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American Laryngological Association

Forty-second Volume

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OF THE

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OF THE

American Laryngological Association

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MAY 27, 28, 29, 1920

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TRANSACTIONS OF THE FORTY-SECOND ANNUAL CONGRESS

OF THE

AMERICAN LARYNGOLOGICAL ASSOCIATION

HELD AT

BOSTON, MASS., MAY 27, 28 AND 29, 1920

REGISTRATION

The Forty-second Annual Congress of the American Laryngological Association was called to order Thursday, May 27, 1920, at 10 A.M. by the president, Dr. Norval H. Pierce, at the Harvard Medical School, Boston, Mass. The following Fellows enrolled during the session:

BARNES, HARRY ALDRICH
BIRKETT, HERBERT S.
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LOGAN, JAMES E.
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MOSHER, HARRIS P.
PACKARD, FRANCIS R.
PIERCE, NORVAL H.
RANDALL, B. ALEXANDER

Renner, W. Scott
Rhodes, John Edwin
Richards, George L.
Richardson, Charles W.
Shambaugh, George E.
Shurly, Burt R.
Skillern, Ross H.
Sluder, Greenfield
Smith, Harmon
Swain, Henry L.
Theisen, Clement F.
Wilson, J. Gordon

ADDRESS OF WELCOME

A. LAWRENCE LOWELL
PRESIDENT, HARVARD UNIVERSITY

WHEN one who is totally ignorant of a subject comes to address those who know all about it, at least all that is possible to be known, it is of great advantage to have it clear from the start that ignorance can contribute nothing. Nevertheless, one can speak as a layman who cannot help marveling at all that appears to be necessary for the profession to know at the present time, and one can be deeply interested in the process.

Looking at American professional men and comparing them with men of the same class in Europe, one is brought to the conclusion that the American specializes more and specializes earlier than does the European. The men in other countries are supposed to know more along general lines as well as the subject of particular study. This is due to delay in all subjects. It takes men a longer time here to fit themselves for medicine than for other subjects, because the amount of material they have to command is very much greater. One looks forward to the time when a simplification will take place; when some particular form of information will make way for the advent of general principles that simplify the processes of education and which will permit of the command of a larger variety of facts than could be available through isolated factors. These processes occur from time to time. Thus the bacterial theory of disease has simplified a great many problems which otherwise would have remained separate and complex.

The whole process of medical education is interesting to one who sees it as part of the total plan of education for a large number of professions. In the other professions, now, there is getting to be somewhat of a feeling that it is important that a man should be trained to be a citizen as well as a professional man. The training for the legal profession should involve many things besides actual study of law. A man should know what his relations are to his fellow-men, and in a

general way what man has done on this planet. The engineer needs to know more than mere engineering and to enlarge his interests in life. In medicine it is all the other way. Medicine is a field of specialists.

A man is obliged to study this, that and the other before he enters a medical school, and that is wise up to a certain point; but here lies the difficulty: Our men are entering the profession later than before. If it is true that there is a time for everything: a time to be born, a time to wed, and a time to die—and it is generally conceded to be a mistake to do any of these things at the wrong time—then it is especially true that there is a time to enter a profession. There is a period when men acquire knowledge more easily and launch out with more energy and force into their career. I feel that men today are entering too late, especially into medicine, because medicine takes longer. The amount of preparation required at the present time can be carried so far that it will make it impossible for men to enter at all before forty years, and then it would be useless. As it is, they do not enter until very near thirty, much older than in other countries.

Why is it that our men enter professions at a later age than men in any other countries in the world? Our men are delivered at college later than men in other countries, in the same stage of education. Secondary education is completed at a more advanced stage, and our completion of secondary education is considerably behind that of Europe. Men enter college at eighteen, and the amount of information they possess could easily be attained at sixteen years. Medical men always advise against pushing boys and girls as rapidly as they might be pushed, and the whole weight of the profession is on the side of slowing down of education. Family physicians are constantly saying, "Don't push your boy too hard." I heard a physician—a bachelor, by the way—say he could not keep his nieces at school because the family physician advised letting them stay at home. Physicians say a child can be kept out of school until ten years, and that after that the child can catch up all that is necessary for it to know. Schools, after all, are a mechanical arrangement. If you have a sausage factory, and you put the pig in at one end, sooner or later the sausage is turned out at the other. The schools have the same type of process. In European countries the child goes to kin-

dergarten at three and learns to read. Here the child goes at five and learns to read after that. Those two years are never made up. Our education begins too late. The doctors slow down education up to the age of high school, and the profession, as a whole, suffers from this result, because it means that they gather their own recruits later.

Every man must be excused for riding his hobby for a time, so that I am going to indulge mine on this occasion. I see men all the time coming in at eighteen and doing work which they were capable of doing at sixteen. I believe it is better to put the work a little above a boy's head and let him reach up to it. It is a fact that our boys are learning to make boats at an age when their grandfathers were commanding ships that sailed around the world. The war showed us that our boys could rise to anything that occasion required of them, and I believe that they are capable of commencing college life at sixteen. The mind is more active at twenty than at twenty-five.

However, my purpose today is not to give you my views on problems of education but to extend to you a very cordial welcome to Harvard University and to express the pleasure I feel at having your Association visit us, and to hope that you will have a very successful meeting.

ADDRESS OF THE PRESIDENT

NORVAL H. PIERCE, M.D.

SOME time since, in reading over the *Transactions* of our Association, I was impressed by the fact that the progress of laryngology was so inseparably connected with the life of our Association that one might justly compile a history of laryngology within the years between 1867 and the present time from the *Transactions*. And this is rather remarkable when we take into consideration the fact that the membership of this Association up to the recent past has consisted of so few men. It has stood as a judicial body, sifting the wheat from the chaff in laryngology and stamping with its approval that which was mature and proved.

A creditable commentary this on the quality of our membership, and one standing in the position that I for the present occupy, must be filled with a real sense of unworthiness when he feels that he is grouped with the brilliant galaxy of medical men who have made up that honorable membership.

It must be said, in all frankness, that a policy of exclusiveness has been continuously exercised in the selection of those admitted to membership in the Association. They have been selected not only because of their scientific qualifications, but because of their social and ethical and personal qualifications also, and this policy has no doubt stood as an impregnable wall against the quackery which has so easily preyed upon our peculiar domain.

Many regard our Association as a kind of aristocracy, the last promotion that one may receive for work well done in the practice of medicine. I felt this when I was inaugurated a member. I shall never forget how completely I was charmed by the personality of what we might call the Baltimore group. Since my entrance into the specialty of laryngology I had admired to an extravagant degree the literary style and historical acumen of Mackenzie. I will admit to a certain awe when I was presented to him, which melted away

into an intimate admiration before the charm of his cordiality. Dr. Delavan did and still does inspire me with his kindly elegance.

If ever an *esprit de corps* existed among a body of men in the finest manner, it has existed in our Association. But I believe that we stand on the threshold of a new period in our development. And this is not strange. In all the domains of human endeavor a great change is taking place in social, scientific and economic life. We will no longer be content with things as they were. The men who have served in the army have been face to face with reality, and many phases of life as they existed in the past, and which they accepted as a matter of course, seem now to be unsatisfactory and futile. There will be less self-satisfied conservatism and smug complacency.

There is a desire in the air for new and more productive effort, and that which interferes or tends to check the fulfilment of that desire will sooner or later be swept aside.

In the past our people have been characterized by a spirit of haste that has caused our young men to be satisfied with the most superficial acquaintanceship in the fields of knowledge. Dr. Parkings, executive officer of the Rhodes Trust, in a recent article on the Rhodes Scholarship, points to a markedly high proportion of failures on the part of American candidates to pass the very moderate examinations required for entrance to Oxford University, and suggests that this high percentage of failure is to be found not only in the classical languages but in the so-called modern subjects as well. May it not be true that the American student resents the demand for the close and long-continued application necessary to an accurate knowledge of any difficult subject?

The examination of candidates for admission to the army medical corps in the department of laryngology and the experience with many of them after their admittance disclosed the fact that a very large percentage of men who regarded themselves as laryngologists were totally unqualified.

We have found in our teaching institutions an appalling lack of enthusiasm on the part of the young men to begin at the bottom and gradually rise by slowly building up a foundation composed of the fundamentals, thoroughly schooling themselves in diagnosis, the indications and counterindications for operations. Their ambition is to bound, as it were, in one leap, after a few months, to the operating table and scalpel.

The postgraduate medical schools, as they have in the past existed, with their six weeks' course and their large illuminated certificates presented at the end, have been instrumental in perpetuating this deplorable state of unpreparedness.

It is not an unusual occurrence for men to come to our clinics in Chicago with the request that they be instructed in laryngology and rhinology. Many of these men, after questioning them as to their desire, are found to conceive a successful specialist as one who is more or less perfected in three operations—tonsillectomy, septum resections and turbinectomies.

The address of my predecessor concerned itself with a correction of a part of this evil condition, but only a part. He paid most attention to the proper education of specialists. The achievement of that end would result in the protection of the public against ignorant practitioners—a consummation devoutly to be wished. But we must go further: we must protect laryngology against itself. I mean that we must at all hazards widen the scope of those who practise within the confined limits of laryngology.

How is this to be accomplished?

First, by the preliminary education of specialists. In presenting my views on this subject I cannot do better than quote from a report by a committee composed of the heads of the departments of otolaryngology of three universities in Chicago, of which I was a member.

Graduate Work in Otolaryngology

"The need of better preparation and training of physicians who limit their practice to otolaryngology is admitted.

"The present system of instruction in these departments in the postgraduate medical schools of this country is inadequate and inefficient for various reasons, among which is the fact that these schools lack the essential organization and laboratory and clinical facilities necessary for the training of such specialists. Almost without exception their organization is on the lines of the old proprietary medical schools. Their force of instructors is in most cases insufficient and sometimes incompetent. Their courses of instruction are incomplete and altogether too short, and in general their standards of requirements are too low.

"It is our opinion that an improvement in this situation is necessary and that it can be best accomplished here by a proper combination of the laboratory and clinical facilities of the medical department of our universities, together with the coöperation of the competent men who are working in these laboratories and clinics, and possibly of some who are not at the present time connected therewith.

"It is agreed that it would be advantageous for a person who desired to specialize in either of these departments to devote two or even three years of study and training in either one of them, and if any have this laudable desire it should not be discouraged. Suitable degrees, such as S.M. and Ph.D., might very properly be offered by universities to encourage such advanced work.

"But comparatively few will have the time, the means or the inclination to pursue such an extended course, and yet they desire to fit themselves as good practitioners in their specialty. For such as these we feel a shorter course might be given, with enough work on the fundamental subjects of each department, combined with properly conducted clinical courses, that would fit them to make a start as sound practitioners in these specialties.

"With this in mind we have agreed upon what we consider should be a minimum course of study and training for preparation in these specialties.

Requirements for Entrance Upon the Special Study of Otolaryngology

"Graduate students entering upon this course of special study must show that they have received the degree of Doctor of Medicine from acceptable institutions (*i.e.*, those in Class 'A' of the American Medical Association), and if graduated after 1920 must show that they have had one year's experience as intern in an approved hospital or as assistant in a laboratory in an acceptable medical school. This requirement might be waived if, in the judgment of the dean or a council on requirements, an individual gave evidence of proficiency in scholarship and training that would enable him to satisfactorily pursue the courses required.

"A minimum of one year's study in the various branches of the department of otolaryngology is considered necessary to fit such a candidate for practice of that specialty.

"The program of the year of special study in each department should be so arranged that six months, or twenty-four weeks, should be devoted to fundamental subjects, and six months, or twenty-four weeks, should be allowed for clinical subjects.

FUNDAMENTAL SUBJECTS.—Six months, twenty-four weeks, full time.

1. Advanced gross anatomy of the head and neck, including:
   (*a*) The paranasal cavities.
   (*b*) Epipharynx, mesopharynx, hypopharynx.
   (*c*) The larynx, esophagus, trachea and bronchi.
   (*d*) The three divisions of the ear.
   (*e*) The surgical relations of the temporal bone.
   (*f*) The venous sinuses of the brain.

2. Advanced histology of the nose, throat, middle and internal ear. The student should make his own preparations.

3. Embryology of the nasal cavities and paranasal cavities; the pharynx, especially of the tonsils and epipharynx as well as the middle and internal ear.

4. Physiology of audition, olfaction and voice.

5. Physics of sound.

6. Neurology.

7. General pathology.

CLINICAL SUBJECTS.—Six months, twenty-four weeks, full time.

1. Special pathology of the nose, throat and ear, including bacteriology.

2. Otoscopy, rhinoscopy, anterior and posterior, indirect laryngoscopy, pharyngoscopy, including the proper methods for examination of tonsils.

3. Direct laryngoscopy and broncoscopy and esophagoscopy, suspension laryngoscopy.

4. Functional tests of the middle ear, cochlea and static apparatus.

5. Clinical diagnosis.

6. Treatment:
   (*a*) Local.
   (*b*) General.
   (*c*) Surgical.

7. Operations on the cadaver.

8. Skiascopy.

9. Relation of the ear, nose and throat to:
   (*a*) Internal medicine.
   (*b*) Neurology.
   (*c*) Pediatrics.
   (*d*) Industrial medicine.
   (*e*) Public health.
10. Preparation of history and records.

"The proper apportionment of time for each of these subjects could be worked out later, but it might be on the basis of six hours per day, or thirty-six hours per week. A definite special time could be allotted to courses that required lectures and demonstrations, whereas time devoted to laboratory or clinic work might easily exceed the amount stated above.

"The student should be directed in his reading and encouraged to familiarize himself with the best literature of the subject. If he has not a reading knowledge of either French or German he should be urged to acquire knowledge of one or preferably of both languages. He should be encouraged to make intensive study of some subject, with a view to engaging later in investigative or research work during his clinical year."

It was recommended that, as a maximum requirement to complete a full rounded-out preparation for special practice, three full years be spent in which the work pursued should be analogous to that done in graduate study in other departments of the university leading to the degree of Ph.D.

Fundamentals in such a course should be the successful completion of an original piece of research.

It was further recommended that assistance, in the form of fellowships, be provided for students pursuing this work, as is now being done for students in other fields of study who are working for a similar degree.

To prevent a narrowing of vision of those occupied in special fields there is nothing so helpful as association with other branches of medicine. Especially is this true as regards neurology, embryology, comparative anatomy, pathology, histology, bacteriology, physiologic chemistry and internal medicine.

The pure specialist is, of necessity, one who is doomed to atrophy.

Experience in army base hospitals, with the intimate coöperation of all the departments composing the staff, has shown the invigorating and broadening influence of such coöperation.

Investigation and research: Thomas N. Vail, the distinguished organizer of the telephone system, said: "Research, investigation, experiment, comprehension and thoroughness are now necessary to hold in position any industry or utility enterprise."

If this is true of industry and enterprise, how infinitely more true is it as regards medical specialism.

The programs of our various medical societies, when viewed from the standpoint of the advancement which of necessity occurs as the result of investigation and research, must be characterized as decadent. They vary little from the qualities which characterized the program of twenty to thirty years ago. There is a slight improvement, no doubt, but it is not marked. It is time to break away from this well-worn path, and in order to break away it is necessary that the practising otolaryngologist shall broaden his field by entering those border-line provinces which were enumerated above.

As an example, we will take the question of focal infections. To my mind the viewpoint of many laryngologists regarding this subject varies from the pathetic to the absurd. Here we have involved the stupendous problems of susceptibility and immunity, probably of endocrinology, and yet some men have so simplified the problem as regards the tonsils that they are satisfied by the formula that all tonsils are better out than in.

Again, as to the causation of ethmoid disease, in the light of the great work just completed by Whitmaack, of Jena, on the normal and pathologic pneumatization of the mastoid, many diseases of the accessory sinuses which continue through life may be due to an inflammatory process interfering with normal development in early infancy or childhood. Yet, though these problems involved in disease of the paranasal sinuses cry for solution, we occupy most of our time in devising various modifications of operations to annihilate them.

If I may depart a little from our own specialty and direct your attention to otology, the great question of the tracts leading from the semicircular canals to the higher centers demands investigation, and I believe that this question can be settled best by the otologist who is also a neurohistologist.

In short, unless we advance by broadening our field we are prone to degeneration.

In scanning the membership of our Association I find the names of many of the heads of departments of otolaryngology in our university medical schools. By a concerted effort of these men they could, without doubt, hasten and continue the advance in our specialty. As the most honorable body of specialists in our specialty this Association should so activate itself in this direction that this betterment would be assured continuance.

I am sometimes fearful that the American Laryngological Association is being regarded by many as an elysium where effort ceases. Why should the newcomer work when he has attained the most exalted position possible? We must arouse ourselves from the complacency of the past and by ceaseless effort endeavor to advance the standard of laryngology.

To this end I would suggest that the methods of program preparation be radically altered. It is too much to ask one man, each year, to solicit papers, which are usually hastily prepared, from members of the Association. I do not believe any great improvement in the quality of programs can be expected under the present plan of preparation. I believe it imperative that a Program Committee, as a part of the Council, be appointed, the life of which council or committee shall not be for a year or two but for five years. This committee should have the power of assigning subjects for investigation and research a year or more in advance, and programs should be prepared at least a year in advance. It should act as the clearing house of the Association in its scientific work.

Problems for investigation and research should be discussed by this council, and one of its principal functions should be the promulgation of that idealistic spirit which, unsatisfied by the flesh-pots of commercialism that so poison our civil life at the present, seeks satisfaction in a higher sphere of endeavor. It should lend its aid and influence in securing grants for research workers and investigators.

I hesitate in an official address such as this to discuss the combining of other societies with the American Laryngological Association; yet I believe that this is one of the inevitable developments of the future. We see now here in Boston three societies, extending their conventions over a period of nearly ten days, all active and high-

aiming societies. Does not this appear to be an economic waste of time? There will scarcely be in the future many men who split the practice of medicine into otology and laryngology exclusively. The natural tendency is to combine the two.

Fortunately, the Otological Society has lately held its meetings in close proximity as to time with the Laryngological Association. It would not be beyond the bounds of propriety to suggest that these two societies enter into some kind of an affiliation by which their programs and times of meeting might be brought into relationship.

It is an inspiration to stand within the beautiful walls of this great medical school. We in the West look to Harvard for much of our inspiration. It is with great satisfaction that I can report to you a signal advance in the medical schools of the Universities of Chicago. Rush, the medical school of the University of Chicago, is in process of erecting a new group of buildings for the teaching of medicine with paid instructors. Northwestern has started a drive for millions wherewith to erect a new set of buildings. The medical school of the University of Illinois has purchased a block of ground and will begin within a few weeks the erection of a group of buildings. One will be a new Illinois eye and ear infirmary, with adequate modern facilities for teaching the undergraduates, and where graduate instruction can be carried out according to the plan outlined above.

In closing, will you permit me to pay a tribute to the recent dead of our Association; especially to one, Dr. Christian R. Holmes, who was most dear to me.

I have the honor of declaring the forty-second session of the American Laryngological Association now open for official business.

RETENTION CRYPTS IN THE INFRATONSILLAR NODULES AS HARBORS OF PATHOGENIC BACTERIA

THOMAS R. FRENCH, M.D.

It is well within the limits of accurate statement to say that only meagre and incidental attention has been paid to the presence of chronic infectious material in the chains of lymph nodes which are variously known as the infratonsillar or lingual nodules, and the lateral pharyngeal columns. As, however, the tonsilloscope, acting as a sleuth, has, during the past few months, made the illuminating disclosure that when associated with diseased tonsils those structures are seemingly invariable pathogenic culprits, we gladly avail ourselves of the privilege of reporting to this body of medical scientists the results of a clinical study of such lymphoid developments, in order that our findings may be subjected to a searching review.

Our especial attention was drawn to the infratonsillar nodules in tonsilloscopic studies *in situ* of the inferior lobes of pathological tonsils, including a few which had been permitted to remain after tonsillectomies. Early in those clinical studies the thought dawned upon us that the tonsil lamp was making extraordinarily frequent disclosures of the presence of disease in lymphoid structures which, while they often appeared to be a part of the inferior lobes, must, because of their extent, really lie below the tonsils. After that impression had recurred a number of times in examinations of tissues of a similar character, and the reason for it had at last been made clear, we awoke to a realization of the existence of a seeming fact that upon the lateral walls of the laryngopharynx and the base of the tongue, between the tonsils and the level of the epiglottis, a broad field of disordered lymphoid tissue was lying invitingly open for exploitation. What then seemed to be true has since proved to be so. The tonsilloscope must, therefore, be regarded as the respon-

sible agent in detecting and exposing those germ-laden menaces to health, for that little instrument of precision has led us to at least the beginning of a knowledge of common and often very extensive harbors of infectious material which of necessity must be reckoned with.

About all that is said of this tissue in text-books is that it is a chain of lymph nodes on the lateral walls of the laryngopharynx which is continuous with the various lymphoid aggregations of the nasopharynx, and which in common with all other lymphoid tissue in that region is susceptible of inflammatory hyperplasia. Harrison Allen,[1] in his *Human Anatomy,* says of it: "Extending downward in the tonsillar space below the tonsil are scattered a few pea-shaped bodies which resemble the tonsil. These form the infratonsillar glands."

Jonathan Wright,[2] in his masterful descriptive writing on the minute anatomy of the mucous membrane of the pharynx, says of the chains or lines of lymphoid tissue connecting the various tonsils: "In childhood the lateral lymphoid development is infrequent. In adults it develops as the result of inflammation. 'Waldeyer's ring,' as applied to the disposition of the lymphoid tissue in the throats of adults, including the faucial, lingual and pharyngeal tonsil, is connected by a line of lymphoid deposits obviously due to the pathological activities in their inception."

The above part description undoubtedly refers not alone to the chain of infratonsillar nodules but also to those lines of small lymph nodes which extend from the fossa of Rosenmüller, along a part of the inner edges of the posterior palatine arches, to the pyriform sinuses, and which in an inflamed or enlarged state are often seen in the throats of adults. With those lines or chains this study has no relation. It deals only with the chains or nodules lying on the lateral walls of the pharynx and the base of the tongue directly beneath the faucial tonsils.

Barnes,[3] in his classical work on the tonsils, says of the lymphoid nodules of the posterior and lateral walls of the pharynx: "They

1 Allen: Human Anatomy, 1883.
2 Wright and Smith: Diseases of the Nose and Throat, 1914.
3 Barnes: The Tonsils, 1914.

often become hypertrophied without causing symptoms. This is especially true in children and adolescence after the removal of the faucial and pharyngeal tonsils." Such hypertrophy he considers nearly or quite normal. He approaches nearer to the state of affairs as we find it when he writes the first sentence of the following: "Occasionally these nodules become the seat of chronic infection with secondary involvement of the cervical glands, the joints or the heart. More often they cause no trouble or are the distinctive feature of the local condition known as chronic granular pharyngitis."

