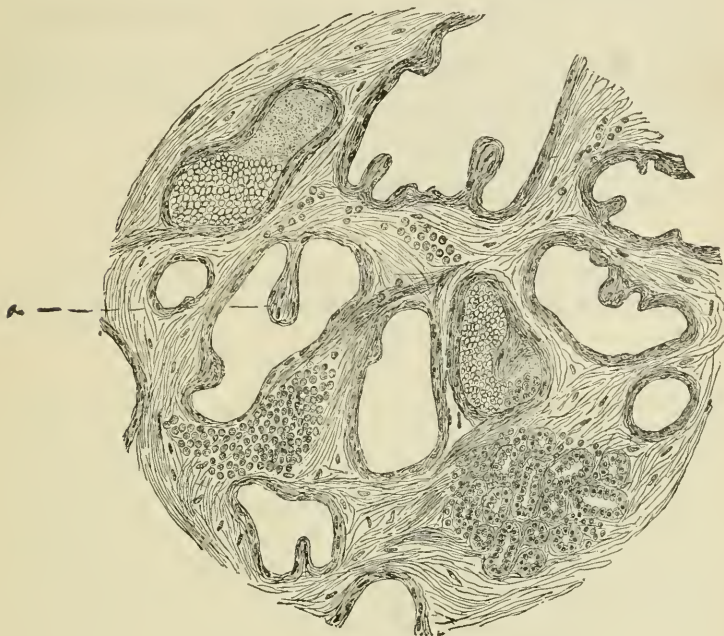


FIG. 2.

Contrast the condition here with that found in the first specimen and in the acute and earlier stage of chronic rhinitis. Observe closely the little buds or bulbous processes which jut out from the walls of the cavernous sinuses, and which are made up of out-growths from the newly formed intercellular connective tissue. In my anatomical study of this stage I overlooked these little buds, and my attention was subsequently called to them by my friend, Dr. Councilman, who had taken one of my sections for examination.

Projecting inward, they form bulbous processes or septa of varying thickness, which sometimes interlace, sometimes form bands which connect one portion of the sinus-wall with another, thus constituting another factor in the division and obliteration of the cavernous spaces.

Care should be taken not to confound them with the remains of a thinned and ruptured intercellular wall; in the latter case a similar projection will usually be found at a point diametrically opposite to that occupied by the projecting band.

We have, then, four modes of obliteration of the erectile spaces in nasal inflammation:

1. By the contraction of the newly formed intercellular fibrous bands.
2. By obliteration of their lumen by masses of round cells which resemble the white corpuscular elements of the blood. (See first article in the "Medical News.")
3. By the formation of thrombi in certain cases.
4. By the process of septa formation.

#### ISOLATION OF THE TEMPERATURE SENSE IN THE ORO-PHARYNGEAL CAVITIES AND NASAL PASSAGES BY MEANS OF COCAINE.

By JOHN N. MACKENZIE, M. D.

MY attention was first called to the isolation of the temperature sense by means of cocaine through an observation of Dr. William Warfield, of this city, who noticed during an operation on the eye (under the anæsthetic influence of this drug), performed by Dr. Russell Murdoch, that, while the sensibility of the conjunctiva and cornea was abolished, the contact of the instruments was felt as a distinctly cold sensation. Subsequently Mr. H. H. Donaldson, of the Johns Hopkins University, acting upon this hint, examined the eyes of two patients with reference to this singular fact, and discovered that, although the eye was rendered completely insensitive, the sensations of heat and cold were readily distinguished.

Struck with the original observation of Dr. Warfield, I experimented with regard to the isolation of the temperature sense in the nasal and oro-pharyngeal cavities. Six persons (hospital patients) were taken for the experiments. Having thoroughly anæsthetized the mucous surfaces of the soft palate, uvula, and nasal passages with a four-per-cent. solution of cocaine, a probe, which had been previously immersed in a mixture of ice and salt, was made to impinge upon the parts rendered insensible to contact and pain. A distinct sensation of cold was complained of in each instance. The opposite extremity of the same probe was then heated over the burner of a lamp used for laryngoscopic purposes, and in its heated

condition carried over the anæsthetized area. While absolutely no pain was felt by any of those experimented upon, there was a marked unanimity of the answers, given voluntarily, in regard to the sensation of heat. In three of the cases an eschar followed the application of the heated probe, and in one an acute pharyngitis developed; yet at the time of application no pain was felt, though the temperature sense remained intact. These observations are of interest, in view of the fact that, while recent physiological research has rendered it probable that the sensations of heat and cold are distinct from those of mere contact and pain, it has heretofore been impossible to demonstrate the fact by the complete isolation of the temperature sense. It is accordingly obvious that its separation from the other senses may lead the way to more interesting physiological discovery.