Soon after the tonsilloscope had made its first disclosure, we transferred our study to the operating clinic in the hospital. We were then, quite naturally, in some doubt as to the extent to which a surgical invasion of that region would be justified, for the indicated tissues lay upon a path that was practically untrodden. The tonsilloscope was, however, insistent and its signs had never failed us, and so we made the venture. In our first operative efforts we must confess to a feeling of considerable trepidation, especially because of the knowledge that an elaborate venous network existed under the mucous membrane in that neighborhood. Not being at all certain that a nodule could be detached from its bed as an entity, or that underlying tissues would not have to be removed with it, we approached the tempting masses gradually and for a time hesitatingly. In the first actual removal of nodular tissue, which was from the throat of a girl, aged seven years, a section a quarter of an inch in length was enucleated with the tonsil, and in that short tonsillar appendage three collections of pus-like debris were found. And in conjunction with that revelation we were cheered by what seemed to be another, of only slightly less importance, that on the under surface of the appendage there was a smooth, limiting membrane which was manifestly a section of a fibrous capsule. The double display was, naturally, quite sufficient to stimulate thought for devising means to secure the removal of the whole of the structure, and when that had been accomplished and many entire nodular columns had been enucleated and their contents examined it was made wholly apparent that here was a hidden, but probably common, source of infection which no doubt had been responsible for the inception and continuation of physical ills which had long baffled understanding. And it also was made clear that after we have become skilled in

removing those masses of disordered tissue within the limits of safety to the patient we will have no more right to permit such tissue to remain attached to the throat in our tonsil operations than we now feel we have the right to perform a tonsillotomy, or even an incomplete tonsillectomy, when the tonsils are seen to be infiltrated with the products of past attacks of acute inflammation.

After we found that entire nodules could easily and safely be peeled out of the throats of children, we submitted many specimens for laboratory examinations to Dr. Archibald Murray, professor of pathology in the Long Island College Hospital Medical School. He reported later that they had "well-developed fibrous capsules and a few crypts, but did not contain pus." The crypts referred to were those which are commonly grouped at one end of the structure, have large mouths and shallow cavities and can readily be seen by the unaided eye. The shallowness of the crypts and their round, wide-open mouths made it seem highly improbable that they could act as retention sacs, and, therefore, as Dr. Murray was unable to find pus in any of the specimens he examined, we were at a loss to understand the tonsilloscopic sign which proclaimed the presence of numerous collections of necrotic material which was, apparently, quite as irritating to the tissues as pus. An examination of those specimens in the external tonsilloscope before they were sent to the laboratory showed what we believed to be superficial abscesses, as each of the closely set collections of foreign material lying near the surface was surrounded by a zone of hyperemia such as is always seen surrounding abscesses in other lymphoid tissues. Despite the positive pronouncements of the tonsilloscope we did not feel justified in continuing the removal of nodules until a solution of this vexing question could be found. Indeed, we were in some doubt as to whether it might not be possible that the code of the tonsilloscope which had never failed us in the tonsil would fail us when applied to fully developed lymphoid tissue in the laryngopharynx. Our faith, though somewhat shaken, was happily not enough so to prevent our making further and extra painstaking direct inquisitorial examinations of the lingual branches in several adult subjects, for the purpose of detecting, if possible, the secret underlying the conditions which would have meant pus elsewhere but which evidently did not mean pus here.

Those examinations were made with the tonsilloscope and also with a direct illumination of the nodules from a concentrated beam of an arc light, the field of observation meanwhile being magnified with a large warmed lens held in front of the mouth. While the nodules were glowing with the light of the tonsil lamp or were being directly illuminated and magnified in the way just described, numerous small slits and pin-point spots, flush with the surfaces, were seen upon the tops of the lymphoid bodies. With the aid of a very thin bent probe, or searcher, those slits and spots were shown to be minute openings to crypts of varying sizes, but often relatively very large, and which at once were proved to be veritable traps to the unwary ingesta of secretions gravitating downward from the mouth and throat, for each of them was filled, and some of them were distended, with necrotic material which could easily be culled out with a curette. Had it occurred to us earlier that heretofore overlooked pockets, or crypts, might possibly be found in those bodies we could have detected them in the small enucleated specimens which had previously been removed from the throats of children—but thought is often a laggard.

The constant presence of pathogenic bacteria in the crypts of the nodules has now, seemingly, been established, and those tissues, therefore, constitute still another field to which we must look for possible sources of chronic systemic infections.

Anatomy, Pathology and Bacteriology of the Nodules. The following observations on the anatomy, pathology and bacteriology of the infratonsillar nodules are based upon studies of forty-three enucleated nodules, studies of all the nodules at all ages *in situ* and also upon numerous facts gleaned from curettage of the crypts as well as from many cultures made from the cryptic contents.

Except in broken chains and in minute form the nodules are not present in a state of health. Their presence in continuous lines or solid columns is an expression of a pathologic state. The four tonsils are constant structures. The nodules are constant only in minute form, but the fields, or pathways, over which they may develop, almost as if they were new growths, are definitely mapped out. The extent to which those fields, or pathways, may be occupied by the nodular tissues depends largely upon the amount of and the degree of irritation occasioned by the foreign material deposited within

them. When fully developed, which is not until early adult life, the nodules appear as represented in Figs. 1 and 2. We believe that a clearer mental picture of the site and possible extent of those structures will be obtained from a glance at the drawings than could be conveyed by a prolixity of description. If the nodules could be viewed from the back of the neck their appearance, when fully developed, would suggest a *bas-relief* of a rope of lymphoid tissue garlanded around the base of the tongue and hanging over the tonsils as supporting rosettes—their free ends depending perpendicularly from the supports. As is also true of the four tonsils they seem like foreign structures, for they are set upon the submucosa in much the same way that a plaster form is set upon a ceiling. When their hoods of mucous membrane are severed at their points of attachment to the subjacent tissues they peel off almost as readily as the skin of a peach from the fruit.

The nodules are of a piece with the tonsils, as their underlying capsules are a continuation of the capsules of the tonsils (Fig. 5, *d*). The mucous membrane covering the nodules is attached to the lower edges of the inferior poles of the tonsils, but the loosely attached ends of the lymphoid bodies extend upward to, and not infrequently slightly overlap, the under surfaces of the posterior lateral halves of the inferior lobes.

It is now apparent that the structures commonly spoken of as infiltrates or recurrent tonsils, which appear in the tonsillar fossæ after the removal of the faucial tonsils with their capsules, are really nothing more than extended and expanded ends of the nodules. They contain crypts and are occasionally, as elsewhere in the nodules, the cause of localized sore-throat from minute acute septic processes in one or more of the crypts.

Later and more extended studies following the removal of the nodules of adults may, of course, modify our views, but from our observations thus far it appears that the pharyngeal or vertical nodules are to be found fully formed, but varying in length and thickness, in all subjects above six or eight years of age possessing tonsils which are to any degree diseased; that in subjects possessing tonsils which are extensively diseased, in addition to the pharyngeal nodules, the lingual nodules become more or less prominent in early youth and increase in size as the years run on; that the bases of the upper sections of the pharyngeal and lingual nodules become fused

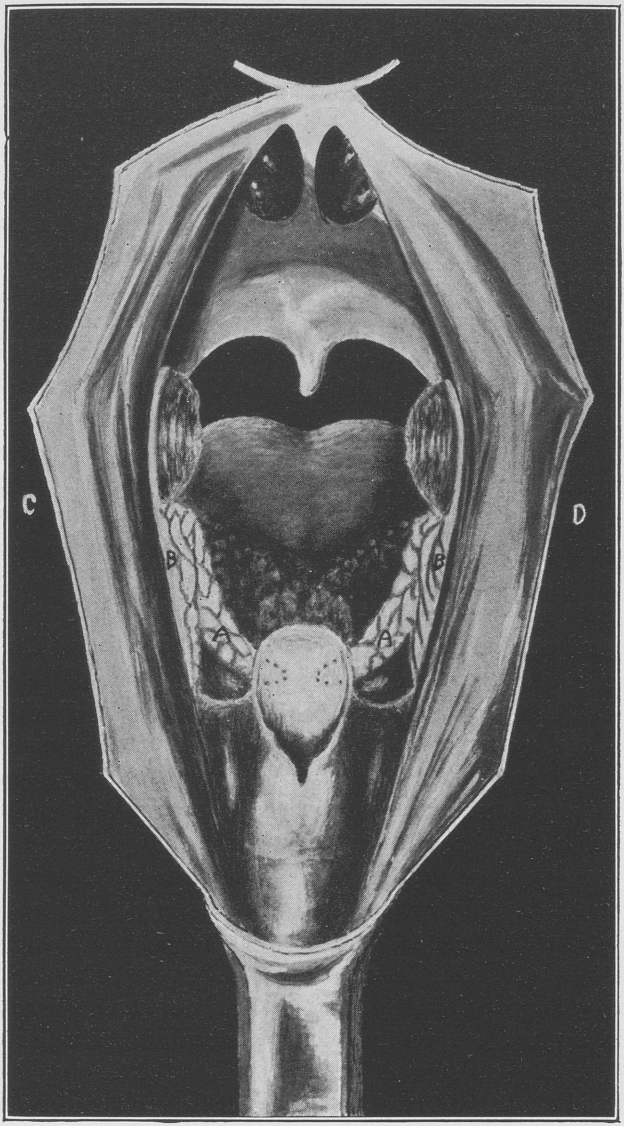


FIG. 1.—Diagrammatic drawing of the pharynx, with fully developed nodules of adults, as it would appear if laid open and viewed from the back of the neck. *AA* are the lingual and *BB* the pharyngeal branches of the infratonsillar nodules. On the side of drawing marked *C* the upper ends of the branches are seen to be blended into a common trunk. The trunks have common capsules which with the capsules of the branches are continuous with the capsules of the faucial tonsils. The looped lines on the side of drawing marked *D* show the varied lengths of complete pharyngeal nodules removed from children and youths before the trunks and lingual branches were developed. The dotted lines on the epiglottis indicate the positions of the free ends of the lingual branches on the base of the tongue just above the glosso-epiglottic fossæ.

into a common trunk with a common capsule, so that then it would seem proper to regard the nodular mass as having a trunk from which the pharyngeal and lingual branches are given off. It therefore would seem to be a fact that while in late childhood and youth, in association with diseased tonsils, there are always pharyngeal nodules which later may become branches, the lingual nodules are always branches, for they do not exist without trunks made by their junction with the pharyngeal nodules. The lingual branches are apparently developed in youth, and then only in association with extensively diseased tonsils. The only exception to the presence of developed lingual branches in association with extensively diseased tonsils in an adult was in a college athlete, aged twenty-two years. That was a rare exception, for the number in which they have been seen to be present in association with extensively diseased tonsils, even at that age, was very large. In adults with tonsils containing detritus only we find, however, that the pharyngeal nodules are, as a rule, the only nodular developments present.

The nodules vary in size. When fully developed they may measure from a quarter to half an inch in width and thickness. In children and youth their width and thickness are likely to vary between one-eighth and three-eighths of an inch. When the pharyngeal nodules alone exist they vary in length in children and youth from a quarter of an inch to an inch and a half. In adults their free ends are usually lost to view in the pharyngo-epiglottic fold. The length of the lingual branches usually measures the entire distance between the nodular trunk and the median glosso-epiglottic fold, on each side of which their free ends apparently terminate. Occasionally, however, we find them of full width and thickness but ending abruptly, as if cut off, a third or a half of the way down the paths from the faucial tonsils, their stubby ends curling slightly away from the tongue. The same character of development in an immature state is sometimes seen in early youth, giving those branches the appearance of developing by projection from the upper ends (Fig. 5, *c*). In adults the nodular trunk usually represents a total of the combined width of the two branches. It is probably true that if the trunk and its branches were rolled into a single mass it would, in most cases of fully developed nodules of adults, comprise as much lymphoid tissue as is contained in the tonsils to which they

are attached. In many adult cases there is a half moon-shaped apron of diseased lymphoid tissue stretched from the lateral walls of the pharynx across the base of the tongue, which in bulk appears to be greater than that of both of the faucial tonsils.

A longer experience with the nodules of adults will no doubt reveal many facts which now are only suggested, but the experience we already have had inclines us to the belief that in that stage of life the nodules are, up to a certain limit, usually progressive in size as the tonsils become regressive. Even in young adults the group of nodules will occasionally be seen to be larger, and if subjected to Coolidge's method of measuring tonsils would probably weigh more, than their associated atrophying tonsils.

The nodules of children are smooth, round-topped, elongated eminences of lymphoid tissue which are rather firm to the touch. Later in life the surfaces become irregular, until in adult life they are thrown into numerous folds or flat convolutions. The lingual branches when well developed are as soft as adenoid growths, and though usually projecting from the tongue like copings, that is, with side walls and rounded tops, the surfaces of the tops looking like tufted cushions, are, in some cases, maize-like in their arrangement, when they suggest a resemblance to a line of irregularly folded tape set on edge. The trunk, which is a hinge of lymphoid tissue spanning the glossopharyngeal groove, is heavily folded into many convolutions (Fig. 5, *e*). The interspaces do not often dip deeply into the body of the nodule, but where they do they are liable to form pockets in which cheesy collections are entrapped.

It seems to us quite probable that the size and appearance of enucleated nodules will in themselves be sufficient to indicate the stage of life to which the subjects from whom they were removed belong. That is, whether they belong to late childhood, youth or adult life, but not the stage of adult life, for fully developed nodules are found in all stages of the lives of adults, including old age.

Our observations lead us to the belief that the lingual tonsil is far less frequently enlarged than the nodules which connect it with the faucial tonsils, and when it is enlarged it is very much less so than the nodules. Indeed, it seems to be a fact that when the lingual tonsil is enlarged and the associated nodules are connected with pus tonsils above the nodules are liable to be several times larger than the lingual tonsil.

We believe that the free ends of the lingual branches are much more often the cause of pressure cough in adults than is the lingual tonsil which is usually credited with it. This has occasionally been interestingly illustrated in the subjects of long-standing, irritative cough who were almost instantly relieved by the emptying of crypts in the nodular tissues in contact with the epiglottis.

Scattered over the upper surfaces of the nodules there may be anywhere from twenty-five to one hundred and more openings to crypts, the crypts themselves varying in width and depth, and we regard it as being well within the limits of safety to assume that a half, or even more than a half, of the number are retention crypts. Some of the crypts are round-mouthed and shallow and are manifestly incapable of retaining foreign material. Many of the mouths are straight or crescent-shaped slits with their lips in apposition (Fig 5, *e*), and the crypts into which they open are found to be capable of entrapping much foreign material. Still others have round mouths which are so small that they only can be seen *in situ* with the aid of a magnifying glass or can be found with a very thin searcher. The slits and small cryptic mouths are usually set flush with the nodular surfaces. Small-mouthed crypts are commonly found surmounting the eminences of convolutions and many of them penetrate the entire depth of the structure (Fig. 5, *b*). When distended this variety of crypt is capable of retaining a large quantity of debris, for while the bodies of the crypts become distended, like filled silk purses with the strings drawn, the mouths remain constricted. Occasionally, however, in a first examination the contents of one or more of the crypts can be seen to be protruding from their mouths, when it needs but a gentle touch of the curette to dislodge them from their beds. This fact suggests the probability that various crypts become ripe, as it were, from overdistention when they evacuate themselves. We have not yet seen protruding cryptic contents in subjects under thirty-five years of age, but above that age we have seen many. That the material in the crypts is irritating to the surrounding tissues and gives rise to the degree of hyperemia which led us into this investigation is clearly shown by transillumination of the lingual branches a week or so after one branch has been, in part or wholly, cleared of debris, the other branch remaining untouched. It also has been shown that the degree of prominence of attached nodules is, in a

measure at least, dependent upon the number and size of filled crypts which they contain, for in a month or so, after many of them have been emptied, the nodular structures appear shrunken and partly collapsed.

Pus is not often found in the nodules. We have opened abscesses in several trunk specimens but have not seen pus elsewhere in those structures. The necrotic tissue is practically all in the crypts, and in many of them it is so tightly locked in by the constricted mouths that it seems almost as if it were sealed in, for in order to rupture such crypts in a fresh specimen it is necessary to apply heavy pressure to the sides of the nodule.

The cryptic material may be cheesy or somewhat like candlewick, but that is not the rule, for the rule is that the debris is either pus-like in character or of a sufficiently glutinous consistency to take shape in the ring of a curette.

The infective debris in the crypts of the nodules of some adult subjects probably amounts to, or even exceeds, a quantitative equivalent of the infective debris in extensively diseased tonsils, and the pathogenic organisms isolated from the debris in both localities are practically the same. It is probable that a greater number of culture studies of the material in the crypts of the nodules will reveal the presence of other varieties of pathogenic organisms than those which thus far have been isolated, *i. e.,* the Streptococcus hemolyticus, the Streptococcus viridans and the Staphylococcus aureus. The finding of one or the other or several of those varieties in every one of the many cultures satisfied us, however, that the cryptic material was a competent and probably common source of infection.

As the lymphoid nodules described in this paper were believed to be devoid of lymph paths or crypts and also of capsules, objection has been made to their being classed as tonsils.[1] Both of the missing links have been found to be really cryptic, or in hiding, and as we now know that all the elements which characterize the faucial tonsils are, with a somewhat different arrangement and grouping, also present in the nodules, it would seem to be entirely correct to place them in the tonsil class. As they are in truth but offshoots or branches of the faucial tonsils, it may come to be a habit to speak of them as parts of the faucial tonsils instead of separate structures.

[1] Lennox Browne: Diseases of the Throat and Nose, 1899.

DIAGNOSIS. To obtain a view of the nodules and ascertain the extent of their infective contents, a tongue depressor and a single tonsilloscopic lamp, with the smallest window, are needed. With the conventional tongue depressor much can be accomplished, but the

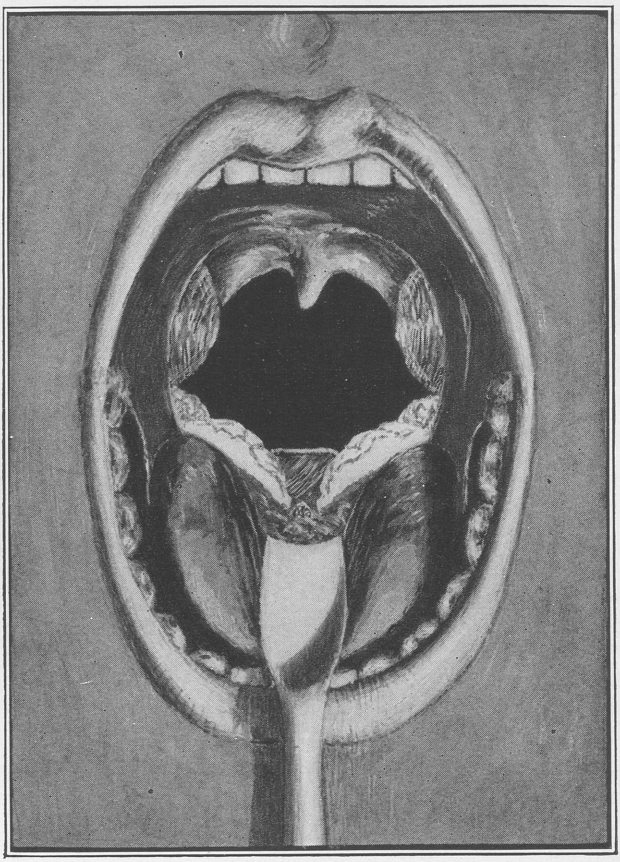


FIG. 2.—Direct view of the whole of the lingual and the upper ends of the pharyngeal branches of the infratonsillar nodules obtained by deep depression of the base of the tongue. As in Fig. 1, their upper, or outer, extremities are seen to be connected with the inferior poles of the faucial tonsils—their lower, or inner, extremities to lie directly in front of the epiglottis. The branches extend backward as well as inward and are, therefore, longer than they appear to be in the sketch. With soft yielding tongues and moderately tolerant fauces this exposé is very easy of accomplishment.

manipulation of the tongue necessary to clear a visual pathway to the part of the cavity of the pharynx containing the nodules is best effected with a special tongue-base depressor (Fig. 3), for with it soft and yielding tongues—and most tongues yield enough—can be pressed down or aside sufficiently to bring nearly all of the nodular masses into easy, direct range of vision. As is seen in Fig. 2, by depressing the tongue far back upon its base the lingual branches and the upper parts of the nodular trunks will be directly exposed. The tonsil lamp is then made to slide along behind the ridges of tissue to produce in its passage a luminous display of the pathologic

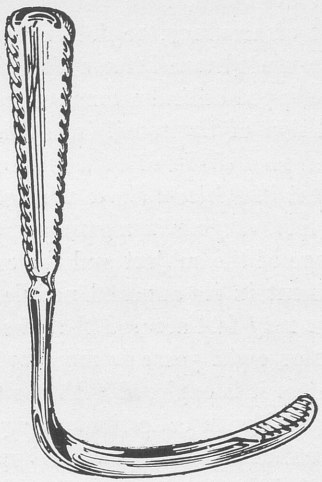


FIG. 3.—The tongue base depressor.

conditions in every part of them. (Incidentally it may be said that there need be no more hesitation in accepting the verdict of the tonsilloscope when applied to the nodules than when applied to the tonsils, for the lymphoid elements in both are identical. This color sketch[1] of transilluminated tonsils and nodules will, perhaps, assist you to a better understanding of what has just been said in regard to transillumination and also make clearer the remarks on the use of the tonsil lamp which are to follow.) When, however, an unyielding tongue or excessive faucial irritability make an extended direct view impossible, then with an ordinary depressor or the special base depressor the tongue can be pressed aside far enough to uncover the

[1] See New York Medical Journal, June 19, 1920.

upper end of a pharyngeal nodule, or a nodular trunk, to permit the end of the tonsil lamp to be slipped behind it to act as a hook with which to draw it forward into the sulcus between the tongue and the lateral wall of the pharynx. In that position, with the glowing window of the lamp pressed firmly against it, the nodule is, so to speak, cornered, and will instantly proclaim its depth of guilt by the depth of its blush. When the nodular crypts contain a considerable amount of debris the picture presented by this method of examination is not unlike that of the setting sun at the end of a canyon. If, however, the fauces are too irritable even to permit the manipulation just described, then the condition in a nodule can, with a fair degree of accuracy, be determined by ascertaining the condition in its associated tonsil, for a situation in which the lamp cannot be quickly slipped behind a tonsil is scarcely conceivable. If the diseased condition of the tonsil is extensive enough to give a uniform bright red rose shade of color in transillumination it is a fair assumption that in subjects above the age of six to eight years, filled retention crypts, varying in a general way in number and size according to the age of the subject and the extent of the disease in the tonsil, are present in its annexed nodule. If there is detritus only in a tonsil we may feel assured that the pharyngeal nodule at any age above six or eight years is more or less though not fully developed; but unless it is explored with the tonsil lamp the extent to which it is studded with collections of cryptic debris cannot be known. Transillumination will show the hyperemia caused by and surrounding the debris in the crypts, but unlike pus and some forms of debris in a tonsil, the contents of nodular crypts usually transmit light and do not cast a shadow.