## OBITUARY NOTICES.

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### LOUIS ELSBERG, M. D.

THE death of Dr. Elsberg, which occurred at his home, in New York city, on Thursday, February 19, 1885, is a marked event in the history of laryngology in this country, and of even greater significance as coming so quickly after that of his distinguished fellow-laborers, von Bruns, Kris-haber, Mandl, and Thomas.

To Dr. Elsberg more than to any other New York physician it was given to see the rise, the advancement, and, finally, the complete success of the special department of research in which he labored, himself meanwhile keeping well abreast of the current of fresh discovery and practical improvement by which so many of his predecessors and contemporaries have, one after another, been overborne, and so many of the old scientific landmarks carried away.

Dr. Elsberg was born at Iserlohn, Westphalen, forty-eight years ago, and came to America with his parents when he was thirteen years old. The family settled in Philadelphia, where they started a small shop, and the boy became a pupil in a public school. Afterward he went to the High School, from which he graduated, with the valedictory honor, in 1852. A position was obtained for him in an academical institution in Winchester, Va., where he remained two years, after which he returned to Philadelphia, and, entering the Jefferson Medical College, took his medical degree in 1857. Immediately after graduating he came to New York, and for six months was resident physician at Mt. Sinai Hospital. He then went abroad for a year. He returned in 1859, and at once began the active practice of medicine in this city, but shortly turned his attention exclusively to laryngology. In this he soon met with signal success, both as a practitioner and as a well-grounded authority in the literature of the subject, until, in later years, few could be found whose knowledge was more thorough or whose opinions carried greater weight.

Although by no means "the Father of Laryngology in America," that place having been accredited, thirty years before his advent, to the distinguished Horace Green, of New York city, he still was entitled to

the honor of having, in 1861, begun a course of lectures on laryngology in the Medical Department of the New York University, and thus instituted the first regular instruction in laryngology in America. In March, 1863, the faculty of the University organized a clinic for the treatment of indigent throat patients under the charge of Dr. Elsberg, who utilized it for purposes of clinical instruction. This was the first free throat clinic in America, and, perhaps, in the world.

Later he held for several years the lectureship of laryngology in the Medical Department of the University of the City of New York, delivering at the same time an excellent course of clinical lectures at Charity Hospital. He assumed a similar professorship at Dartmouth College, while, in the same position in the New York Polyclinic, his devotion and reputation contributed materially to the gratifying success with which the early history of that institution was distinguished.

As he was possessed of great energy of character and untiring industry, his aid was sought for and appreciated in many important directions, prominently by the American Laryngological Association. Of this society he was one of the founders and, from its inception, one of its most active workers, occupying the position of president during the first two years of its existence, and contributing not a little to its prestige and success. Soon after the establishment of the Association, Dr. Elsberg, in company with Dr. Cohen, Dr. Knight, and Dr. Lefferts, started a special quarterly magazine, the "*Archives of Laryngology*," upon such a high plane of literary and scientific excellence that it easily and at once took the lead among journals devoted to the same branch. Dr. Elsberg's labors in these two fields were widely recognized and well repaid, for they assisted materially in extending his already brilliant reputation.

Dr. Elsberg was connected with many of the leading medical societies, both at home and abroad. His writings, which were extensive, were characterized by great clearness of thought and expression, and his style, eminently philosophical, was at the same time convincing and attractive. He restricted himself mainly to the consideration of limited subjects, furnishing monographs which were, in many instances, of exceptional value and importance.