The sense of touch, if a touch is permissible, will, of course, enable one to determine the approximate sizes of the nodules. This is especially true of children in whom the laryngopharynx is very accessible, but in adults the nodular trunk is usually all that we can hope to investigate in that way.

Enucleation of the Nodules, Puncture and Curettage. The key to the method of enucleating the pharyngeal nodules at any age and the nodular trunks and their pharyngeal branches in adults lies in a block moulded to fit over the angle and under the lower edge of the jaw in such a way that it will serve as a resisting wall, or outside

runway, for an undercutting scoop of the arc of the Sluder guillotine. The technic of the procedure for removing a pharyngeal nodule is quite simple. The block-mould (Fig. 4), which, as can be seen in the illustration, has an inward projection at an angle of about 20 degrees, is placed in position by an assistant whose duty it is to fit it snugly under the angle and lower edge of the jaw and then to hold it firmly and steadily. The block duty usually falls to the anesthetist. After the block-mould is in place the forefinger of the free hand of the operator is introduced into the fauces to press the tonsil firmly outward and downward upon the nodule to be removed. The guillotine, with the flat surface of the shaft in a horizontal position, is then introduced obliquely into the mouth and dipped gently downward over the side of the base of the tongue, close to the end of the forefinger pressing upon the tonsil, until the arc meets with the resistance of the pharyngo-epiglottic fold. The edge of the shaft is then pressed forward deeply into the base of the tongue as near its outer limit as possible. The arc is now pressed outward with moderate firmness in order to sink it into the tissues below the free end of the nodule, and, while maintaining the pressure of the shaft against the tongue, the arc is drawn slowly upward along the block-supported wall toward the finger pressing upon the tonsil. Upon reaching the inferior pole the upward movement of the arc is checked and at the same instant it is pressed hard against the ramus of the jaw to maintain its hold upon the stretched mucous membrane of the lateral wall of the pharynx. That membrane is highly elastic and is drawn under the nodule in ridges, like the wake of a moving hull, and put under considerable strain as the lower end of the nodule is doubled under itself by the arc. The finger holding the tonsil is then slipped down to the dislocated nodule overhanging the arc, to manipulate it into the grip of the blade of the guillotine —when after a half-minute of compression it is cut off and the guillotine withdrawn.

A pharyngeal nodule is removed after a tonsillectomy—the block-mould being in position outside of the neck—by a scoop of the arc of the guillotine upward against a resisting finger held in the lower part of the empty tonsillar fossa, where it also may be made to assist in manipulating the dislocated tissues into the grip of the blade.

We have not yet been able to decide upon the safest and most effi-

cient method of disposing of the lingual branches in adults. Those branches differ from the pharyngeal branches in several ways, the most important of which is that when they are fully formed their free extremities lie close to the orifice of the larynx. Our distinguished fellow-member, Dr. Swain, in one of his helpful and encouraging personal communications to the writer during the progress of this research work, drew attention to the presence of numerous large venous trunks lying close to the surface of the base of the tongue, under a frail basement membrane beneath the lingual tonsil.

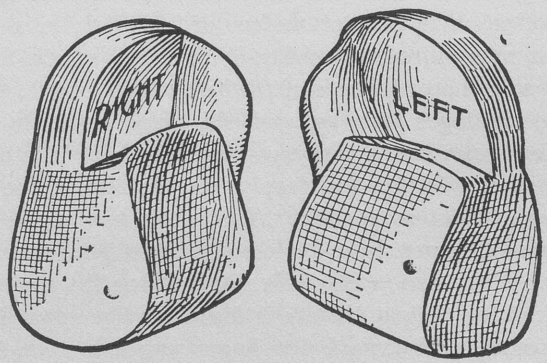


FIG. 4.—The block moulds.

We were already acquainted with the results of his dissections of the base of the tongue,[1] and doubt if we would have been deterred from enucleating the lingual branches because of possible hemorrhage from that elaborate venous network, for the employment of dull instruments only for peeling the capsules from the basement membranes would, almost certainly, have been a sufficient safeguard against that danger.

It is, nevertheless, largely because of his important disclosures of the exceedingly rich blood supply to the base of the tongue that we are cautiously approaching radical measures for the removal of the lingual branches. We have so often viewed the orifice of the larynx in a condition of edematous swelling that we are free to admit that we stand in some dread of inviting, through a possible septic heal-

[1] Henry L. Swain: Acute Diseases of the Lingual Tonsil, Tr. Am. Laryngolog. Assn., 1896.

ing, an obstruction to that constricted, single-track airway. Thus far we have emptied the crypts in those branches either by laying them freely open or by curettage, but up to the time of this writing we have not felt justified in taking further liberties in that somewhat untried-out region. While enucleation of the lingual branches with the capsules is most appealing to our ideas of completeness, it is possible that a less thorough removal of them will be quite as effective in obliterating the retention crypts, and also that the resulting wound will be less liable to inflammatory reaction during the healing process. An incision from the free end to the trunk made midway between the capsule and the upper surface would, in a fully developed nodule, undercut many crypts and probably convert the remainder into more or less wide-mouthed cups which could never again entrap foreign material. A very promising plan of accomplishing the midway severence of those tissues is to shave off their tops with the guillotine, for with it the alignment is more accurately made, compression can be practised, and if the lymphoid masses are not drawn through the fenestrum of the instrument, there is no danger of wounding the subjacent tissues or the numerous small varices which in adults often overlap the bases of the nodules. After a study of the effects of many more minor operations which we are now performing under local anesthesia, we will be in a better position to judge of the wisdom of subjecting those branches to midway incisions, or shaving, in radical operations. Still, we believe it to be more than likely that the surgical ingenuity of this group of highly endowed laryngologists will anticipate our efforts to find a happy solution of the one remaining problem.

If for the sake of securing the greatest safety to the patient the means of disposing radically of the lingual branches must be left for further consideration, there is no reason why we should not meanwhile enucleate the nodular trunks and their pharyngeal branches. The procedure for such enucleations is carried out in much the same way as that for the removal of the pharyngeal nodules already described, the principal difference being that the arc of the guillotine must, in its upward sweep, be made to break through the lingual branch at its point of attachment to the trunk. To make that possible the trunk must be lifted upward and inward with a curved seizing forceps as far as it can be made to stretch, and then be held in

that position until the arc has doubled the end of the nodule well under the trunk. The seizing forceps is then removed and the forefinger introduced to press the tonsil downward and manipulate the nodular mass over the arc and into the grasp of the blade. A little more practice will undoubtedly enable us to include the tonsil and remove both structures as one piece, but as yet we have, for the most part, been unwilling to risk the cosmetics of the fauces for the sake of enhancing interest in a specimen. If, however, before sufficient skill has been acquired to perform a one-step operation one desires to obtain a specimen for study of the link connecting the nodule with the tonsil, he can readily secure it by carrying the arc well up under the tonsil to include a part of the inferior lobe in the final severance of tissues.

Almost all of the forty-three enucleated nodular structures were from the throats of children and youths, and most of them were either lost or destroyed in the examinations necessary to determine their character. The specimens which were rescued untouched, a few of them having been photographed to illustrate this paper, will, however, convey some idea of their anatomy and variation in size as well as their relation to the faucial tonsils. Complete specimens from adults will, of course, appear much larger than any of those displayed in Fig. 5.

In all the subjects operated upon for the removal of infratonsillar nodules the somewhat surprising and altogether pleasing fact has been that the blood loss from that source during operations was negligible, apparently adding little or nothing to the drain of the tonsil and adenoid procedure, and also that there has been no postoperative hemorrhage, no deterrent effect upon recovery from the enlargement of the pharyngeal wound and no added pain during the healing process. Indeed, the clinical picture following tonsil and adenoid operations including the removal of the nodules has been the same as the familiar picture after similar operations without the removal of nodules. The above statement is based upon a "follow-up" of most of the patients from whom nodules were removed, but, of course, we are not yet in a position to determine whether there are to be late postoperative effects.

In the event of hemorrhage during or after operation, the possibility of the occurrence of which we have had constantly in mind,

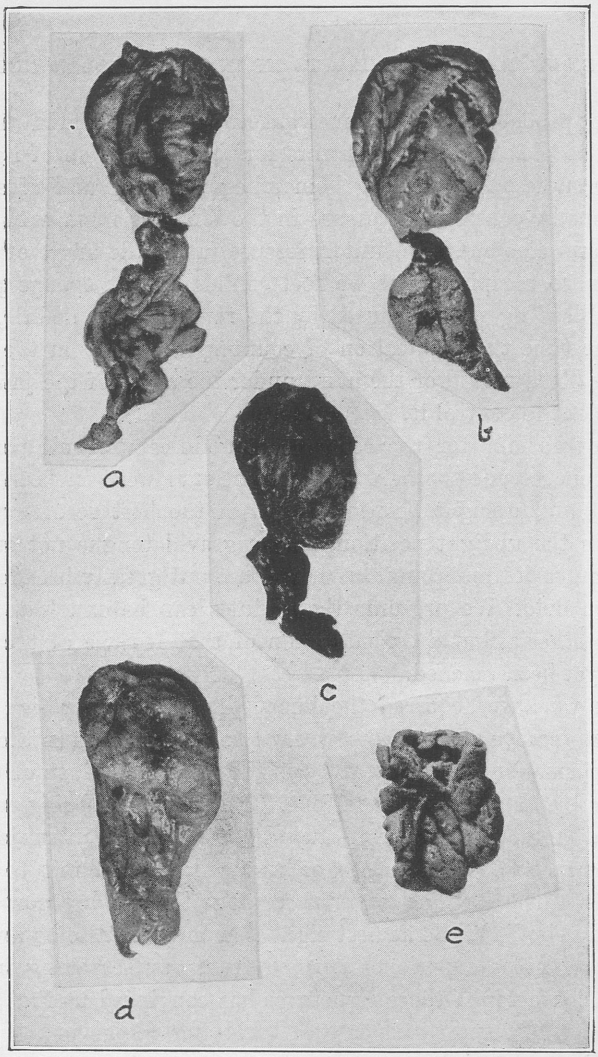


FIG. 5.—*a*, tonsil with pharyngeal nodule from lad seventeen years of age. Two step operation. *b*, tonsil with pharyngeal nodule from girl aged fourteen. Nodule laid open to show shape and size of two bisected crypts. Lateral half of one crypt broken through in preparing specimen. The nodule contains twelve retention crypts. Two step operation. *c*, tonsil with nodular trunk and both branches in an immature state. Removed from a boy aged thirteen. Two step operation. *d*, showing continuity of capsules of tonsil and nodular trunk. Specimen removed from a woman aged twenty-three, in a one step operation, breaking through tissues at points from which the pharyngeal and lingual branches were given off. *e*, nodular trunk from man aged twenty-six, showing openings to many retention crypts.

it would, probably, in that somewhat awkwardly situated region, be difficult to pick up bleeding points for the application of ligatures; but our success in arresting hemorrhages during and after tonsil operations by continued pressure in the tonsillar fossa with a stick-sponge and also outside counterpressure under the angle of the jaw has been so complete that we feel confident that sponge pressure upon a bleeding wound caused by the removal of a nodule, and at the same time the application of counterpressure from the outside with the block-mould or the hand under the angle of the jaw, would be sufficient to control it.

The operations for the removal of nodules were all performed under general anesthesia while the patients were in both the recumbent and upright positions. Much the best results were obtained in the upright position, as the gravid tongue not only permitted an easier manipulation of its base but greatly broadened the operative field. We presume the nodules can be enucleated under local anesthesia, but a consideration of that feature of the subject has not yet been reached.

When we have acquired the knowledge and skill which will be needed to remove all of the accessory lymphoid tissues in the throat, we can permanently dispose of a considerable percentage of them in our tonsil and adenoid operations. But there probably will still remain a larger percentage of such diseased tissues in subjects who either cannot be subjected to or who will not submit to radical measures. It is for that larger percentage that we are now seeking means of relief. While at first sight that may seem to be an almost hopeless task the experience derived from our searching inquiries into the character of those structures has convinced us that because of the accessibility of and ease of emptying the crypts, it will be possible in many adult cases not only to empty those receptacles but also to destroy their power of making mischief in the future. In addition to measures which are now on trial, so many promising plans have suggested themselves that we believe it will be only a question of a comparatively short time before efficient conservative methods of dealing with the crypts will be found and put into every-day practice. The procedures which are giving us the greatest satisfaction, and with the aid of which we have, in a few cases, obtained nearly perfect results, are puncture through the sides of the

crypts of the lingual branches and curettage of all nodular structures.

Puncture of crypts in the lingual branches ought only to be made when those structures project from the tongue far enough to present definite side walls, as illustrated in Fig. 2. If a branch, so formed, is grasped between the oval blades of a sponge-stick the compression will blanch the tissues and, in some cases, bring into relief the outlines of several of the distended crypts, which then can be readily evacuated by puncture and the use of the curette. If, however, the incision is carried upward to the surface our belief is that after healing the crypts will lose their power to collect and retain foreign material. Puncture also can be practised with perhaps less subsequent reaction than that which is at times caused by the compression forceps, by drawing the structure forward with a broad retractor to put the tissues on the stretch and also establish a firm background upon which to make the incision.

Our experience with curettage in adult cases has been that when a large part of the nodular structures can be brought into direct view by deep central or side pressure upon the tongue, most of the crypts can, in some cases, be thoroughly emptied, and in practically all cases the contents of many of them can be removed in a series of sessions, for, unlike the faucial tonsils, when the crytic openings can be reached directly the contents of the cavities into which they lead can usually be completely culled out. Skilful curettage is an art which requires considerable practice to acquire, but the value of the method as a conservative measure makes it worth while to develop, if possible, the deftness needed for the procedure. During a well-illuminated direct exposure of the lingual branches, or of a nodular trunk and the upper part of a pharyngeal branch, or of a pharyngeal nodule, six or eight cryptic openings can be penetrated and reamed out with a searcher. The slight traumatism made by rupturing or stretching the cryptic mouths marks the position of the crypts which already have been penetrated, when it is an easy matter to introduce a small ring curette to clear the cavities of debris. If during this minor operation the curette is not allowed to impinge upon the lateral or posterior wall, or is prevented from slipping or sliding from the tops of nodules, the uncomfortable acts of gagging or retching will perhaps be avoided.

For high-walled, narrow-topped, jelly-like lingual branches, in which the crypts are long and their openings minute, an effective method of emptying the crypts is by compressing the nodules with an oval sponge-stick and then expressing the cryptic contents as juice is expressed from an orange. The material in the crypts is thus "started," and while that preliminary is of material assistance in curettage, we believe that if a choice of methods could be submitted to the patient's feelings the procedure just described would be the last to be selected. In the majority of cases delicacy of manipulation only is tolerated by this highly sensitized region.

Indirect curettage is more difficult of accomplishment, for it must be carried out with curved or angular curettes (Fig. 6) and a mirror. As the nodules can be seen only in perspective we have, with this method, rarely attempted to ream out the mouths of any of the crypts but have relied upon preliminary pressure upon the tissues

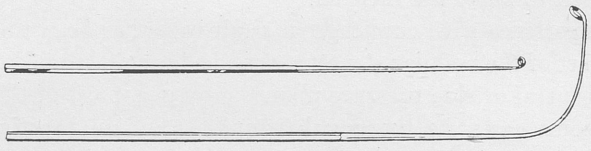


FIG. 6.—Curved and angular curettes.

at many points to effect their rupture. Even without preliminary rupture of the cryptic openings the contents of many of the crypts can often be removed by repeatedly, but with great gentleness, drawing the curette upward over the tops of the nodules. Indeed, some of the most striking and rapid changes in clinical stories have resulted from curettage carried out in this way. It is possible that an indirect curettage of the pharyngeal branches in adults, with curved curettes presenting laterally, will prove more effective, but we have been well satisfied with the effects obtained from the curved curette when it is held obliquely with its handle in the corner of the mouth of the same side. The laryngopharynx is often such a difficult region to work in that tact, patience and effective manipulation are required to secure satisfactory results.

It is a pleasure to acknowledge the courtesy of Dr. Albert J. Keenan, laryngologist in the Long Island College Hospital, in having placed many young subjects at our disposal in his operating

clinic. And we also wish to express our appreciation of Professor Archibald Murray's collaboration, of Dr. S. Zwerling's valuable aid, and of Mr. J. A. De Veer's care in carrying out the bacteriologic part of the study.

For a sifting of the statements and a test of the accuracy of the observations recorded in this communication, we gladly submit this brief report of our investigation to the wisdom, judgment and skill of the Fellows of this Association. Many corrections will doubtless be made and much information will be added to that which has been reported, for this study is but the entering wedge driven through the outer barrier of a field which is rich in opportunities. But whatever else may be said, or may be thought and not expressed, the important fact must not be overlooked that the study would not have been begun, and therefore the wedge could not have been driven, had it not been for the searching and revealing rays of the tonsilloscope.

Discussion

Dr. D. Bryson Delavan, New York:

Any suspicion that the character and quality of our program may have deteriorated has been effectively removed since we have listened to Dr. French's remarkable presentation. This splendid contribution to our knowledge of the anatomy and pathology of the tonsil is not the result of cursory or superficial work, but the outcome of much long-continued, patient and laborious study. The more we consider the facts discovered by Dr. French, and now so graphically and convincingly demonstrated to us, the more we are impressed by the lack of thoroughness of the ordinary methods of removing the tonsils. In cases in which septic conditions are present and fail to disappear after the usual tonsillectomy, the results of the removal of the tonsil remnants, as Dr. French has instructed us, are most gratifying.

This contribution, which marks a real epoch in the progress of our knowledge of the tonsil, should be most carefully studied and understood. The experience of those who have already followed it, of whom I am one, has been entirely confirmatory of all Dr. French has said. His genius has achieved yet another triumph of which we, his friends, should be proud.

Dr. Greenfield Sluder, St. Louis, Mo.:

Dr. French has launched a perfectly new study, and I do not think many of us have followed these cases as he has followed them. Upon his introduction of the tonsilloscope, five or six years ago, I pre-

dicted that it had a future capable of great development. This work is the result of careful and painstaking investigation; few of us have been so industrious. The nodules he speaks of seem to be in close proximity to the lingual mass and cross over from the lingual tonsil. In five or ten years these masses fill out and practically reproduce the entire tonsil.

Dr. Henry L. Swain, New Haven, Conn.:

It is impossible to discuss intelligently such a brilliant piece of work as Dr. French has put before us, especially as it is in territory in which none of us has done much work and so cannot achieve an intelligent conception of it. There are, however, two or three points that I should like to make. The first is that we are told that all the new work is being done by the young men; but this wonderful piece of work is done by one of our oldest members. Another point is that this tissue, as removed by Dr. French, is definitely encapsulated and mechanically loosens upon enucleation.

As to the location of the nodes: I have been a little in doubt as to where they were situated. Evidently, on each side of the lingual tonsil, between it and the lower end of the faucial tonsils, there lie at times these masses, and it is most interesting to me that the specimens exhibited here today, so skilfully removed in their capsule, are from young people in whom at the same time there was hypertrophy of the faucial tonsils. A further study will, I am sure, also show them to develop in postoperative cases as well as in the tonsil fossa proper. Furthermore, they have nothing to do with the lateral columns of the pharynx, which may also be a fruitful source of trouble to their host.

The tissue seems to be histologically identical with that of the tonsil and lingual tonsil. The lymphoid structure is, to all intents and purposes, the same as any tonsil in its effects upon the system, and is able to poison it in such a way that the importance of removal is equal in value to that of a full-sized tonsil in any other situation.

I take off my hat to Dr. French, the first man who had the courage, with malice aforethought, to attack this mass and excise it. And this last is more especially true inasmuch as we have all had the experience of hemorrhages from the lower pole of the tonsil, which is exactly the part into which he puts his tonsillotome.

Dr. G. L. Richards, Fall River, Mass.:

I must pay my tribute to Dr. French. He has been a member forty-one years. We get a new contribution, not from the younger men, but from one of the older ones. He has set all the men thinking. I would like to thank him for what he has done for me individually in making this presentation.

Dr. L. A. Coffin, New York, N. Y.:

I think Dr. French is not showing us how to grow old gracefully, so much as he is how to maintain youth.

Dr. French, closing:

I am very much gratified by your appreciation and endorsement. I shall have to be very much older than I am before I even begin to feel old.

AN UNUSUAL TYPE OF NASAL TUBERCULOSIS[1]

GEORGE E. SHAMBAUGH, M.D.

TUBERCULOSIS of the nasal cavities is a rather rare condition. It has been recognized clinically in two more or less distinct forms: in the one, the hyperplastic form, a round-cell infiltration leads to the formation of tissue masses, the tuberculoma; in the other, the ulcerative form, the destruction of tissue is conspicuous. This varies from a superficial erosion to the formation of deep-seated, excavated ulcers, which may invade and destroy the underlying bone. The two forms are often combined, the formation of the tuberculoma preceding the development of ulceration. The case I am here reporting is one of miliary tuberculous nodules involving the nasal mucous membrane not associated with general miliary tuberculosis. As far as I am aware, no similar case has been reported in the literature.

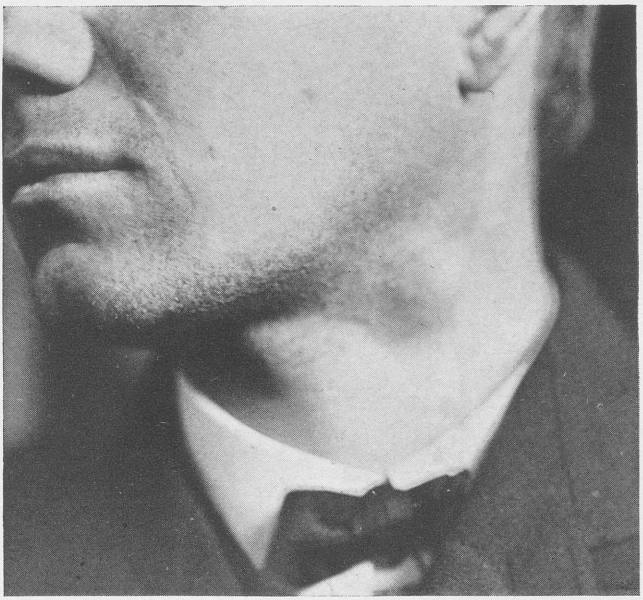
The patient is a man, aged 43 years, who consulted me first sixteen years ago, complaining at that time of nose and throat symptoms which were associated with marked enlargement of the cervical lymphatics, chiefly on the left side. He was a man of strong, robust build. The nasal symptoms had been annoying him for about two years. These were characterized by sensations of soreness and most annoying burning and dryness in the nose. A similar annoyance was experienced in the pharynx, especially in the epipharynx. The nasal symptoms were especially marked on the left side of the nose. The patient also suffered a great deal from left-sided frontal headache. The attacks of headache were quite severe and usually lasted two or three days. For a year before consulting me the patient had discovered that he was having an elevation of temperature, varying, as a rule, from 99° to 101° F. On one occasion, while under my observation, this temperature was as high as 104°, but in a few days subsided to the usual 101°. The enlargement of the cervical lymphatics had begun to appear on the left side about one year before I saw him and for six months these glands had been quite sensitive and painful.

An examination disclosed an enlargement of the cervical lymphatics beneath the angle of the jaw, on the left side, fully the size of a turkey egg. The posterior group of lymphatics on this side

[1] Read by title.

were also involved. On the right side the posterior chain of cervical lymphatics were enlarged to the size of a large pea. There was one isolated gland in the clavicular region about the size of a small hazelnut. The lymphatics in both axillæ and the groins were palpable, but not sensitive.

A general examination was made by Dr. J. B. Herrick, professor of medicine in Rush Medical College, who found no other lesion except a nodule the size of a hickory-nut in the epididymis, on the left side. This nodule the patient had been aware of for many years. There was no history of any venereal disease, and Dr. Herrick's opinion was that the nodule in the testicle might be of tubercular origin.



On examining the nose the following conditions were found: the nasal passages, especially on the left side, were quite roomy, presenting an appearance of moderate atrophy of both the middle and inferior turbinate bodies. The mucous membrane was distinctly congested and presented a dry, glazed appearance, but with no crusting or accumulation of secretion. On the septum the mucous membrane on the left side presented an unusual appearance. It was deeply congested, and scattered over the surface were a number of discrete pinpoint nodules. These were distributed widely over the

septum. There were eight or ten of these nodules that could be seen by anterior rhinoscopy, and it seemed quite probable that there were still others located beyond the field of vision. The nodules presented a slightly grayish color, which made them stand out quite distinctly from the surrounding congested membrane.

The mucous membrane of the pharynx presented the typical pharyngitis sicca, but with no accumulation of secretions. The lateral bands were moderately swollen. The tonsils showed no evidences of chronic infection, nor was there a history of attacks of acute tonsillitis.

One of the nodules on the septum was located on the crest of a small septal spur, located near the floor of the nose, close to the entrance. This nodule was shaved off with a sharp scalpel and a piece 2 mm. in diameter was mounted in paraffin and sectioned. The specimen showed no break in the surface epithelium. Beneath the surface layer was the round-cell infiltration, typical of a tuberculous process, in which here and there a giant cell was discovered. Efforts to find tubercle bacilli were not successful.

The clavicular gland on the right side was removed and turned over to Dr. Le Count, professor of pathology in Rush Medical College, for examination. His report was that the gland was the seat of a chronic tuberculous process, in which he was able to discover a few scattered tubercle bacilli.

Under the direction of Dr. Herrick the patient was placed on a regime best suited to combat tubercular disease.

The patient did not reside in Chicago, but returned from time to time for observation. After several months he moved to Colorado, where he remained the greater part of two years, living in a tent. At the end of that time the enlargement of the cervical glands had practically disappeared. The annoying nasal symptoms had also disappeared. The only local treatment carried out during this time was regular cleansing of the nasal passages by means of a simple alkaline nasal wash and the application of alboline by means of an atomizer.

I have seen the patient occasionally up to the present time, and he has continued to remain in robust health; no return of the nasal symptoms, the headache or glandular enlargement. The last examination was made March 13, 1920. At that time the nasal chambers appeared quite normal, and there was no distinct evidence of an atrophic process, which was present when he was first examined. The mucous membrane of the pharynx was also quite normal, with no evidences of dryness and no thickening of the lateral bands. The cervical glands were not palpable.

The question arises whether this was not a case of primary nasal tuberculosis, with secondary involvement of the lymphatics. One

fact seems clear, namely, that the nasal involvement was not secondary to any pulmonary tuberculosis. The fact, too, that the evidences of tubercular trouble seemed limited to but one side of the nose suggests that the nasal membrane may have been the portal of entrance. It seems quite clear that the cervical adenitis was secondary to the nasal infection: first, because the nasal symptoms had been present for some time before the enlargement of the cervical lymphatics became apparent, and second, because the chief glandular trouble was on the same side as was the nasal disease. On the other hand the presence of a number of tuberculous nodules scattered widely over the nasal septum speaks rather against the origin of the trouble being in the nose, where we would expect only a single focus in case the nasal disease was the portal of infection. In view of the fact that the patient had a nodule, probably tuberculous, in the epididymis, which was present for some time before his other symptoms appeared, it seems probable that this may have acted as the primary focus for dissemination of the infection and that the miliary tubercles seen in the nose were secondary to this focus.

A CASE OF MULTIPLE STRICTURES OF ESOPHAGUS, APPARENTLY CURED BY REPEATED DILATATION WITH GRADUATED BOUGIES. REPORT OF A CASE OF SYPHILIS, VINCENT'S ANGINA AND SARCOMA OF THE PHARYNX, ONE CONDITION FOLLOWING THE OTHER IN THE ORDER NAMED

CLEMENT F. THEISEN, M.D

THE first case I wish to report, one of multiple strictures of the esophagus, in a woman, aged fifty-one years, presented in some respects more difficulties in the way of treatment than any esophageal case I have ever had.

The patient was referred to me eight months ago, with a history of an inability to swallow anything but liquids for the past year. The patient is a woman of average height, and before her esophageal trouble weighed 132 pounds. When she came to consult the writer she was reduced to 104 pounds and had a markedly cachectic appearance, so the possibility of malignancy at once suggested itself. The only thing she could think of that could have a possible bearing in causing the strictures was the accidental swallowing of a little of the fluid in a bottle of smelling salts, which contains considerable ammonia. About two years ago, she stated, she was using a bottle of smelling salts while lying in bed, and got a little of the liquid in her mouth when she tipped the bottle too much. She did not think that she swallowed more than a teaspoonful. After drinking a good deal of water the burning sensation and irritation gradually subsided. The difficulty in swallowing came on very slowly, gradually becoming worse, until for the past year nothing but liquid foods, and often with difficulty, could be swallowed.

She was first given a barium bolus, the passage down the esophagus being watched with a fluoroscope. The bolus was arrested at the first stricture, apparently a fairly tight one. Roentgen-ray plates

were then taken and briefly showed the following conditions: The roentgen-ray plates showed five distinct strictures: the first about at the cricoid, where there is always some natural constriction, and the other four almost equal distances apart, the lowest being about 2½ inches above the stomach. The question of malignancy was probably settled by the roentgen-ray plates, as no evidence of a growth could be seen. In order to positively confirm the diagnosis a Jackson esophagoscope was passed and the presence of the upper stricture confirmed.

As the patient was in such poor condition no attempt was made the first time to get through the stricture. She was allowed to rest for several days, and then, after a good deal of difficulty, a small, very flexible, metal bougie was passed through the first stricture. This was done several times before any attempt was made to get through the others. She was able to take a little more liquid nourishment after the first few weeks and gained slightly in weight. During the next six weeks we succeeded in getting through the other strictures, the lowest one causing the greatest difficulty. Graduated metal bougies were used, beginning with small ones, and by the end of February of this year we were able to pass a 13 mm. bougie, which is almost the size that should go through the normal adult esophagus. From this time on the patient started to gain rapidly, and for the past three months she has gained nearly a pound a week. The last time I saw her, the middle of May, 1920, she weighed 129 pounds, almost her normal weight. She is now able to eat anything she wishes and takes three full meals a day without difficulty. The cachectic appearance has disappeared and she says she feels perfectly well.

At the present time I pass an esophageal bougie about every two weeks, and for the past two months have been able to use fairly soft, flexible, fiber bougies. The largest size passes to the stomach without any difficulty. During the first few months, when the metal bougies were used, there was occasionally very slight bleeding after the bougies were passed. This only happened three or four times. After the first time a little olive oil was swallowed before and after the bougies were passed, and she has occasionally, for the last few months, taken a little of the oil before each meal.

The writer has had two other cases of esophageal strictures, both

in adults, in the last few months. In both cases there was a history of the accidental swallowing of washing fluid, which contains a good deal of caustic potash. Both these cases are doing well under the same plan of treatment used in the case reported today.

The statement was made in the title of this paper that the patient is apparently cured, and she certainly seems to be. We all, however, realize the difficulties of keeping the strictures dilated in cases of this kind, and a case cannot be called definitely cured until it has been kept under observation for a long time.

The second case is reported not because of the rarity of any one of the three diseases, because all of them unfortunately occur frequently enough, but on account of the unusual combination of syphilis, Vincent's angina and sarcoma. It is the first time that the writer has observed these three conditions in the pharynx of the same patient. As stated in the title of the paper, they followed each other in the order named. It is possible that the syphilitic lesion and Vincent's angina were present at the same time, although the angina was not diagnosed for quite a while after a positive diagnosis of syphilis was made. The sarcoma developed after the angina, and the progress of the disease could be carefully watched, as the patient was under the writer's observation continuously until he died.

This patient, a man, aged thirty-eight years, was referred to me for an ulceration of both tonsils that had existed for some time. On examination we found a rather deep ulceration almost covering the surface of both tonsils, which were large. The condition looked very much like a syphilitic lesion. No syphilitic history could be obtained, but the diagnosis of syphilis was proved by a Wassermann, which was positive. He had at this time only slight pain in swallowing. He was given a saturated solution of iodide of potash and referred back to his doctor in his own town, for further observation. He wrote me, after several weeks, that the ulcerative process was extending rapidly, in spite of vigorous antisyphilitic treatment. I then saw him again and found that the ulceration had extended to the mucous surfaces of the cheeks and gums, around the last molars, on both sides. The typical odor of Vincent's angina was now quite apparent, and the diagnosis of the angina was confirmed by the microscopic examination of smears from throat swabs. The patient

was then given by his own physician five injections of salvarsan, without the slightest result. During this time I saw him every week, and in spite of the salvarsan injections and rapidly increasing doses of potassium iodide the ulcerative process extended steadily. He was also given the local treatment, which is usually effective in cases of Vincent's angina, continuously.

Early in January of this year the edges of the extensive ulceration, which had now practically destroyed both tonsils, uvula and part of the soft palate, became very nodular and indurated, with a rapid extension of both the ulcerative and nodular process. At this time he also developed a large, very hard mass in the left side of the neck. Clinically the throat picture was fairly typical of an ulcerative carcinoma. A piece of the very firm, nodular mass from the edges of the tonsillar ulceration was removed, sent to the laboratory for examination and found to be a round-celled sarcoma. He had from time to time rather serious hemorrhages from the erosion of bloodvessels by the constantly increasing ulceration. The nodular mass, which broke down rapidly, extended to the base of the tongue and finally into the larynx. The patient died about the middle of April. I had not seen him for several weeks before his death.

This case is reported simply because of the unusual combination of diseases. The writer has seen the combination of syphilis and Vincent's angina a number of times, and it is, of course, well known that syphilitic ulcers make a very favorable soil for the development of Vincent's angina. This combination, in the writer's opinion, occurs much more frequently than is generally thought.

Discussion

Dr. Francis R. Packard, Philadelphia:

I saw a patient in the Pennsylvania Hospital who had a very similar condition. He was supposed to have quinsy. There was a large mass involving the tonsillar region, also an ulcer where an incision had been made. I thought it looked specific. He acknowledged infection and his Wassermann was strongly positive. He was given salvarsan and was not seen for three or four weeks, when he returned with the throat condition very much worse. I took a piece of tissue and the pathologist's diagnosis was "round-celled sacroma." He was given Coley's fluid and began to get better. He had one or two hemorrhages from his throat. I saw him yesterday, and the

tissue mass was almost gone and he was able to swallow. Of course, the Wassermann reaction is known to be frequently positive in association with malignant neoplasms of the throat, a fact which often confuses the diagnosis.

Dr. James E. Logan, Kansas City, Mo.:

It appears to me that in Dr. Theisen's cases the pathologist might have been mistaken in the Wassermann test. It has occurred in my practice that there is a strong difference of opinion, one pathologist giving a diagnosis of a 4 + Wassermann and another a negative test. It is as well to have the matter checked up by a third laboratory man. I do not think it is of any advantage to the patient to administer salvarsan without being absolutely certain of the specific nature of the lesion. Sometimes administration of salicylates will materially affect the Wassermann. I think the lesion probably preceded the sarcoma. The Wassermann may have been anticipatory.

Dr. Thomas H. Halsted, Syracuse, N. Y.:

I should like to report a very similar case. A young man came to me with beginning ulcer of the throat, and I advised iodides and salvarsan. In spite of this he grew worse and the ulceration extended to the soft palate. He went to hospital. He gradually lost the whole roof of the mouth, the nasal bones and external nose. The section removed showed round-celled sarcoma. He died within three months. The man insisted he had never had syphilis. I think other conditions cause a positive Wassermann at times.

Dr. John E. MacKenty, New York:

I have seen three cases in the clinic in which there was sarcoma of the neck or throat. There was a positive Wassermann, but the lesion did not clear up with specific treatment. I do not believe a positive Wassermann is to be taken absolutely seriously, because it comes up all the time where it has no bearing on the question. One can often obtain a positive Wassermann coincident with a tumor growth.

Dr. Lewis A. Coffin, New York:

My impression is that in the case reported by Dr. Theisen the specific element was of prime importance.

In cases showing a positive Wassermann which persists in spite of a vigorous antispecific treatment there exists not infrequently some so-called point of focal infection. Upon the surgical relief of this point the blood promptly becomes negative to the Wassermann test.

Dr. Hanau W. Loeb, St. Louis:

I recall the experience of Vincent's angina cases in the army. There was no way of differentiating them from syphilis except by the course of the disease.

Dr. W. B. Chamberlin, Cleveland, O.:

We do get cases of Vincent's angina complicating syphilis. In a recent case we made a diagnosis of Vincent's angina of the left tonsil. Microscopical examination showed spirillæ and fusiform bacilli. The case cleared up under salvarsan. Subsequently the characteristic rash of syphilis developed and we found there had been a primary sore on the tonsil. The condition was masked by the complicating Vincent's. The primary sore had been acquired during what our patient was pleased to call his vacation.

Dr. Henry L. Swain, New Haven, Conn.:

I think Dr. Thiesen's first case should not go without mention. We have all had these cases of multiple stricture of the esophagus, and work as hard over them as over anything we do. I had a case of complete stricture. The patient disappeared, and later was seen after an operation in which someone had first tried to reach the stricture through an external opening in the neck and later had done a gastrostomy. The esophagoscope did not strike the obstruction at the cricoid, but lower down there was complete stricture behind the arch of the aorta. I dilated with Jackson's bougies, and later the patient began to take liquid nourishment per oram. One day I tried to pass a flexible stomach tube into the stomach and the patient immediately complained of pain. The stomach tube had apparently ruptured adhesions between the posterior side of the stricture and she developed an empyema necessitating resection of the ribs and she nearly died. During this illness a complete stricture supervened. The patient is a young girl, seventeen years old, and if there is anything I can do to avoid for her the fate of passing a long life having to be fed through a gastrostomy opening, I feel it is up to me to do it. At present I can introduce small bougies into the stomach, but get fever and constitutional symptoms if I pass to larger ones.

Dr. D. Crosby Greene, Boston, Mass.:

I think I heard Dr. Theisen say that radium never did any good! In some cases it does much, especially in lymphosarcoma of the pharynx.

Dr. Theisen, in closing:

I want to correct an error in the title of my paper. It says "cured," but I would like to change that to "apparently cured." These cases often recur, as we all know.

Dr. Swain's case reminds me of a procedure which you may have tried. I saw a child with complete stricture of the esophagus, after swallowing washing fluid which contained caustic potash. The child had a gastrostomy done in the hospital by one of the surgeons.

I then succeeded in getting a piece of fine whalebone through from above, to which we attached a ligature, and sawed through the stricture. It was many months, however, before the gastrostomy wound could be closed. The child finally swallowed fairly well.

In regard to syphilis and Vincent's angina, I think, often, syphilis makes a good foundation for Vincent's angina to be grafted on. One is sometimes subsequent to the other and they often occur together.

SYMPOSIUM ON RADIUM

DOSAGE AND METHODS OF TREATMENT

WILLIAM DUANE, PH.D.

In deciding upon the details of an application of radium or of any of the radio-active substances to a case of malignant disease, one must bear in mind the general principles underlying the methods of radiotherapy. There is no evidence that the rays from the radio-active substance can transform tumor cells directly into normal cells. The fundamental principle of radio treatments appears to be one of destruction. The rays from the radio-active substance destroy the tumor cells either by passing through them and exerting a direct action on them or by cutting off their supply of nutrition, just as invading armies are destroyed either by shooting individual soldiers or by cutting off their food supply.

In order to destroy a tumor by radiation we must fill the tumor and part of the surrounding healthy tissue with rays sufficiently intense to kill the tumor cells, but at the same time we must avoid too great a destruction of the normal tissues. The problem becomes largely one of solid geometry. The source or sources of radiation must be placed in such positions in or near the lesion as to produce the required effects throughout the volume of the tumor.

The primary effect of the passage of radio-active rays through a substance appears to be the ejection of atoms of electricity (called electrons) from the atoms of ordinary matter. As a secondary effect a regrouping of the atoms takes place. For instance, if the rays pass through water, H_2O, they split up the water molecules, and, as a regrouping of the atoms, we get molecules of hydrogen, H_2, of oxygen, O_2, of hydrogen-peroxide, H_2O_2, etc. Just what regroupings of atoms take place when the rays pass through living tissue we do

not know and, in the nature of the case, are not likely to find out until we have learned more about the actual distribution of the atoms before the rays passed through them.

Although we do not understand the mechanism of the effects produced by rays on living cells, we do know something about the gross behavior of tumors after radiation.

One of the most important effects due to rays appears to be a retardation of the growth of the tumor. This retardation may last for many generations of cells after the generation that has actually received the radiation. The retardation effect is of great value in cases in which the situation of a tumor does not allow its complete destruction or removal.

The direct action of rays from a radio-active substance on a cell appears to be more pronounced during mitosis than at other times. For this reason prolonged radiation ought to be more effective than short radiation, for there would be more chance of catching a greater number of cells during their most vulnerable period in the former than in the latter case. Over five years ago I used a method of treating certain types of malignant disease with radio-active substances which has the following advantages: (1) the active sources of the rays may be placed and kept in position with considerable precision, thus ensuring an accurate distribution of the radiation throughout the tumor; (2) very little effect is produced in normal tissue at a short distance from the source of the rays; (3) the length of the treatment may be prolonged continuously for days, weeks or even months. The method consists in introducing very minute glass tubes containing a very small quantity of radium emanation (often less than 1 mc.) into the tumor itself through a trocar. The tubes and emanation are left in place until most or practically all of the emanation has disappeared. As is well known, half of a given quantity of emanation disappears in slightly less than four days, so that in this way the tumor tissue may be subjected to weak radiation lasting a long time.

The emanation in the tubes transforms itself into substances called Radium A, B, and C. Radium B and C (not the emanation, nor Radium A) produce the rays that are used in therapy. The walls of the glass tubes being very thin the radiation passes easily through them and is absorbed in the tissues immediately surrounding them—

most of it within 6 or 7 mm. of the tubes. Hence, by accurately placing the tubes in position the radiation can be confined to the required volume of tissue with precision. Owing to the fact that most of the radiation is absorbed close to the tubes, very little effect is produced at a distance from them. Normal tissue appears to be able to withstand indefinitely the weak rays that reach a distance of 10 to 15 mm. from the tubes. Thus excessive destruction of healthy tissue may be avoided if the tubes are properly placed.

In certain types of cases which are particularly well suited to it the method appears to be the best procedure to follow in applying radio-active substances to malignant disease.

This method has been extensively used in our own hospital and in the Memorial Hospital, New York.

FACTORS INFLUENCING THE QUANTITATIVE EFFECTS OF RADIATION

WILLIAM T. BOVIE, M.D.

For every treatment in radiotherapy the clinician must decide the following question:

Under a given set of conditions, what exposure must I give to produce the desired effects? The decision is frequently a mere guess, for many more factors are involved in the dosage of radiotherapy than are involved in the dosage of chemotherapy, and chemotherapeutics can scarcely be classed as an exact science.

The students of photography have very successfully solved the dosage problem for the blackening of the photographic plate. Undoubtedly there is much which the clinician may learn from them. With the speed of the plate determined and stamped on the box, formulæ given for making up developers and fixing solutions, full directions as to temperature control, duration of development, etc., the only thing left to the judgment of the photographer is the intensity of the light to which the plate is exposed, and even here he has been provided with chemical devices, actinometers, for accurately measuring the power which the light has to bring the silver bromide of the photographic film into the developable condition.

It is not always convenient in clinical problems to measure the intensity of radiations at the place where they are absorbed, but when a point source is used, if the intensity of the radiation is known at any one distance from the source, it is possible by means of Lambert's "inverse square law" to calculate the intensity. This does not apply, however, to other than point sources nor to sources of the corpuscular radiations, *a* and *b* rays. By exploring with photographic paper as an actinometer I have measured the intensity of the radiation about small cylindrical sources, such as glass tubes containing radium emanation, and have constructed diagrams of surfaces of equal intensity.

It is not sufficient to know only the intensity of the radiation. One of the oldest laws in photochemistry is Grotthus's law, which states that "it is only that fraction of the rays which is absorbed that is effective in bringing about a photochemical change." It is necessary therefore to know, besides the intensity of the radiation, the fraction of the rays which will be absorbed. Again using photographic paper as an actinometer and beeswax as a typical homogeneous absorbing medium, I have constructed charts and diagrams showing radiation intensities within such an absorbing medium when it encloses a tube of radium emanation as a source for rays.

Photography would not be possible if manufacturers possessed no method of measuring and indicating the sensitiveness of their plates to light. It would undoubtedly help tremendously if we possessed a similar sensitometry for tissues. (Dr. Bovie then discussed the methods of sensitometry of the photographic plate and showed how these methods may be applied directly to the sensitometry of tissues.)