About two years before his death he was attacked with a disease of the kidneys, which impaired his health and seriously threatened his life. From this he recovered, however, to all appearance so thoroughly that he was enabled to take up his usual duties—with what vigor those who were familiar with him well know. For a long time after the attack he seemed solicitous about himself, referring guardedly to the future; indeed, in his last paper, read before the American Laryngological Association in May, 1884, on the subject of Laryngeal Spasm, he explains in his introduction the objects of the thesis, and adds, prophetically, "and I promise you that, *if I live*, I will prepare a more elaborate essay on the subject before our next annual meeting." Within a month of his end,

however, he stated to the writer that he had never felt in better health and spirits in his life, and this assertion his appearance seemed fully to bear out. Ten days before his death, Dr. Elsberg took a severe cold, but persisted in attending to his regular duties. Pneumonia soon set in, and, before it was generally known that he was ill, his death took place. His funeral, held at his late residence, was attended by a large gathering of his professional and social friends, many of whom came from great distances.

Personally, Dr. Elsberg was possessed of social qualities of a high order, and they were nowhere so well displayed as in his own home. In conversation he was learned and brilliant; as an entertainer he was most hospitable; while to his faithfulness as a physician the enthusiasm and affection of his patients, commanded by him to an extraordinary degree, are his highest tribute.

Both to his friends at large and, more particularly, to his fellow-members of this Association he has left a place which can not be filled.

#### C. W. CHAMBERLAIN, M. D.

Dr. Charles Walter Chamberlain died at his home, in Hartford, Conn., having just passed the age of forty. He was a native of Providence, R. I., and received his academic education at Brown University in that city. He took his medical degree at the College of Physicians and Surgeons, New York, in 1871. He quickly attained to a prominent position in the profession in Connecticut, having settled in Hartford, and for eleven years he was the secretary of the Connecticut Medical Society. At the time of his death he was the president of the Hartford County Medical Society, and one of its delegates to the American Medical Association, and was also the secretary of the State Board of Health of Connecticut, a position which, according to our information, he had held since the organization of the board. He was much interested in public sanitation, and his monthly reports have been extensively quoted. As an individual, too, he had made frequent contributions to the medical press. Although he was a general practitioner, Dr. Chamberlain gave special attention to laryngology during the latter years of his life. He attended the last annual meeting of the American Laryngological Association, held in New York last May, and seemed then in poor health, his appearance indicating, what afterward developed, chronic Bright's disease. Dr. Chamberlain was not only of solid repute in his profession; he was also justly esteemed for the manliness of his personal character.

## REPORT OF THE LIBRARIAN.

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THE Library of the Association was transferred to the librarian last December. It was found to contain 12 bound volumes and 133 pamphlets. On the 1st of March of this year a circular was issued calling for further contributions to the library. This was sent to all the Fellows of the Association and about three hundred other physicians, both in this country and in Europe, who are known to be more or less interested in the special field of laryngology.

In response to this circular, 13 bound volumes and 231 pamphlets have been received. In many instances the donations were accompanied by letters containing lists of publications which could not be donated, inquiries in reference to the Association and its library, and promises of future assistance in the matter of contributions to the library.

It seems but reasonable to ask that the published records of the Fellows of the Association be deposited in the library. It is the only library devoted to laryngological literature, and, if it can be made fairly complete, it will not only prove of great service to workers in this field, but will also serve as an additional evidence that the Association is an active, working organization.

Of course, without the means with which to make purchases, the library can not be made complete. But it is certain that it can be made of very great value if the Fellows and friends of the Association will take an active interest in its formation.

Many of the best writings and most of the recent contributions in the department of laryngology are in pamphlet form. It is only by great labor and the consumption of a large amount of time that such material can be gathered by an individual for himself. Much time and labor can therefore be saved if every writer on Diseases of the Upper Air-Passages will send his publications to the library of this Association, where they can be consulted by all interested in this department of medicine. Self-interest alone will naturally prompt authors to assist in the collection of all such material at one point.

Appended to this report is a catalogue of the library, which now consists of 25 bound volumes and 364 pamphlets.

Respectfully submitted,

THOMAS R. FRENCH, *Librarian.*

*Addendum, March 1, 1886.*—Since the above report was presented, 9 bound volumes and 139 pamphlets have been received, and their titles entered in the catalogue. The library therefore now consists of 34 bound volumes and 503 pamphlets.



# CATALOGUE OF THE LIBRARY

## OF THE

### AMERICAN LARYNGOLOGICAL ASSOCIATION.

BY THOMAS R. FRENCH, M.D.,  
LIBRARIAN.

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