In order to arrive at a mathematical expression giving the relationship between the exposure and the physiologic effect, it will be necessary to have a term for the intensity of the radiation; a term for the amount of energy required to produce the particular change sought in a single cell or tissue element; a term expressing the absorption index of the tissue to the particular radiation used; a term showing the concentration of the unaffected cells or elements of tissue and a term expressing the number of cells or elements already altered by the exposure. It may be shown that an expression of this kind leads to the conclusion that the effect produced should vary with the logarithm of the exposure (intensity times the time). It follows, therefore, that a short exposure is relatively more effective than a long exposure.

One other term must be introduced into such a mathematical expression, namely, a term which the photographer calls the "factor of development." The initial photochemical change, latent image, produced by the exposure cannot be detected. It is only after a period of development, in therapy a period of physiologic change, that the effects of the radiation are manifest. Unfortunately at the present time we are quite ignorant of the nature of and the

laws which govern the rate of these physiologic changes. It is for this reason that many of the results of radiation treatment are charged to the idiosyncrasies of the patient.

It is a step in advance to formulate a problem even if we are unable to solve it.

THE RESULTS OF TREATMENT OF MALIGNANT DISEASE OF THE UPPER AIR TRACT BY RADIATION

D. CROSBY GREENE, M.D.

In this paper I shall restrict the scope of the subject to two groups of cases, namely, those of malignant disease of the larynx and those involving the upper jaw.

After reviewing the methods of treatment and the results obtained, I hope to present some cases illustrative of these two groups and also a few other cases showing favorable results.

The material for this study was drawn from the clinic of the Huntington Memorial Hospital, where the observations were made and the treatment carried out. It should be stated that the cases seen at this hospital, in the two groups under discussion, were, with few exceptions, advanced beyond the stage in which a cure by surgical means alone could be hoped for. Although the end-results were almost uniformly bad in the first group the observation of the course of the disease under treatment is instructive as to the effect of radiation, and gives some indication as to what results may be expected under favorable conditions.

Cancer of the Larynx

There are records of 60 cases of cancer of the larynx seen at the hospital from 1912 to 1920. Of these, 15 did not receive treatment by radiation; 3 were treated by *x*-rays; the remaining 42 were treated by radium in some manner. I have divided this series of 42 cases into groups according to the method of application employed.

Group I. This group comprises 14 very advanced cases in which the treatment consisted of applications of relatively heavy doses of radium over the skin outside the larynx; 3 of these cases had rapidly growing, recurrent cancer subsequent to operation. Screening by ½ mm. steel and 2mm. lead and 2½ cm. of gauze was used.

The usual dosage wos from 100 mc. to 200 mc., and the duration of the treatments was on the average about 12 hours. Intervals between treatments varied from one week to a month.

In none of these cases was any marked objective improvement noted, and death occurred on the average in eight and one-half months after the beginning of treatment. One is still living eight months after beginning treatment. The shortest duration of life was one and one-half months and the longest two years and one month. Another lived one and one-half years. Notwithstanding the absence of objective improvement, in many of the cases there appeared to be marked retardation of the growth, with some amelioration of symptoms. The most remarkable example of this was the patient who lived two years and one month. This man had twenty-nine treatments, such as I have described, extending over two years, at intervals averaging less than a month. At the last observation, two years after the first treatment, there had been no marked change noted. He died at home, and the exact nature of his death was not discovered.

A varying degree of palliation was noted in 7 of the 13 cases. It may be concluded that the external treatment may be used in advanced cases, with reasonable expectation of palliative results but without hope of curing the local condition.

Group II. This group is composed of 6 cases treated by direct application to the growth internally of a steel-jacketed tube placed in the tip of a rubber catheter, or by direct insertion of the steel tube into the tumor. The technic of this method was difficult, and it was, on the whole, unsatisfactory.

Preliminary anesthetization of the larynx with 10 per cent. cocain enabled the patient in some cases to keep the larynx fairly quiet while the applicator was being introduced and to hold it there for about one-half hour. It was found essential to do tracheotomy previous to the treatment for two reasons: first, in order to enable the patient to breathe comfortably during the treatment; and second, in order to forestall asphyxia from closure of the laryngeal lumen by the later inflammatory radium reaction.

In spite of the greatest effort on the part of both operator and patient it was not possible to make accurate application by this method, owing to involuntary movement of the throat and the

natural sensitiveness and intolerance of the larynx to the presence of the foreign body. The number of applications given by this method in individual cases varied from one to sixteen. The dosage varied from 15 to 126 mc. An average of over six applications was given in each case, and the duration of the treatments was from one-half to one hour.

It will be seen that the end-results in this group did not vary markedly from that of the preceding. The duration of life averaged six months. In two of the cases, however, a decided reduction in the size of the tumor was noted.

Case 4 of the group came to the hospital on September 7, 1916, with a large tumor mass involving the epiglottis and both arytenoids. After treatment at intervals of a week for two and one-half months a marked diminution in the size of the tumor was noted with almost complete destruction of the epiglottis. After this date the growth progressed downward rapidly and death occurred two months later.

Although the end-results in this group did not vary much from those of Group I, the effect of the closer application of the radium was seen in a definite destruction of tumor tissue in some of the cases.

Group III. The 6 cases comprising this group were treated by a combination of the methods used in Groups I and II; that is, by both internal and external applications. In 2 of them the internal application was made by insertion of a steel-jacketed tube into the center of the growth. In 3 of these cases temporary reduction in the size of the tumor and decided retardation of the activity of the growth were apparent. The average duration of life was almost a year.

Case I of this group has been under treatment for eighteen months and is still living, and has been fairly comfortable most of this time. He was treated first by insertion into the tumor of a steel-jacketed tube, 15 mc., for one-half hour. The subsequent treatments were by the external method. The primary tumor diminished for a few months, then remained stationary for about six months, and since then has slowly increased in size. The metastatic external mass has slowly but steadily increased.

In general the patients treated by the combination of the methods

used in Groups I and II showed more favorable results than those in either of the first two groups, but in no case was any lasting improvement noted.

GROUP IV. Four cases were treated by radium application through a tracheotomic opening, the applicator being laid against the lesion for periods of one-half hour to one hour. The usual dosage was about 50 mc.

All were cases of intrinsic cancer involving the glottic or subglottic region. In these the opening in the trachea seemed to offer the nearest and most available approach to the lesion. Two of the cases were in the last stage and survived shortly after one treatment. The other two showed marked retardation of the growth. One lived ten months and the other twenty-five months. During the first six months of treatment the last patient showed considerable improvement to almost disappearance of the growth, but after that time renewed activity appeared which resisted further treatment.

GROUP V. This group is made up of 5 cases in which surgical removal of the growth by external operation was followed either immediately or shortly after by radiation through the open wound by placing a radium-bearing applicator against the site of the lesion; in one case by implanting two small seeds into the tissue on either side of the internal laryngeal wound. All of these 5 cases were at last account living, at periods of nine months, eight and one-half months, seven months, six months and one month after operation. As this group and the next represent cases which I have been personally treating and following during the past year, I will go a little more into detail in describing the treatment and the results.

Case I was operated on on May 31, 1919, by Dr. F. E. Garland, who did a hemilaryngectomy. He found extensive invasion of the upper end of the esophagus and did not attempt to remove this part of the growth. A wide opening was left in the region of the left wing of the thyroid, giving a free exposure of the posterior wall of the larynx for radium applications. Ten applications were made during a period of seven and one-half months, from June 25, 1919, until February 4, 1920; dosage, 60 mc.; duration, one-half hour. The lesion in this case was shown in a diffuse swelling of the party

wall between the larynx and the esophagus, involving both arytenoids, without observable ulceration. Under the treatment a gradual diminution in this swelling was noted. The patient was from the start very thin and cachectic and did not make any appreciable gain in general condition.

Case II, a case of well-advanced intrinsic carcinoma of the larynx, was operated on by Dr. H. A. Barnes on September 20, 1919, at the Massachusetts General Hospital. A window resection of the left side of the larynx, with removal of all visible tumor growth, was performed and the wound left open. The patient was first treated at the Huntington Hospital on October 8, 1919. His laryngeal wound was at that time healed except at its lower part, through which a tracheotomy tube extended into the trachea. The cavity of the larynx showed no recognizable tumor growth. Marked swelling of the walls of the cavity was present, with granular surface, a condition which might have been due entirely to operative reaction. Three radium treatments were given, as in Case I, at monthly intervals. The dosage at the first treatment was 96 mc. for fifteen minutes; at the remaining two treatments the dosage was 20 mc. for one-half hour. The last treatment was on December 17, 1919. The case has done well. To date he has shown no sign of recurrence and is in good physical condition. Locally the cavity of the larynx shows a smooth, unbroken surface.

Case III was very similar to the preceding and the treatment was essentially the same. I operated on the case at the Massachusetts General Hospital on October 15, 1920, and did the same type of operation that Dr. Barnes did on Case II. Subsequent treatments were essentially the same, except that they were started later, as the patient did not report as directed for radium treatments. His first application was nearly two months after operation. Although I could not recognize any recurrence at that time, he showed evidence of beginning recurrence two months later in spite of treatments.

Case IV, a young woman, aged twenty-two years, had cancer of the left cord extending across the anterior commissure and involving a little of the right cord. I operated on this patient on April 10, 1920, doing a window resection of the larynx and removing all visible growth. I then inserted two 2 mc. seeds into the anterior

part of the internal laryngeal wound on either side of the cavity and left the wound open. The patient has done well thus far, but it is, of course, too early to say anything of the result in her case.

GROUP VI. Five cases. These cases were treated by insertion of radium seeds directly into the tumor mass. The technic was as follows: Preliminary tracheotomy was performed, then, under ether anesthesia administered through the tracheal tube, the patient was suspended with the Lynch apparatus and the seeds inserted by means of a suitable trocar under direct vision into the exact location desired. The dosage was 2 to 4 mc. for each seed. Two to four seeds were inserted at each treatment, according to the size of the growth. This has proved to be by far the most accurate and effective method of attacking the growth locally. Without exception a marked diminution in the size of the tumor has resulted in the cases thus treated.

There have, however, appeared certain untoward complications which should be noted. The chief of these is the prolonged inflammatory reaction which has followed, with clinical signs of perichondritis. This reaction has lasted in some cases from four to six months before subsiding. In two of the cases severe hemorrhage resulted from the necrosis produced, which in one instance was fatal. This extension necrosis, occurring at considerable periods after the radium application, is, I believe, due to septic processes set up by the radium burn and is not directly due to the destructive action of the rays. The sequence appears to be, first, localized necrosis of the cartilage from the radiation, and then prolonged inflammation and extending secondary necrosis.

The following case which came to autopsy shows the destructive effect produced by radiation. The patient, a woman, aged thirty-four years, was operated on at the Massachusetts General Hospital, September 17, 1916, for a rapidly growing intrinsic carcinoma of the larynx which had invaded the esophagus on the left side. I did a partial laryngectomy and excision of a portion of the upper end of the esophagus.

After recovering from operation she received fourteen internal radium treatments over a period of six months. For twenty months after the last treatment there was no evident recurrence, but shortly after that the patient began to have dysphagia, pain and cough.

Examination a month later showed pronounced swelling in the arytenoid region. A seed insertion was made into this region. No improvement followed and the patient died four months later.

Autopsy was by Dr. J. H. Wright, who reported: "The larynx as such was not found, but in its situation was a mass of chronically inflamed tissue presenting an extensive ulceration which involved the periosteum of the adjacent cervical vertebræ. In the chronically inflamed tissue in the region of the larynx were embedded two rough, apparently bony masses, each about one-half inch in diameter. The esophagus ends with ragged, necrotic edges in this ulcerated area. Between the esophagus and the trachea, and apparently compressing the esophagus, is a nodular mass of tumor tissue about one and one-half inches in greatest dimension. The trachea seems to be lost and obliterated in the inflammatory tissue occupying the situation of the larynx. Microscopic examination of the tumor mass shows a carcinoma the cells of which are rather small and show numerous mitotic figures. Microscopic examination of the tissue bordering upon the ulcerated area shows no evidence of tumor."

The end-results have been apparent local disappearance of the primary tumor in 3 cases at the present time, at periods of ten months, nine months and seven months after the first treatment. The first 2 received two treatments and 1 only one. One of the cases, however, had a fatal hemorrhage two months after the last treatment. The other 2 cases showed marked diminution of the tumor, followed by gradual recrudescence; 2 of the 5 cases in this group have died and the remaining 3 are still under observation; 1 of these, with disappearance of the primary lesion, has a large metastatic growth in the neck; 1 is apparently doing well and 1 is doing badly, having local recurrence and general loss of vitality.

General Observations. In treating carcinoma of the larynx with radium we are confronted at the outset with the problem of making accurate applications of the desired dosage to the exact location required. Owing to the intolerance of the larynx to foreign bodies and the involuntary movements of gagging, swallowing and coughing, even after thorough cocainization, such accurate application is not practicable by any method of surface application from within. I believe that some improved method of insertion will prove to be effective in a fair proportion of cases which are not far advanced.

This method is especially applicable to the cases of extrinsic cancer involving the tissues about the orifice of the larynx, in which complete surgical removal would involve excision of the tongue, total extirpation of the larynx and resection of the upper esophagus.

In cases of intrinsic carcinoma, operation by window resection of the thyroid cartilage, leaving the wound open for immediate and subsequent radiation, is an effective method of treatment in some cases.

The effectiveness of any method of radiation from a clinical standpoint depends on the extent of destruction of tumor tissue. While the tumor cells have been shown to be less resistant to the action of the rays than normal tissue, in order to furnish sufficient strength of dosage to reach those tumor cells which have invaded normal tissue beyond the limit of gross inspection, some normal tissue also must be destroyed in the process. Unfortunately, cartilage, which forms the framework of the larynx, although peculiarly resistant to invasion by cancer, is especially vulnerable to the rays. Therefore, as a result of radiation, perichondritis and necrosis of the cartilage are likely to take place, resulting later in permanent stenosis of the laryngeal passage.

In early intrinsic cancer surgical treatment by thyrotomy, without radiation, up to the present time has yielded such brilliant results that it is still the method of choice.

Summary. Of the 42 cases of cancer of the larynx treated by radium, 9 are living at present. Of these 2 show no evidence of tumor at periods of eight months and seven months after the beginning of treatment; 2 have been under treatment one month and show no growth at present; 4 are under treatment and not showing improvement; 1 was doing well locally when last seen seven months after treatment was begun.

Upper Jaw Cases

In this series have been placed cases in which the superior maxilla was involved, whether the growth arose primarily from the epithelium of the mouth or from that of the antrum or adjacent ethmoid cells. In advanced cases the bony barrier is seen to have broken down before the invading tumor growth, advancing either from without inward or from within outward, so that at times it is difficult to judge by the appearance whether the primary growth was in the mouth or antrum.

There were 45 cases in this series: 42 were carcinoma and 3 were sarcoma; of these, 6 cases were not treated by radiation, and the remaining 39 were composed of the following groups:

Group I. Received radium treatment alone.

Group II. Came for radium treatment of recurrent growth following operation.

Group III. Received radium treatment immediately after or shortly after operation.

GROUP I. Thirteen Cases Treated by Radiation without Operation. The radium was applied in most of these cases in a steel-jacketed tube, applied directly to the surface of the tumor. In some cases the tube was inserted into the growth and in some inserted into the cavity of the antrum through a fistulous communication leading from the mouth into the antrum. In one case the treatment was entirely by the insertion of small seeds. The results may be classified as follows:

	Cases
No benefit	5
Palliated	5
Marked improvement followed by recrudescence	2
No recurrence to date for four months	1
Total	13

The most favorable result was seen in the case treated by the insertion of seeds. This patient, a woman, presented a large, hard tumor of the left upper jaw involving the alveolus from the median line to the posterior molar region. It extended mesially to the midline. Practically the whole of the left half of the hard palate was involved. There was considerable bulging of the cheek over the left upper jaw. The patient received active radiation, with seeds inserted into the tumor mass at various points, on six occasions over a period of five months. The dosage varied from 4 mc. to 22 mc. A very severe reaction followed the last two treatments, burns on the tongue and cheek being very painful, and lasting about three months. The growth was, however, apparently destroyed. When last seen, four months after the last treatment, the tumor had entirely disappeared. A fistula with smooth epidermatized surface was observed leading into the antrum from the posterior molar region on the outer aspect of the alveolus.

GROUP II. Eleven Cases with Recurrent Growth Following Operation. The methods of application in this group were similar to those used in Group I. The results were as follows:

	Cases
No benefit	3
Palliated	2
Marked improvement followed by recrudescence	4
No recurrence two and one-half years and four years	2
Total	11

GROUP III. Fifteen Cases Treated by Radium Immediately or Shortly after Operation. Two of these cases were radiated before operation also. Several types of operation were employed, the favorite incision for cases primary in the antrum or ethmoid being the Moure external incision or some modification of it. In cases showing little or no involvement of the antrum the tumor was approached through the mouth. Whatever the method of approach a wide exposure of the growth was secured, all visible tumor removed and a wide opening left for the subsequent application of radium in heavy dosage up to 900 mc. hours.

The results in this group are:

	Cases
No benefit	3
Death, secondary to operation	3
Marked improvement, followed by recurrence	1
No recurrence three years, three years, two years, one and one-half years, sixteen months, eight and one-half months, three months, two months	8
Total	15

Of the three deaths secondary to operation, two were from meningitis and one from hemorrhage.

The total results in the three groups are:

	Cases
Not improved	11
Palliative result	6
Temporary improvement	8
Death, secondary to operation	3
No recurrence to date	11
Total	39

By far the best results were obtained in Group III of this series. Several of these cases appeared in a hopelessly advanced stage of the disease, and a percentage of 50 per cent. favorable results in such cases is certainly ground for encouragement. Although it is, of course, too early to judge of the ultimate result, there is no question of the benefit already derived.

Several of the cases in Group III were operated upon and treated by Dr. H. A. Barnes, who deserves the credit for conceiving and developing the idea of leaving a wide-open external wound for the application of radium. Several of the most desperate and hopeless cases were operated upon by him.

Conclusions. 1. In malignant disease of the regions we have considered, the chief value of radium lies in supplementing rather than supplanting operation.

2. In cases of extensive extrinsic laryngeal carcinoma about the upper orifice, in which operative removal entails excessive operative risk, benefit may be expected in a small proportion of cases by radium treatment alone. In our hands the method of insertion of seeds under direct inspection has been the most effective in such cases.

3. In early intrinsic carcinoma of the larynx the operation of thyrotomy and excision, without radiation, is still the method of choice. This conclusion is based on the untoward secondary results which have followed in certain cases caused by the destructive effects of active radiation on the cartilaginous framework of the larynx. The results from thyrotomy in early cases are too favorable to lead one to employ radium treatment under these circumstances. In moderately advanced cases, however, the use of radium to supplement operation is advisable.

4. In most cases palliative results in the way of retardation of the growth and relief of pain may be expected by radium treatment in some form.

5. In advanced upper-jaw cases, treatment by operation followed by radiation has given promising results.

TABULAR RESULTS

LARYNGEAL CASES

GROUP I. EXTERNAL TREATMENTS ONLY. FOURTEEN CASES

Case.	No. of Treatments.	Results.
1	2	Slight palliation: death in 6 months.
2	3	No benefit: death in 6 months.
3	14	Still under treatment: no objective improvement.
4	5	Slight palliation: death in 7 months.
5	9	Marked retardation: lost sight of after 1½ years.
6	4	Slight palliation: death in 13 months.
7	8	No benefit: death in 6½ months.
8	2	Slight retardation: death in 2 months.
9	3	No benefit: death in 6 months.
10	29	Marked retardation: death in 2 years, 1 month.
11	5	Slight improvement for 1 month: death in 6½ months.
12	8	Growth stationary for 9 months: patient then went to England; not heard from.
13	3	No benefit: died in 1½ months.
14	4	No improvement: death in 9 months.

Palliated or retarded, 8; no benefit, 6; total, 14.

GROUP II. INTERNAL TREATMENTS ONLY. SIX CASES

Case.	No. of Treatments.	Results.
1	2	No benefit: death in 5 weeks.
2	1	No benefit: death in 1 month.
3	11	Marked temporary retrogression: death in 5 months.
4	16	Marked temporary retrogression: death in 12 months.
5	8	No benefit: death in 13 months.
6	1	No benefit: death in 2 months.

Temporary improvement, 2; no benefit, 4; total, 6.

GROUP III. COMBINED EXTERNAL AND INTERNAL TREATMENTS. SEVEN CASES

Case.	No. of Treatments.	Results.
1	21	Retardation for 18 months: still under treatment.
2	5	Temporary retardation: death in 6 months.
3	5	No benefit: death in 12 months.
4	18	Slight retrogression for 6 months: death in 12 months.
5	4	No benefit: death in 7 months.
6	10	Marked retrogression 1 year: still under treatment.
7	7	No benefit: death in 10 months.

Retarded or temporarily improved, 4; no benefit, 3; total, 7.

GROUP IV. TREATED THROUGH TRACHEAL FISTULA. FOUR CASES

Case.	No. of Treatments.	Results.
1	12	Retarded: death in 10 months.
2	1	No benefit: death in 12 hours.
3	1	No benefit: death in 2 months.
4	7	Marked retrogression for 9 months: death in 2 years and 1 month.

Retrogression or retardation, 2; no benefit, 2; total, 4.

GROUP V. RADIATED IMMEDIATELY OR SHORTLY AFTER EXTERNAL OPERATION. SIX CASES

Case.	No. of Treatments.	Results.
1	3	No recurrence to date: 8 months.
2	10	No evident recurrence for 8 months: patient lost sight of.
3	2	Recurrence in 5 months.
4	16	Recurrence after 20 months: death in 25 months.
5	4	Recurrence in 5 months: still under treatment.
6	1	No recurrence: still under treatment, 1½ months.

Recurrence, 3; no recurrence at present, 3; total, 6.

GROUP VI. CASES TREATED BY SEED INSERTIONS. FIVE CASES

Case.	No. of Treatments.	Results.
1	1	No recurrence to date: 6 months.
2	2	Marked improvement, followed by recurrence in 5 months; death from hemorrhage 1½ months after last treatment.
3	2	Marked temporary retrogression, followed by recrudescence; still under treatment.
4	4	Disappearance of primary tumor after 6 months: gland metastasis still under treatment.
5	2	Temporary retrogression, followed by recrudescence.

Retrogression, followed by recurrence, 2; no recurrence to date, 2; retrogression, death from hemorrhage, 1; total, 5.

UPPER JAW CASES

GROUP I. TREATED WITHOUT OPERATION. THIRTEEN CASES

Case.	No. of Treatments.	Results.
1	13	Palliative.
2	38	Retarded: death in 20 months.
3	5	Palliative.
4	?	Palliative.
5	7	Temporary retrogression.
6	2	Temporary retrogression.
7	3	Temporary retrogression.
8	1	No benefit.
9	3	No benefit.
10	4	No benefit.
11	3	No benefit.
12	2	No benefit.
13	6	No recurrence: 4 months.

Temporary retrogression or palliation, 7; no benefit, 5; no recurrence, 4 months, 1; total, 13.

GROUP II. TREATED FOR RECURRENCE AFTER OPERATION. ELEVEN CASES

Case.	No. of Treatments.	Results.
1	2	Slight retardation.
2	15	Palliative.
3	9	Marked temporary improvement.
4	2	Marked temporary improvement.
5	7	Marked, but temporary improvement.
6	10	Marked retrogression; tumor now stationary; still under treatment; 15 months.
7	2	No benefit.
8	4	No benefit.
9	1	No benefit.
10	5	No recurrence after 2½ years.
11	6	No recurrence after 4 years.

No benefit, 3; temporary retrogression, 4; palliation, 2; no recurrence, 2½ years and 4 years, 2; total, 11.

GROUP III. TREATED IMMEDIATELY OR SHORTLY AFTER OPERATION. FIFTEEN CASES

Case.	No. of Treatments.	Results.
1	5	Recurrence.
2	21	Recurrence.
3	3	Recurrence.
4	5	Recurrence.
5	2	No recurrence: 3 years.
6	2	No recurrence: 3 years.
7	15	No recurrence: 2½ years.
8	2	No recurrence: 1½ years.
9	6	No recurrence: 16 months.
10	4	No recurrence: 3 months.
11	1	No recurrence: 2 months.
12	1	Death from meningitis: 11 days.
13	1	Death from hemorrhage: 4 months; no recurrence noted.
14	1	Death from meningitis: 10 days.
15	3	No recurrence to date: 8½ months.

Recurrence, 4; death from hemorrhage, 1; death from meningitis, 2; no recurrence to date, 8; total, 15.

Report of Cases

D. Bryson Delavan, M.D.:

The amount of material relating to this subject thus far available in literature may be quickly summarized. The cases published and the remarks made by different observers upon the general situation will be sufficiently suggestive to make their presentation worth while.

For us who are laryngologists, malignant disease of the larynx offers most serious and important problems. It has received considerable attention.

Our experience at the Memorial Hospital, New York City, seems to have been similar to that of other institutions and investigators: In several instances radium appears to have succeeded in arresting the disease; in some others temporary retrogression has taken place in the growth; in the majority of a large number of cases, even where actual retrogression has not taken place, distinct relief of unpleasant symptoms has followed the use of radium; in certain other cases it has been ineffective; in a few, very advanced, the results seem to have been a stimulation of the infiltration.

Dr. Duncan McPherson,[1] through Dr. Forbes, allows me to quote 2 cases of laryngeal carcinoma which he has treated with radium at the New York Postgraduate Hospital. In 1 there has been distinct retrogression of the growth to date. The case has been too recently under treatment to admit of a complete report. In case No. 2, advanced and inoperable, radium brought great relief to distressing symptoms. In both of these cases the condition of the enlarged postcervical glands has been greatly benefited.

Larynx. Freer[2] reports a case of epithelial carcinoma of the larynx and base of tongue in a man of middle age treated by means of Simpson's radium needles, in May, 1917, and at the last account well. He refers to two cases successfully treated by Dr. Ingals, of malignant tumors of the pharynx.

Boggs,[3] of the Allegheny General Hospital, Pittsburgh, says indefinitely of the work at his institution: "Some good results have been obtained by the use of radium in the treatment of carcinoma of the throat."

Nasopharynx. While there are no reports of cases of nasopharyngeal fibromata, the results of the radium treatment of uterine fibroma are very satisfactory and warrant a passing reference. Several hundred successful cases have been reported by various well-known American authorities. There is every reason to believe that the use of radium in nasopharyngeal fibromata will prove valuable.

Launois, Sargnon and Moutet[4] report that tumors of the nose, sinuses and nasopharynx treated by them (mostly sarcomas), usually showed good results.

New,[5] of the Mayo clinic, for malignant tumors advocates the destruction of growths of the antrum by slow actual cauterization; this is to be followed by the application of radium. He reports 15 cases, of which the histories are complete, but only 1 of which has been observed for a period of two years: 3 patients died; in 2 there was speedy recurrence; 10 were alive with no recurrence from eight to twenty-eight months after operation.

Boggs[3] says: "Sarcoma in the nasopharynx is much more amenable to radium treatment than carcinoma. Even in cases in which half of the throat is filled the growths frequently disappear in from four to six weeks after treatment." Several such cases of his have remained well for four years.

Tonsil. While few cases of tonsillar growth have been reported, many have been treated, with histories conforming to the general experience, namely, that the more malignant the neoplasm the less effective the treatment.

Launois and Sargnon[4] report sixteen tonsillar tumors (lymphadenomas or sarcomas), of which 6 were cured. Rainey[6] reports a lymphadenomatous growth of the tonsil, cured by radium.

Lip, Tongue, Etc. Lip. Elliot[7] believes that epithelioma of the lower lip is generally caused by pipe-smoking and that it should be treated with radium.

D'Arcy Powers[8] believes that carcinoma of the lips is due to smoking and that it will be more common in the future in women from their having taken up the habit.

Broders[9] gives a laborious study of 500 cases of squamous epithelioma of the lip, operated upon at the Mayo clinic. Apparently radium was not used. He gives a diagram showing the percentage of metastases resulting from cancer of the lip involving the lymph-nodes of the neck, mediastinum, and even the liver. His observations have not been verified by autopsies at the Memorial Hospital, where it has never been found that metastases from the lips and tongue extend below the line of the clavicle. When they do occur they are apt to affect the sublingual gland and the postcervical lymph nodes.

Sittenfeldt[10] reports 15 cases of carcinomata of face, mouth and throat. Among these were 7 cases of basal-cell epitheliomata of the nose, ear, lips, cheek, etc., every one of which yielded to treatment and has been free from recurrence from one to six years; 3 cases of squamous-cell epithelioma of the antrum complicated with ethmoidal and sphenoidal sinus involvement, 2 of the tongue and 3 of the tonsil, involving the pharynx and larynx, were not as satisfactorily influenced. Of these 8, hopelessly inoperable, 2 are still alive, 1 cured for the past four years, and 1 already much improved. One man, eighty-two years old, with spindle-cell sarcoma of tonsil, pharynx and larynx, lived two and one-half years and died of metastasis.

Boggs[3] says: "The older methods of treatment of malignant growths of the mouth and throat have not been successful. The pessimistic reports from the London radium and other institutes, concerning the value of radium, must be discounted when it is recalled that most of these institutions treat only inoperable cases and with radium alone." He believes that radium, except with early cases, should be combined with other suitable measures, such as surgery, in order to obtain the best end-results. He continues: "In epithelioma of the mouth and throat the use of radium is sometimes brilliant, sometimes disappointing. The results warrant the consideration of radiotherapy in every case, whether as an anteöperative procedure or as a palliative in hopelessly inoperable cases."

Launois and Sargnon,[4] in a study of 43 cases, have found that the results of the radium treatment of nonepitheliomatous growths have been good; in true epithelioma they have not been so favorable, while in epithelioma of the ectodermal type the disease has not been affected by the radium and may be unfavorably influenced.

Recent improvements in the production of the roentgen-ray have imparted to it properties which closely resemble those of radium. Thus far, however, the difficulty of concentrating the *x*-ray upon a given circumscribed locality, and of applying it from within such enclosed cavities as the larynx and nasal region, render it less adaptable to growths of the upper air passages than radium, which, easily manipulated and capable of being so regulated as to allow of its action being absolutely confined to given fixed limits, far surpasses for our special purposes the roentgen-ray.

Cullen[11] says: "At the present time we know of at least three good things radium has done: (1) It has apparently cured a percentage of surgically inoperable cancer and sarcoma cases. (2) It has prolonged life in others. (3) It has relieved pain and done away with or mitigated distressing symptoms in not a few."

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DR. J. PAYSON CLARK, Boston, Mass.:

George B., aged thirty-eight years, first seen August 21, 1918. Throat began to swell eight weeks ago. Now marked swelling in region of right tonsil, involving half of soft palate and extending on to hard palate. Tumor ulcerated, no glands in neck, general condition good. Clinical diagnosis, sarcoma. Treatment: 72 mc., screening steel, protection 2 mm. lead to tongue, for half an hour.

At the next two visits there was extensive sloughing of the tumor: on October 2 the pocket left by the slough was clean, but below, and flaring out around this pocket, was a mass of growth resting on the tongue. Treatment: 77 mc., steel tube, screening adhesive and steel, protection 2 mm. lead on tongue, half an hour.

On October 16, there being little effect from the last treatment, a steel tube (66 mc.) was inserted into the tumor for one hour.

On October 30 the growth had shrunk to half former size. A steel tube (82 mc.) was inserted into the tumor for three-quarters of an hour.

On November 13, back of the soft palate on the right, there was an irregular reddish swelling involving the lateral and posterior pharyngeal wall. In the region of the right anterior pillar were two small pedunculated growths, one of which was snipped off for microscopic examination. Microscopic report: "Tissue composed largely of closely packed medium-sized lymphocytes, and not showing the usual appearance of tonsillar tissue. Mitotic figures are present. Diagnosis: Malignant lymphoma." One glass tube (2.9 mc.) inserted and left in tumor.

On November 27, in region of anterior pillar, there is cicatricial tissue; no evidence of growth. Just back of remains of anterior pillar, and involving posterior pillar and right lateral pharyngeal fold, is a soft red swelling.

January 8, 1919. Apart from slightly increased redness on right pharyngeal wall nothing abnormal seen. When seen two months later this redness had gone and there has been no evidence of recurrence since.

Dr. Frederick E. Hopkins, Springfield, Mass.:

This case ought, perhaps, to be reported as one for diagnosis, since there is no definite proof regarding the nature of the obstructive lesion, because it was impossible to secure a specimen for microscopic examination. In the case I reported to this Association under a similar title, two years ago, where the accessory thyroid projected into the lumen of the esophagus, a portion was removed and a section was definitely shown to be thyroid tissue.

If exception be taken to the diagnosis of the case herewith reported, I shall be much interested to hear the grounds on which this exception is based.

The patient, W. E., American, seventeen years of age, extraordinarily tall and slender, son of a country minister, gave the following history: While spending his summer vacation, 1919, on the Vermont farm of his uncle, he suffered from what was considered an acute infection of his throat, "a severe tonsillitis," attended by high temperature and marked prostration. A prominent symptom was difficulty in swallowing, a difficulty becoming at once serious because of its interference with nutrition. He was taken to the hospital at Springfield, Vt., where he was fed by tube and bougies were passed to dilate the supposed stricture of the esophagus. This was continued for a period of about six weeks.

The feeding was insufficient, and the boy was all but starved, becoming so weak he could not sit up, and the doctor, discouraged by the outlook, on September 19, 1919, referred the patient to Dr. Ralph H. Seelye, surgeon to the Springfield Hospital, Springfield,

Mass., who courteously turned him over to my service. Here I had the most earnest and thoughtful assistance on the part of the members of the staff in the attempt to solve the problem presented in this unusual esophageal obstruction. Dr. Van Allen, the roentgenologist, with fluoroscope and *x*-ray plates, gave a definite picture of the position of the obstruction, which was but little below the cricoid cartilage, evidently displacing and closing the esophagus from the posterior and right side. The ease with which a soft rubber tube was passed into the esophagus and the rounded mass shown by the esophagoscope suggested abscess in the cellular structure around the esophagus. Notwithstanding the long freedom from pain or rise of temperature and no glandular enlargement, I proposed to incise the supposed abscess through a short Jackson tube.

The rounded, somewhat yielding surface, as the tube entered the esophagus, gave me the impression that if I were possessed of the necessary skill and boldness the boy was promptly to be relieved. However, no abscess was opened, for none existed. Palpation showed a yielding mass but not a fluid content. At this juncture Dr. Frederick Jones, pathologist at the hospital, recalling the accessory thyroid case to which I have already referred, suggested that this growth might be of a similar nature and that this supposition fitted the condition better than any theory we had thus far entertained.

Dr. Van Allen then undertook the treatment of the case with radium and *x*-ray, after the manner which he describes in the appended letter:

"In response to your inquiry I am sending details of the treatment of W. E. Four radium treatments were given in the esophagus: October 16, December 9, 1919; February 11, March 29, 1920. The technic of each treatment was as follows: 50 mgs. of radium; ½ mm. silver filter; 2 mm. rubber; 1 hour duration. The rubber filter consisted of a catheter in which there was a piece of lead and above this the radium. The treatment was given in the fluroscope room and the lead in the catheter enabled us to see clearly the exact position of the radium. The patient was able to hold the tube in position the entire hour without difficulty."

Of the plates taken by Dr. Van Allen he writes as follows:

"I am enclosing prints of the case of W. E. No. 1 was taken in September. This shows a pushing forward of the esophagus by the neoplasm, which was behind and to the right of it. No. 2 was taken on the same date. At this time his efforts to swallow bismuth paste were watched under the fluoroscope. The bismuth mass would be passed down repeatedly with force to the point "A," but as a total result only a small bit passed into the esophagus, showing the bismuth at "B." No. 3 was taken April 28, 1920, and does not express

the condition well. The bismuth lodged at the point "A," but every act of deglutition passed good-sized portions easily downward into the stomach. The paste passed downward by two routes, as though a tumor or smooth body was projecting into the center of the caliber

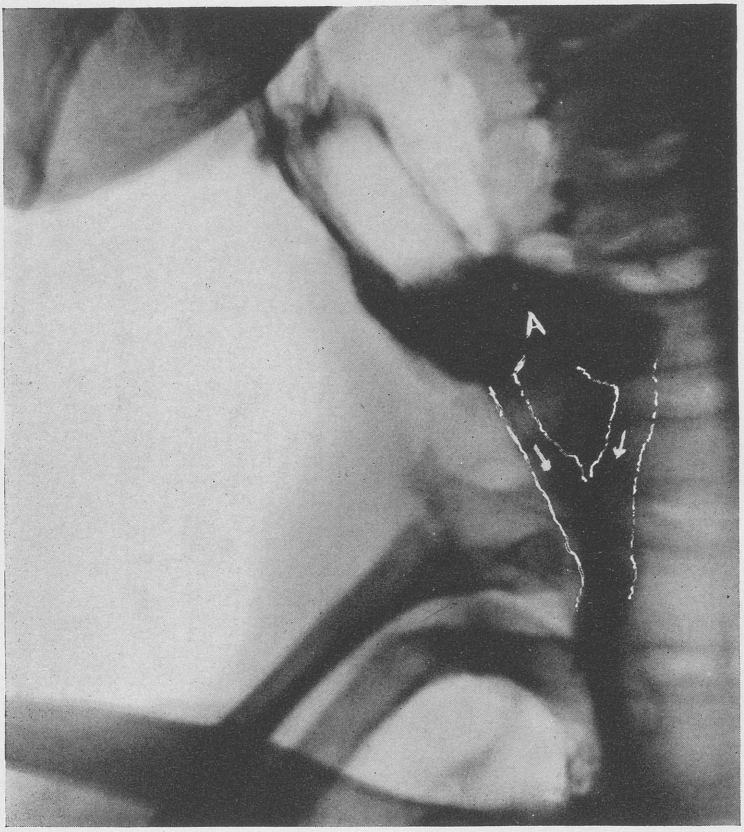


FIG. 1

of the esophagus. This fluoroscopic appearance I have traced on plate No. 4."

I do not definitely recall how early there was evidence of sufficient subsidence of this mass encroaching on the esophagus to permit of swallowing, but there was a steady improvement until food was taken

comfortably, and by Christmas he wrote Dr. Van Allen that he hoped the doctor was having as good a Christmas dinner as he was eating. A gain of thirty pounds in weight was made, with resumption of all a boy's activities.

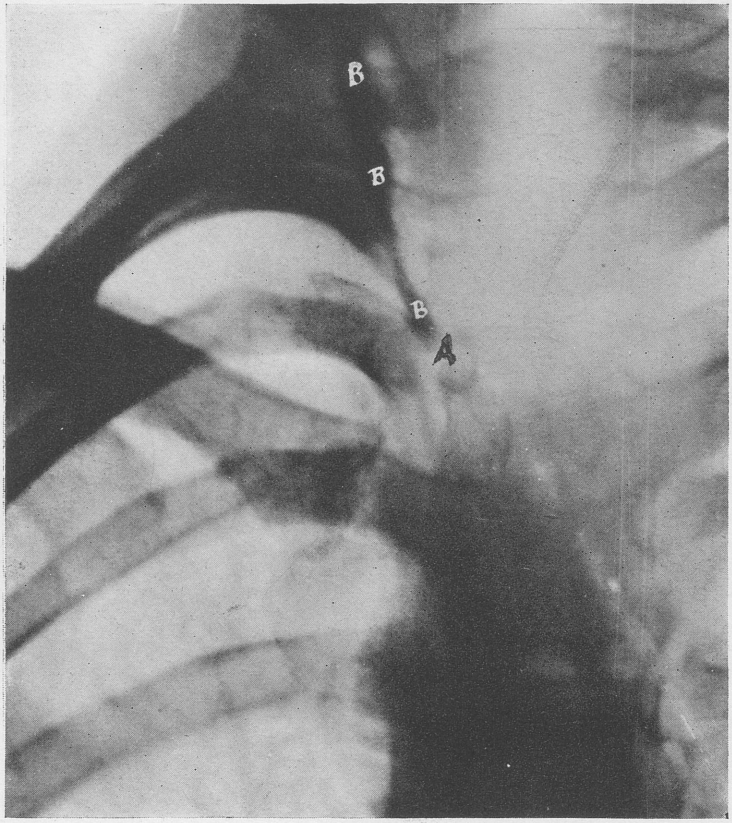


FIG. 2

DR. JOHN E. MACKENTY, New York:

I want to present a specimen of a larynx which shows the effect of radium treatment. Radium gas was injected into the larynx direct and left in. Three weeks later there was an enormous edema of the larynx, so that it was necessary to do a tracheotomy and feed the patient by tube through the nose. The man developed a septic bronchitis and was rapidly losing ground. An operation was done under combined local and general anesthesia. The temperature never rose at all after operation. The larynx was the site of a large abscess

cavity. The man made a rapid recovery and now takes the normal amount of food in the usual way. The pathological gross and microscopical reports follow.

Microscopic Report. Section 8430 (below the ulcer) includes the suppurating base of the ulcer at one margin and the perithyroid tissues in some thyroid acini attached at the other opposed margin. Between these we may divide the tissues for the purpose of description into three zones: (1) that of the ulcer with its inflammatory area adjoining; (2) beneath this a zone of chronic and subacute inflammation, and (3) the cartilaginous and perithyroid tissues.

1. The ulcer zone shows a typical fibrinopurulent exudate. Under this is the usual reactive inflammatory tissue, with a layer of polynuclear infiltration superimposed upon developing inflammatory connective tissue with large areas of round and plasma cell proliferation, interspersed with a moderate number of polynuclear cells and eosinophiles. Between the first and second zones, here and there, are scattered a few (four in this section) distorted carcinoma cells with large deeply-staining nuclei. Their nuclei differ from those of the inflammatory giant cells seen in another section in the intensity with which they take the hemotoxylin stain.

2. The second zone is made up of new-formed connective tissue in varying stages of fibrosis, in which inflammatory foci are interspersed. In the latter plasma cells are the preponderating elements.

3. The inflammatory process in its chronic form, represented by proliferation of round and plasma cells, can be traced well into the connective tissue of the third zone immediately adjoining the thyroid tissue.

Above the ulcer this section includes one portion covered by intact mucous membrane, under which is a zone of inflammatory infiltration glandular elements, muscle and new-formed connective tissue, and a second portion adjacent to but not covered with mucous membrane.

The first is bordered by intact mucous membrane which is infiltrated with polynuclear elements. The submucosa is thickened by extensive infiltration with round and plasma cells. Beneath this the connective tissue shows evidence of chronic hyperplasia, and still farther in the depth a more intrinsic chronic productive process.

That portion adjacent to the mucous membrane, and where the latter is defective, presents granulation tissue on the surface, the deep portion of which manifests the usual transitions into connective tissue formation. In places there are inclusions of lime deposits and foreign body giant cells. Atypical, distended and atrophied glandular acini are also seen and in a few places a number of suspicious carcinoma cells, the inflammatory invasion having distorted these beyond point where recognition is certain.

NOTE: October 6. Patient has gained fifty-one pounds and has resumed his occupation.

Discussion

Dr. C. G. Coakley, New York:

In the treatment of malignant disease by radium we have to learn more of the technic to be employed than we know now. Experimentally it should be put in where the surrounding structures cannot be reached. Usually radium will retard the progress of the disease for a time. I think that it has been proven experimentally and clinically that while there is a partial destruction of the tissues of the pharynx and larynx, and improvement of the patient, there is liable suddenly to occur a rapid extension and increase of the growth such as occurs in no other way. One point observed in radium treatment of the nose and nasopharynx is the extraordinary amount of pain and burning produced, which no medication will allay.

I have had 11 cases of cancer of the larynx; 1 radiumized November, 1913. It was favorable for such treatment, as the growth was limited to one-half of the cord. The man was given an improperly screened dosage, and while the growth diminished there was terrible destruction of tissue and the trachea was destroyed. Dr. Wood sectioned the cord. There was not a trace of epithelioma found, but there was a septic bronchopneumonia due to absorption of toxic material. In another case I do not know whether or not radium should have the credit. There was an epithelioma involving the upper part of the larynx. A tracheotomy tube was in two weeks. When the tube was removed there was considerable granulation tissue that was radiumized. The man is going about now with his tracheotomy tube still in position. I think the granulation tissue was burned out by the radium.

Surgery may be used in cases where radium fails: 5 cases of fibroma of the nasopharynx did remarkably well; 1 case of epithelioma of the palate had a recurrence after eight months; 1 case of a young woman whose constant asthma was caused by nasal polyps was treated by radium. The asthma was relieved, and some months after it was found that the polyps had entirely disappeared. This might have been due to radium.

Dr. H. P. Mosher, Boston:

I have had more experience with carcinoma of the upper jaw than with carcinoma of the larynx. I am now running a series of cases of malignant disease of the antrum and ethmoid. All the cases had the Moure operation, followed by the employment of *x*-ray (to block off the lymphatics to the glands of the neck) and radium.

Radium has raised our hopes in the treatment of malignant disease which is superficial or which can be made so by operation, as these cases of malignant disease of the upper jaw and the accessory

sinuses can be made by operation. If the extent of the disease calls for it, the floor of the antrum must be taken away and the nose and the mouth turned into one cavity. I strongly object to this if it can be avoided. It is not necessary in early cases. If a patient in the cancer age has nasal obstruction and bleeding from the nose the antrum should be opened as an exploratory measure, because, as far as my experience goes, most of the cases of malignant disease of the nose start in the antrum and usually from the outer wall.

Dr. Harry A. Barnes, Boston:

I have used radium with success as a postoperative measure after excision of malignant growths. The tubes are placed in the cavity, 35 to 40 mc., and left in about two weeks. If used at once to kill off any cells which may have been transplanted by traumatism this measure will prevent metastases. Of 6 carcinoma cases, I have had 3 die and 2 are alive and well—3 successful cases in all, making about 50 per cent. of good results.

Dr. Harmon Smith, New York:

It has been my practice for the past number of years, in fact since radium was first used in this country as a therapeutic agent, to send all my cases to Dr. H. H. Janeway, of the General Memorial Hospital, New York City, where the strongest radium was available. His absence here materially lessens the force of my remarks, as he had embodied in his paper the histories of a number of my cases. I can only recall a few of the series from memory.

The first cases were all unquestionably carcinoma of the larynx and had proceeded too far for justifiable operation when first seen, for at that time Dr. MacKenty had not demonstrated his brilliant operative technic in the complete extirpation of the larynx for this disease. All of these cases had progressed so far that it was even necessary to perform a tracheotomy before they were turned over to Dr. Janeway, and while their span of life may have been extended they nevertheless went on to their doom within a year or eighteen months after the application of radium.

The next two cases were those of lymphosarcoma of the tonsils. In the first case, a boy of eighteen to twenty years, I removed the right tonsil, and in about eighteen months there appeared a similar involvement of the left. I also removed this and had radium applied postoperatively. For about two years he remained free from involvement, and so far as the pharynx was concerned there was never any indication of a return of the growth. However, metastases occurred in the chest and head, and he ultimately died, being unconscious for a long while previous to his demise. The second case was also lymphosarcoma of the right tonsil, in a man over forty years of age. No operation was performed, but under the use of radium the

growth disappeared, and while under observation, about two years, there was no evidence of return.

The next two cases were typical nasofibroma—one in a boy sixteen years of age and the other in a man of about twenty. The first case showed the greater evidence of malignancy, if one can properly call malignancy "cell-growth run riot." I removed this tumor several times, with profuse hemorrhage each time. I also injected monochloracetic acid into the body of the growth. But each time the recurrence was more rapid, until finally the tumor grew around the zygomatic wall of the superior maxilla and protruded into the cheek; likewise filled both nasal cavities and all the nasopharynx. The patient was submitted to radium treatment at several different intervals, but to no effect, and while in the General Memorial Hospital for another trial with radium he had a spontaneous hemorrhage of unusual proportions, and before a tracheotomy could be performed or the hemorrhage controlled he drowned in his own blood. The second case followed virtually the same course and at the same time. In this case, one of my assistants, Dr. White, even split the palate in an endeavor to remove all the tumor. I expected no more favorable outcome than in the first case; but while exercising my brain for some new means of controlling this tumor the patient disappeared from the hospital and did not reappear for about a year. Upon his return the growth had disappeared from his cheek and had markedly diminished in all its proportions. I had one of my assistants inject again, with monochloracetic acid, into that portion appearing in the nasopharynx, likewise into that in the nares, and after a few months the growth had almost entirely disappeared. Whether Nature had formed the proper fibrosis around its pedicle and shut off the blood supply, or whether radium had instituted certain fibrosis changes, or monochloracetic acid had been the favorable agent, I cannot say.

The last cases have been cancer of the larynx and are now under treatment. One patient came to me from South America in November, 1919, with cancer of the larynx. He came with the express demand that if the lesion were cancer he wished radium applied, and if I did not favor his desire he would go to Johns Hopkins. Nearly all the cases I have had in the past three years have expressed themselves after this fashion. I think the reputation for the cure of cancer by radium has been unjustifiably advertised to the laity, and in many cases—such as in the patient cited from South America—one may lose the crucial operative moment by applying radium first. It is certainly of the greatest importance that we shortly determine exactly what radium can do and likewise ascertain its limitations; for, to my mind, the laity are too favorably impressed with its virtues.

ACUTE ABSCESS OF THE LATERAL WALL OF THE LARYNGOPHARYNX

CHARLES W. RICHARDSON, M.D.

CLINICALLY we occasionally meet with conditions which we have not seen described in the literature, which seem to us unusually rare, and which cause us either to doubt our clinical acumen, or wonder if such experience has not been the experience of others who have for various reasons not given description to their findings.

The condition which I propose to report briefly today is the occurrence of an abscess in the laryngo-pharynx. In this region, occasionally, we have abscesses directing their way down from peritonsilar pus formation. In this type of laryngo-pharyngeal abscess we have the easily recognized relationship with the coexisting peritonsillar abscess. The form of laryngo-pharyngeal abscess which I shall describe is primarily an abscess of this region, with an absolutely normal faucial region. In the past ten years I have seen three primary abscesses of this region, two of which I have observed in the past eighteen months. From the clinical account of a case which terminated fatally in the practice of a colleague, I believe that he had to do with an abscess of this character.

The etiological factors which enter into the formation of an abscess in this region have been difficult for me to elucidate. It is possible that a lymphatic gland, numerous in this region, might have become infected, or some article of food containing a foreign body might have slightly incised the mucosa and thereby produced infection.

The symptoms are quite characteristic. The onset is quite sudden. Pain is usually the earliest symptom. The pain is very intense and is located just below the angle of the jaw, over the great cornu of the hyoid bone. Tenderness to pressure in this region is very marked. Pain in swallowing is exquisitely pronounced. The pain is so great as to render sleep fitful and unrefreshing. There is a pro-

fuse secretion of mucus, but no insalivation. There is a noticeable tumefaction to the touch on the second or third day, which no doubt would become markedly visible did not spontaneous or artificial evacuation take place. Respiration is not affected, and the voice is usually normal. Chilly sensations are present from time to time. The temperature is septic, but with only a moderate wave. The patient is decidedly uncomfortable, restless, anxious and entirely disturbed about the issue of his case.

Local manifestations: The faucal regions appear normal; no tenderness about tonsils. Depression of the tongue is painful. Through the use of the laryngeal mirror a distinctive swelling can be observed protruding inward in the lower pharynx on a line with the fossa navicularis. This region has a slightly congested appearance. On the second or third day distinctive pointing takes place, from which spontaneous rupture with evacuations may take place, or through which an incision may be made which will result in the evacuation of the abscess.

In conclusion I wish to make several observations:

1. The sudden onset.
2. The severity of the symptoms; in particular, the pain.
3. The absence of tonsillar infection.
4. Location well below the lower border of tonsil.
5. The uncertainty of its etiology.
6. As rare as it seems in my clinical work, I am sure that many of the membership have seen this type of faucial infection and may help to elucidate what is still unclear in my report.

Discussion

Dr. Henry L. Swain, New Haven, Conn.:

In the year 1913 *Transactions,* I published five or six cases of this lesion which, in contradistinction to the posterior pillar of the palate, I called abscess of the lateral column of the pharynx. In all of these cases there was marked edema of the larynx. I recently had a case very similar to Dr. Richardson's, low down on the lateral column, without edema. The abscess cavity was fully as large if not larger than the ordinary quinsy, and would have dissected downward if not opened.

Dr. John E. MacKenty, New York:

Several cases came to me this winter. In one case there was danger from edema of the larynx. The neck was opened from the outside. There was good drainage of the constricted area of the pharynx. I believe it is safer in some cases to operate from the outside. Probing for pus in the edematous tissues of the throat is a very dangerous procedure. Tracheotomy in these cases is a serious matter.

Dr. Richardson (closing):

Dr. Swain's article, which I had the pleasure of reading, does not fit in with the type of cases which I am narrating in my paper. They refer more to cases of abscess in the lateral wall of the pharynx and posterior pillar of a dissecting type. The last case which he mentioned is exactly similar. I hope my good friend will pardon me for thus referring to his cases.

NASOCILIARY NEURALGIA

GREENFIELD SLUDER, M.D.

PAIN[1] in the eyes, brow and root of the nose is frequent, and may be of different origins. Localization of the pain of the several origins by the patient is not precise. Pains of frontal, ethmoidal or sphenoidal sinuses, or nasal (phenopalatine-Meckel's) ganglion, or supra-orbital or nasociliary nerve origin may overlap in their sensations. This last pain is usually referred to the small district bounded by the supraciliary ridge above the supra-orbital notch laterally and the nasal bones below. Sometimes it extends to the tip of the nose. Rarely it is referred to the eyes. Patients often complain that they cannot wear their glasses because of soreness of the nasal bones. Severe degrees, however, of whatever origin, may be referred beyond these limits. Pain of supra-orbital neuralgia is more widespread. Pain of suppuration of the frontal or ethmoidal sinuses, under pressure, is of long-known recognition. Pain of vacuum frontal sinus origin was described in 1900.[1] Pain of nasal ganglion origin, referred to this district was described in 1907.[1] It is usually accompanied by other painful sensations also. Pain of sphenoidal origin referred to this district, was described in 1912.[1] It, too, is usually accompanied by other painful sensations. Pain of supra-orbital systemic toxic neuralgia is of classical description.

Anatomical description, copied from Quain, eleventh edition, part II, iii, 16:

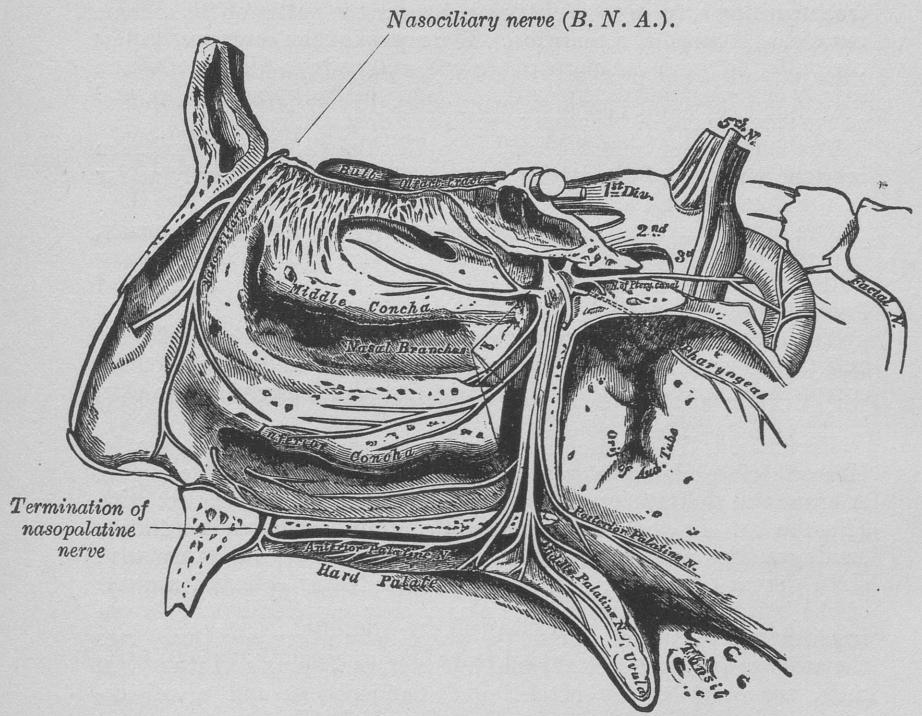
Nasociliary or nasal nerve.[2] This nerve enters the orbit between the heads of the external rectus muscle and between the two divisions of the third nerve. It then inclines inwards over the optic nerve, passing beneath the superior rectus and superior oblique muscles, to the inner side of the orbit, and leaves that cavity by the anterior

[1] For detailed description of these phenomena, see Headaches and Eye Disorders of Nasal Origin," by Greenfield Sluder, 1918. St. Louis.

[2] The name "nasociliary" is given by the B. N. A. to only the orbital part of the nerve; the term "anterior ethmoidal" is applied to the continuation from the orbit through cranial and nasal fossae.

internal orbital canal. In this part of its course it furnishes a slender branch to the ciliary ganglion, one or two filaments (long ciliary) directly to the eyeball, and a considerable infratrochlear branch, which arises just before the nerve enters its canal on the inner side of the orbit.

Arrived in the cranial cavity, the nerve is directed forwards in a groove at the outer edge of the cribriform plate of the ethmoid bone to a small canal between the forepart of the plate and the frontal



The splenopalatine ganglion and its branches. (Gray.)

bone, through which it descends to the nasal fossa. Here it gives off internal, or septal, and external branches to the mucous membrane of the forepart of the nasal fossa, and is then continued downwards in the groove on the back of the nasal bone, to terminate as the anterior or superficial branch in the integument of the lower part of the dorsum of the nose.

The *branch to the ciliary ganglion,* very slender and from a quarter to half an inch in length, arises generally between the heads of

the external rectus. It lies on the outer side of the optic nerve, and enters the upper and back part of the ganglion, constituting its *long root.*

The *long ciliary nerves* are situated on the inner side of the optic nerve; they join one or more of the short ciliary branches from the ciliary ganglion, and, after perforating the sclerotic coat of the eye, are distributed in the same manner as those nerves.

The *infratrochlear nerve* runs forwards along the inner side of the orbit, below the superior oblique muscle, and parallel to the supratrochlear nerve, from which it receives, near the pulley of the oblique muscle, a filament of connection. The nerve is then continued below the pulley to the inner angle of the eye, and ends in filaments which supply the conjunctiva, the caruncle, and the lachrymal sac, as well as the integument of the upper eyelid and root of the nose.

The *internal* or *septal branch* supplies the pituitary membrane over the forepart of the septum, extending downwards nearly as far as the opening of the nostril.

The *external branch,* often represented by two or three filaments, is distributed to the mucous membrane of the forepart of the outer wall of the nasal fossa, including the anterior ends of middle and lower turbinate bones.

The *anterior* or *superficial branch* issues between the nasal bone and the upper lateral nose, and runs downwards under cover of the compressor naris muscle to the tip of the nose, supplying the skin of the lower part of the organ.

Varieties. The nasociliary nerve occasionally (frequently, Krause) gives filaments to the superior and internal recti muscles. A branch to the lavator palpebræ superioris has also been met with (Fasebeck). In one case filaments of communication passed from a small ganglion connected with the nasociliary nerve to the third and sixth nerves (Svitzer). In two instances Testut observed absence of the infratrochlear branch, its place being supplied by the supratrochlear nerve. Offsets from the nasociliary nerve, as it traverses the anterior internal orbital canal to the frontal sinus and ethmoidal cells, are described by Meckel and Langenbeck; and a *sphenoethmoidal* (Luschka) or *posterior ethmoidal* (Krause) branch is said to pass through the posterior internal orbital canal to the mucous membrane of the sphenoidal sinus and posterior ethmoidal cells.

It is to be seen that the nasociliary nerve as it enters the nose in its uppermost anterior limit, is quite near the surface of the membrane. It is more superficial than the nasal ganglion (usually). The ganglion may, however, be quite superficial (submucous), according to Krause.[1] So it is easily understandable that an inflam-

[1] Krause: Anatomie des Menschen, p. 547.

mation of the membrane in this part may irritate or inflame the nerve and produce pain. In older cases, with general hyperplasia of membrane and bone, it is also easily understandable that the ethmoidal slit may be encroached upon to narrow its caliber and place the nerve in a more easily vulnerable position.

Differential Diagnosis. The nasociliary nerve is more easily cocainized than the nasal ganglion. A small applicator with 20 per cent. solution suffices. It is passed upward on the inside of the nose, being held forward in contact with the anterior limit of the nasal fossa until it reaches the roof of the fossa. By this procedure it arrives automatically in the apex of the angle formed by the cribriform plate above and the anterior limit of the nasal fossa. It is at this point that the nasociliary nerve enters the nasal fossa.

When the pain in this region is of nasociliary origin, such an application of cocain will stop it in a few minutes. Should it be of the other origins mentioned above, it will not be influenced by such an application. The differential diagnosis will, furthermore, reveal a tender spot in the floor of the frontal sinus if it be a case of vacuum or purulent frontal sinus origin (Ewing's sign). If it be a suppurating frontal or ethmoidal sinus, pus will usually be seen in the middle meatus, anteriorly. *X*-rays will show the frontal separated from the ethmoid. Should the frontal be totally closed, no pus will be thus seen; but the sinus will burst into the orbit. *X*-rays also show it. Should the pain be a supra-orbital neuralgia, this nerve in the supra-orbital notch will be found sensitive to touch. Pain of nasal ganglionic or sphenoidal origin will not be influenced by nasociliary cocainization. Ewing's sign will be absent. No pus will be found in the middle meatus. The supra-orbital nerve will be negative to pressure. Pain of nasal ganglionic origin will be relieved by cocainization of the nasal ganglion. Pain of sphenoidal origin will not be influenced by any of the above procedures.

Clinical Course and Treatment. My observation, so far, has been that nasociliary neuralgia has usually been a transitory phenomenon in the course of cases which have been under observation or treatment for something else. The nasociliary neuralgia would appear from time to time in the course of other clinical conditions and was usually not obstinate; it would yield to cocainization and applications of dilute carbolic acid, ½ per cent. Four times, how-

ever, I have seen it the only clinical phenomenon. Once I injected the nerve trunk at its entrance into the nose, with relief to the patient. The technic is that first advocated by Otto J. Stein in his alcohol injection treatment of hyperesthetic rhinitis.[1] A straight needle is passed upward in the nose in the same way as the applicator for cocainization, described above. A few drops 95 per cent. alcohol with 5 per cent. phenol are instilled into the nerve trunk at its exit from the ethmoidal slit.

Discussion

Dr. Henry L. Swain, New Haven, Conn.:

Although I know very little about it, I would like to remark on this paper. Dr. Sluder has gone to a refinement that the rest of us have not approached. He gave us the sphenopalatine ganglion syndrome, and now he is teaching us the nasociliary type, to be added to the neuralgias that have borne his name all over the world.

I have had an interesting case of the Sluder syndrome, which I reported to Dr. Sluder, and he writes me that it is an exquisite and unusual case, as I supposed it must be. The patient is a very intelligent lady, forty-five years of age. The symptom which most worried her was the Ewing's sign, which was very marked. That is relieved by the application of cocaine to the sphenopalatine ganglion. It is so sure a result that it is like turning on running water from a faucet. The pain immediately leaves. The woman had no knowledge of the subject, and the supposition is that if I could maintain this impression long enough, the pain could permanently be relieved. In this case the pain in the angle of the orbit was only one of the troublesome features. She had been to several eye specialists, and their treatment did not bring the relief which a single application to the sphenopalatine achieved. Dr. Sluder advises me to use injections of phenol and alcohol, and while I have no doubt it would be a good thing to do, I was hoping that he had discovered something less extreme. I have tried the applications of a weak solution of nitrate of silver and this prolonged the benefit of the cocain. Personally, I hesitate to apply carbolic and alcohol to the ganglion in this case because I am sure we shall get a severe reaction. When we used the simple 2 per cent. nitrate of silver we had a most distressing disturbance for twenty-four hours. As stated above, this patient had pains in the other situations mentioned in Sluder's classic description, the one behind and slightly above the

[1] Some Observations on the Treatment of Hyperesthetic Rhinitis. Laryngoscope, 1908.

ear, in the side of the throat, down the neck, in back of the neck, together with its peculiar taste as of altered salivary gland secretion. Simple pressure over the ganglion would bring out one after another of these painful spots, and this, Sluder explains, is due to the very thin covering which overlies the ganglion.

On four different occasions this winter I have seen these nasal neuralgias, and have put on cocain and adrenalin to the great relief of the ganglion. If Dr. Sluder's new discovery will relieve pain in this area we should follow him up in his splendid work.

DR. HARMON SMITH, New York:

We must not forget that the excellence of Dr. Sluder's articles has gone a long way toward disposing of the extra volumes of the *Transactions* left on our hands each year. Only a few weeks ago I received a request from a publisher to forward to some specialist in Italy the volume of the *Transactions* containing the article "Sluder's Syndrome," and this by no means represents an isolated instance in the case of Sluder's productions.

I will relate briefly a case I submitted to Dr. Sluder, in which he advised against his procedure of an anesthetization, and yet to my mind it presented all the symptoms which he claims are amenable to his method of treatment. I should like to have Dr. Sluder detail his reasons for not taking the case with him to St. Louis and pursuing the matter further than he was able to do in my office. The patient was a lady from Los Angeles who had had several operations upon her left maxillary sinus, all of which were followed by intense pain over her face on that side, becoming almost unbearable at times. She was sent to me to try the Sluder method, but as Sluder himself was coming to New York in a few days, I awaited his arrival and submitted the case to him. Local anesthetization had no effect, and Dr. Sluder seemed averse to having the patient return with him for further treatment. I then had Dr. Faulkner inject the Gasserian ganglion with alcohol, which had only a temporary effect. I then had Dr. Janeway apply radium within the antrum, which produced excruciating pain. He then placed her in Dr. Sharpe's hands, and her semilunar ganglion was removed, with immediate relief.

DR. JOHN E. MACKENTY, New York:

I am glad to hear Dr. Sluder's paper. Dr. Sluder always explains to us what we have seen and have not understood. We have all had this experience. This patient of mine had a nasociliary neuralgia. She had considerable inflammatory tissue there. I removed the tissue with the Sluder knives and this relieved the condition. There is another type of case: The patient has a sense of pressure over

the distribution of the nasal nerve, as if something were pressing inside of the nose. This causes a great deal of distress and does not yield to treatment. I would like to know if Dr. Sluder would include this in the nasociliary cases.

Dr. Hanau W. Loeb, St. Louis, Mo.:

The interesting part of this report is that it makes it possible to differentiate this type of pain from other types of nasal origin. I can see the logic of this work. Has Dr. Sluder met any cases with pain referred to this region but with a distant point of origin?

Dr. Norval H. Pierce, Chicago:

Some years ago I had a patient, an Episcopalian minister, who was obliged to give up his work in the church on account of a phonetic spasm, which, when the larynx contracted, made him go through all kinds of grotesque facial contortions. He was greatly depressed about his condition. His son brought him to my office because of pressure symptoms in the nose—a sensation as if the nose were clamped by very tight pince-nez. I used equal parts of cocain and sugar-of-milk for blowing up the nose. To our surprise, he began to talk in a perfectly natural manner and the facial spasm disappeared, the voice became normal. That lasted while the effect of the cocain lasted. After that, whenever he had to preach or talk, he used an insufflation of 50 per cent. cocain and sugar-of-milk. This was done long before Dr. Sluder published his work. I think the case might have been one of reflex trouble from the nose.

Two things are puzzling, however: one is that cocain relieved the pain whether applied on the right or the left side; the second, that hypodermic injections of cocain had precisely the same effect. In nervous conditions I think we cannot eliminate the systemic effects of cocain any more than we can eliminate the constitutional effects of morphine when injected.

Dr. James E. Logan, Kansas City, Mo.:

I am always interested in Dr. Sluder's investigations. He is always able to crystallize our experiences for us. I have seen several cases in the last few years which might be called vasomotor neuroses. Dr. Sluder is pointing out the way in which we can localize our treatment to some particular locality, so that we can handle these cases more intelligently. Dr. Sajous used cocain on the turbinates in his study of the reflex neuroses of the nasal cavity, but Dr. Sluder has brought out more clearly the connections of the subject from the diagnostic and remedial standpoint.

DR. SLUDER, closing:

Dr. Swain alluded to his case, which was evidently a nasal ganglion neurosis, the type that could be exploded by a single touch. I suggested that he inject it. He said she was a very lovely lady, but I presume she was very neurotic and a very difficult patient. In such cases the injection should be carried out under nitrous oxide anesthesia and a small amount of cocain on the nasal ganglion. The gas does not complicate the issue. When coming out of the gas the patients are analgesic and respond readily to suggestion. Care must be taken in directing the needle. You must be on guard for the sphenoidal sinus. The middle turbinate may make you think that you have transfixed the anterior process of the sphenomaxillary process. You may strike the pterygoid, and then your injection is in the nasal fossa and a drop of alcohol will run down the throat. This is difficult to control under general anesthesia. I have added methylene blue to the alcohol. This facilitates matters, as the blue solution is easily seen running down. If you once try the application under nitrous oxide gas you will always work under that method. Ether complicates matters. A straight needle is better than a curved needle, which is apt to catch.

DR. HARMON SMITH:

The case I mentioned had been operated on for maxillary sinusitis, and continued to suffer from neuralgia. Cocain did not do any good. Dr. Sluder advised against continuing.

DR. SLUDER:

Such cases transcend all categories for difficulty. The nerve supply of the nasal ganglion comes through the sphenoidal bone. In Dr. Smith's case a Gasserian ganglionectomy was done I presume. If you remove the entire sensory supply it makes a cure in some cases, but not in all. I have seen cases with continued pain after having the semilunar removed. The question is what is the source of the pain? My opinion is that the pain is transmitted by the sympathetic fibers that run into the nose. However, all studies made on the sympathetic, by the masters of the study, declare that the sympathetic is purely a motor system and that there are no fibers of a sensory nature at all. There is considerable literature, however, on the other hand, to prove that the sympathetic has a sensory mechanism, that there exist a motor and a sensory supply, taking in the spinal ganglion.

All cases of facial trigeminal neuralgia are not relieved by semilunar ganglionectomy. Cushing thinks that all my work is a mistake, and we are due for a discussion on the cranial nerves at the Triological Society. I hope Dr. Cushing will come to the discussion.

Dr. MacKenty has mentioned that patients do not always speak of a painful sensation, but many patients complain: "I cannot bear my specs, because they hurt me."

Dr. Loeb spoke of the orbital pain—Ewing's sign. The floor of the sinus is very thin. Other types of pain are associated with toxic origin or systemic disturbance. The nerve in the notch is extremely sensitive, and in these cases Ewing's sign is absent and the floor of the sinus most tender. Pain of the sphenoid may be the result of the trigeminus, which runs through the sphenoid.

Dr. Pierce's case is very interesting and raises the question as to how much of this effect is referred to absorption and systemic influence. In the beginning of this work, in 1903, many of these patients were put to the test. An ignorant patient will tell you unmistakably what is the matter. He suffers and you can see by his expression that he is in pain. Cocain is put on one of the lower turbinates. You need not ask questions. If he is better he will tell you so himself. If he does not get better you can put in cocain on the nasal ganglion. If it helps he will say so. The statement of relief of pain will finally settle the question. You can tell by the patient's expression and actions at once if he is relieved, and your diagnosis is made. The man begins to smile and says he feels better.

The question of separation of local from constitutional effect is not decided. I cannot answer Dr. Pierce. I cannot comment upon his interesting case, but I have seen a similar one complicated with blepharospasm. The man had orbicularis oris spasm, when he tried to speak, and spasm of the soft palate. It is difficult to classify this as speech defect. Cocainization of the nasal ganglion relieved the orbicularis oris spasm and soft palate spasm for twelve hours. I have had 4 cases and 2 cured. I took the nasal ganglion for three reasons: (1) experience with blepharospasm; (2) sphenoiditis; (3) the fact that the great superficial petrosal goes into the nose as a motor supply from the seventh geniculate ganglion. Next time I get a case I am going to give a subcutaneous injection of cocain to see if Dr. Pierce's point can be proven.

In regard to Dr. Logan's question as to vasomotor neuroses in the nose, these are controlled by nasal ganglion injections. I have injected in the edema of hay fever, when the whole nose was occluded, and this was cleared up by injection. Some of these results are very good.

Dr. Pierce:

I am very proud to have Dr. Sluder as a member of this Society.

Dr. Sluder:

I am equally proud to be a member of this Society.

ESOPHAGISMUS AND ALLIED DISORDERS

THOMAS HUBBARD, M.D.

It is important to keep in mind that in the modern conception of the physiology of digestion muscular action is given the role of primary importance. The chemical part of digestion is rarely deficient, having abundant reserve in one organ or another, and hence the treatment of this function in disorder, indigestion, is largely directed toward correction of disturbances of motility, or, in other words, restoring peristalsis to the normal. This mechanical part of the function is primal, and in higher animals there is consequently an immense concentration of nerve energy—voluntary, automatic and psychic—in the upper part of the *prima via.* From the hypopharynx downward, the whole digestive tube exhibits a gradually reduced reflex muscular activity, or, to put it the other way, an increase from below upward to the hypopharynx. The esophagus "starts the ball rolling," and the stomach passes it more slowly along to the intestines. The process is quite comparable to the "conveying system" in a modern factory, except that one is analytic and the other synthetic. Rhythmic peristalsis is a physiologic function comparable in importance to respiration and heart action.

Normal peristalsis is from above downwards; but, as observers of the abnormal, we are more concerned with that phenomenon known as *reversal of peristalsis.* Internists are attributing to reversal many of the acute and chronic disorders of the gastro-intestinal tract, and the natural terminus of reverse peristalsis is at the hypopharynx. The concentration of nerve energy in the lower pharynx, the marginal region where the voluntary merges into the vegetative system, the domination by the psychic factor and the intimate anatomic association with such organs as the larynx, trachea and bronchi, impress the importance of studying this subject broadly. We are in the habit of attributing certain throat disorders to objective findings; that is, to etiological factors operating from above downwards. We must

occasionally reverse this method and take into consideration disturbances from below upwards. This by way of preface to explain the presentation of this title in a program on laryngology.

Complete *reversal of peristalsis* culminates in emesis; but the interesting fact is, that the important clinical manifestations are partial or abortive reversals. Globus, heartburn, aërophagia and belching, regurgitation and nausea are familiar clinical examples. Such symptoms suggest conflicting reflex impulses and incoördinated or reversed muscular waves culminating in the hypopharynx. In obscure forms, that is, in abortive attempts at reversal, and where partially suppressed, they may pass as throat symptoms and are too often treated as such. Stomach symptoms are so common that one is liable to overlook their real significance as factors in throat symptoms, and in such cases the laryngologist is usually consulted and may have to make the primary diagnosis.

We are inclined to attribute so-called biliousness, bad taste in mouth and foul breath exclusively to throat, nose and mouth conditions, and certain it is that we have met disappointments in attempts to give relief by ordinary treatment. Recent clinical and experimental observations are convincing that reverse peristalsis can be a factor in causing any of these symptoms.

Consider the simple question of chemical reaction. The esophagus is normally alkaline, the stomach acid. Pyloric and cardiac control are influenced by the chemical reactions, and, likewise, the cricoid may react against the acid of reversed peristalsis. This may produce the symptoms which we call *globus.*

Esophagismus is a better term than *globus,* because the latter can scarcely be mentioned without the qualifying word "hystericus." Victims of esophagismus may become hysterical—the psychic factor responding to the shock of obstruction of the *prima via*—but it is not necessary to assume that hysteria is the cause. It is not rational to label all of these patients psychopathic.

Contesting peristaltic waves produce the muscle fatigue and irritation of mucosa characteristic of *globus.* Diagnosis is not difficult in well-defined cases; but in the milder ones, producing simply the sensation of a lump or throat fatigue or muscle pain, with more or less irritation of mucosa, burning sensation, etc., it is not surprising that they are treated as throat diseases and labeled accordingly:

laryngeal paresthesia, laryngitis, vocal strain or granular pharyngitis, or simply sore-throat, based on inferences from the usual habit of objective study.

Attention has been called to the blending of involuntary and voluntary nervous energy in this region, and, with true *globus hystericus* in mind, we can appreciate what is meant by psychic interference. Any kind of a disturbance of the pharyngeal plexus is liable to make an exaggerated impression in the higher centers, and further, there is a decided tendency toward development of what we may call a chronic paresthesia in psychoneurotics. It is characteristic of the psychic factor that the function as a whole, rather than certain nerve tracts, gives evidence of interference. This accounts for the fact that the symptoms complained of may be located anywhere in the pharynx or larynx, or even in the muscles accessory to deglutition or phonation. You know the type. Everything connected with phonation and deglutition aches.

The discussion at this point naturally leads up to the consideration of *hysterical throat symptoms.* As stated, it is characteristic of hysteria that the nerves concerned in a certain function are involved as a group. The hypoglossal, glossopharyngeal, pneumogastric and spinal accessory, and even the phrenic and sympathetic nerves, controlling salivary and mucous membrane secretions and the muscular action direct and auxiliary to food ingestion or emesis, may any or all be affected. The lubricant of the food bolus is abnormal, scanty or tenacious, and likewise pharyngeal reflexes are, as a rule, obtunded in hysteria, sensation is not normal, and there is a lack of exact coördination. The mechanical part of the act is far from normal. Then we have all kinds of paresthesias: areas of hypersensitiveness, areas of anesthesia and painful muscles. With consciousness of dysphagia, the psychic factor of alarm may cause the reaction of hyperesthesia in areas previously anesthetic, and the tonic spasm results—a spasmogenic phenomenon.

The *foreign body sensation* is very common in this type of throat trouble, and reversely, throat hysteria can be induced by a real foreign body. A pin-prick or a bone-scratch starts the suggestion which may endure indefinitely.

Overstretching, frappé drinks, ices of ten degrees more or less, accidental choking, overtense emotions—any of these may determine

the psychic fixation. The same is true of overtreatment of the throat or bad surgical scars—centering the mind on the throat. The laryngologist is impressed into service in many of these cases. Negative findings by the indirect method rarely make the desired impression, but esophagoscopy *ad nauseam* usually makes an impression on the mind favorable to recovery in one not hopelessly resistant.

The esophagismus of foreign body impaction impresses on the operator the effective muscular energy of the constrictors, especially at the cricoid, and explains the chronicity of functional strictures.

The terminal of the tube at the hiatal orifice, commonly called the cardia, is subject to spasmodic constriction enduring even to the degree of threatening life. (Jackson objects to the term "cardiospasm," preferring hiatal spasm.) It may be primarily a phenomenon of partial or abortive reversal. Chronicity, in this instance, naturally follows the distortion due to sacculation above the stricture, and even in fatal cases—death from starvation—there is found little or no hypertrophy of circular muscle fibers at cardia or hiatal regions. True hiatal or cardiospasm develops lesions which tend to make it a chronic, even an incurable condition, and then the spasmodic factor becomes of secondary importance. The psychic fixation factor is always in evidence, and it is interesting to observe that even a moderate angulation of the axis of the tube in incipient cases determines chronicity.

Certain organic diseases involve the nerves of the pharyngeal plexus, such as bulbar paralysis, general paresis and diphtheria, and must be kept in mind in studying nervous diseases of the throat. In any of these the primary diagnosis may fall to the lot of the laryngologist. These diseases are mentioned to call attention to the problems of differential diagnosis in cases exhibiting obscure dysphagia or laryngeal symptoms. Myositis of rheumatic type, involving throat or esophagus, may cause alarming esophagismus and simulate foreign body symptoms. Certain it is that the larynx, through anatomical association and sharing the same nerves, partakes of any of the nervous disturbances of the pharyngeal plexus. Laryngismus stridulus may be considered an extreme example. Bronchismus or asthma may be of the same origin, suggesting reversed peristalsis sidetracked to the bronchi. Organic diseases of esophagus, such as neoplasms, may cause symptoms identical with

globus by interrupting the peristaltic wave and initiating ineffective spasmodic contraction.

CONCLUSIONS: 1. The pharyngeal plexus is concerned with a primitive function of such vital importance that even slight disturbance may provoke psychic interference, with resulting confusion of automatic reflexes.

2. Chronic spasmogenic phenomena, esophagismus and cardiospasm, may be, primarily, manifestations of irregular or reversed peristalsis.

3. The hysterical throat is a manifestation of paresthesia and incoördinated muscle actions, with psychic fixation in neuropathic individuals.

4. It is probable that disease conditions and local irritations of the gastrointestinal tract may initiate the reverse peristalsis involving the esophagus. Abnormal reflexes and sensations are naturally referred to the beginning of the vegetative tract—the region of the pharyngeal plexus.

5. Through intimate anatomical association, the throat and larynx participate in the clinical syndrome. The gastric factor in asthma may be thus explained.

6. The more we emphasize peristalsis as a factor in digestion, the more important is it to properly interpret abnormal peristalsis as a factor in disease.

DISCUSSION

DR. BURT R. SHURLY, Detroit, Mich.:

There is such an enormous number of cases that exhibit the various phenomena of a hysterical condition of the esophagus that under older procedures we were comparatively limited in our means of helping these individuals. Yet I think that these neuropathic and psychopathic conditions can be relieved with the same certainty that we relieve hysterical aphonia in laryngeal cases. We see a number of cases in this rapid, nervous age. They can be watched through the fluoroscope and the spasm seen. Dilatation causes great relief. Triple bromides, three or four times a day, will help. These cases represent instability and short-circuiting of the nervous system, of the vasomotor type. Many of the nervous women who are our office patients exhibit these phenomena. Reëstablishment of the nerve tone by hypodermic injections of iron and glycerophosphates and dilatation of the esophagus are beneficial. I had one patient

who was unable to eat when anyone was looking, and another who could only eat standing up. This is due to a fixed psychic idea. I had patients of this type in the office eating ham sandwiches and peanuts and other foods which they declared they could not eat. These cases require special differential diagnosis. The personality of the patient and that of the physician count for a great deal in the cure of these cases.

Dr. Lewis A. Coffin, New York:

Dr. Hubbard's paper is broad of application and might be discussed from many angles. If I understood him aright, he said that the chemistry of digestion was considered of less importance than was the matter of peristalsis or reverse peristalsis.

I should take issue with that statement and call to witness the present-day methods of the gastro-enterologists. If the every-day occurrence of the belching of gas and the tasting of previously swallowed foods is due to a reverse peristalsis, I do not know; I have thought of it always as due to gas formation and gas expansion.

Some years ago, at a meeting of the Triological Society, I read a paper dealing with the different forms of pharyngitis and postnasal hypertrophies seemingly caused by marked gastric indigestion and the consequent belching of gas, referring to hypertrophy of the posterior tips of the turbinates, swelling of the mucous membrane seen on the posterior edge of the septum, and granular pharyngitis, and intimated that it might even account for the hypertrophy of adenoid tissue in the nasopharynx. Who has not had a puleing, puking infant to handle and does not know the intensely sour and irritating material thrown into the nasopharynx? Such belchings and regurgitations in the adult cause a pharyngitis varying from acute to chronic as the stomach trouble is acute or chronic—the patient complaining of "sore-throat."

Now these cases, where hypertrophic changes necessitating surgical operation have not taken place, are most amenable to treatment if such treatment be directed to the relief of the gastric indigestion.

From intestinal indigestion there occurs another chain of symptoms belonging to a syndrome covered by the expression auto-intoxication. The symptoms on account of which patients are referred to us are: a stuffed-up feeling of the nose, rhinorrhea, frequent and easy taking of "colds," hay fever and asthma.

I would not think of treating hay fever with the best and most scientifically prepared vaccines and expect good results unless the bowel could be taken care of at the same time and the diet strictly looked after. The general practitioner sends cases to the rhinologist frequently whom he never would send had he put their gastro-intestinal tract in shape. Here one finds himself in rather a delicate

position. The general practitioner is apt to resent a suggestion from you that he look after the stomach and bowels and is apt to say: "That's all right, doctor; you look after the nose and I'll take care of the rest." In the Manhattan Eye, Ear and Throat Hospital, at the present time, the men in every department feel that they get better results from treatment when special attention is given to the gastro-intestinal tract.

Dr. Henry L. Swain, New Haven, Conn.:

I was immensely interested yesterday by the esophageal exhibit by Dr. Mosher. I noted that the lobe of the liver was very near the lower pole of the esophagus. Supposing this lower lobe impinged on the lower end of the esophagus, a marked effect might be produced, both mechanically and in the production of cardiospasm. The idea of considering these cases in the light of a reverse peristalsis is new to me. Whatever viewpoint we take the main point of issue is to cure them and this is often by no means easy.

Dr. H. L. Lynah, New York:

If we swallow air we have to get rid of it. These neurotic cases suffer from that. In the bismuth meal one can see the reverse peristalsis of air bubbling through, although the meal is going down. A great many cases of malignant disease of the esophagus are labelled hysteria and they are only discovered after death. These functional spasms become organic sooner or later. You can use a small esophagoscope in these cases. Talking of patients who cannot eat certain foods, I had one who thought she could not eat cake. Esophagoscopy without anesthesia is the surest cure in such cases.

Dr. Thomas Hubbard (closing):

In answer to Dr. Shurly, I did not include treatment except by inference from study of the etiology. The subject of cardiospasm, for instance, would take up a whole paper. There is no disease more difficult to cure than cardiospasm. Many cases die labelled organic stricture that are purely cardiospasm. The autopsy shows no lesion. In these cases the psychic factor is not the important one. Just what determines sacculation is not clear.

In regard to Dr. Coffin's remark on the chemistry of digestion, the fact that we can remove large proportions of the gastro-intestinal tract without interfering with digestion shows that the chemistry of digestion has immense reserve. Abnormal peristalsis is more likely to be the cause of indigestion. Belchers are nearly always air-swallowers. The actual volume of gas in the stomach is not very great. Dr. Coffin may label a case granular pharyngitis. Pharyngitis may be caused by chemical irritation, and this in turn may be due to reversed peristalsis.

Organic disease may be the cause of spasm. That fact is important and we should be cautious. You can have small tumors in the esophagus which tend to produce esophagismus. I have such a case under treatment: a man who can swallow only liquids; a small pendulous tumor was discovered just below the cricoid; it starts a spasm with regurgitation.

My paper was intended to account for certain obscure throat conditions, and also to develop a good working theory.

INTRINSIC CARCINOMA OF THE LARYNX, WITH A SECOND REPORT OF THE CASES OPERATED ON BY SUSPENSION AND DISSECTION

ROBERT C. LYNCH, M.D.

In 1916 I promised to read a second report of the cases operated on by suspension and dissection of intrinsic cancer of the larynx.

It must be borne in mind that the cases suitable for this procedure must be carefully selected, and, as I have said before, if the growth is found to extend sufficiently deep to produce fixation of the crico-arytenoid joint, or has extended sufficiently high to produce edema of the superior surface of the arytenoid, or the aryteno-epiglottic fold, or has extended sufficiently below to approximate the cricothyroid membrane, then the case is considered unsuitable for operation by suspension and dissection. If there should be palpable cervical glands, even though the apparent extension is within the limits stated above, then, too, is the case unsuitable. If the growth involves the anterior half, the prognosis is better than if it be limited to the posterior half.

Suspension has aided very materially in the proper diagnosis of the area of involvement, and by its means some cases which seemed at first to be decidedly intrinsic, by the mirror, have been found to have extended sufficiently low as to be crawling out of the box through the cricothyroid membrane.

I realize that I am presenting for your approval or condemnation a procedure that is entirely new and differing from the well-established procedures for this dreadful malady, and for that reason I write with the greatest caution and have verified every fact contained in this paper to the very best of my ability and honesty, and I propose to continue these reports, adding to these cases the new ones and reporting perfectly frankly on the old ones, until you are satisfied that the procedure has a just place in our surgery of this disease or until you place your stamp of disapproval on the procedure,

whereupon I will discontinue not only the reports but the procedure as well.

You must realize that in this instance I am attempting to formulate a procedure which has for its basis a careful, painstaking diagnosis, excluding all other lesions by clinical and laboratory aids as we use them at the present time; also, that the procedure is deliberately premeditated and not a haphazard, lucky catch or tear, such as have been reported as having been successfully accomplished on some two or three occasions.

Every case has been carefully studied with a negative Wassermann and a negative clinical test against syphilis and tuberculosis, and the tumor mass removed in each instance has been carefully submitted to a pathologist of repute with the simple notation that the tissue is from the larynx.

Under suspension it is perfectly possible to palpate with a feeler with quite as much certainty as one does with his fingers upon the surface of the body; and, because of the peculiar location of the lesion and the anatomical construction of the cartilagenous box in which this growth takes origin, it seems very easy, for me at least, to make out quite definitely the area of involvement and, thereby making due allowance for microscopical invasion, to cut sufficiently wide of the growth to insure its complete removal, at least with as much assurance of success as one operates for this dreaded disease in any other part of the body, including thyrotomy and the total extirpation of the larynx.

These are a few points to be remembered:

1. After having determined that the case is suitable for intrinsic dissection, it is necessary to have the consent of the patient to do all or anything that is necessary; for while under suspension you may determine that thyrotomy, or even laryngectomy, is the only possible chance to save the individual from this disease and preserve his natural breathway. If you have done a few thyrotomies for intrinsic cancers diagnosed by mirror only, then I feel sure that you have been surprised at the extent of involvement, usually far beyond your expectation.

2. That since it is determined that the case is suitable for intrinsic dissection, when once the forceps take hold of the mass they should not let go to avoid the possibility of cell implantation from this source.

3. The dissection should circumscribe the tumor widely and extend in depth through the perichondrium so as to insure complete removal. The instruments should not come in contact with the tumor mass, thus avoiding another possibility of cell implantation.

4. There must be no special desire to save tissue for subsequent functional use, for fear that in your desire to save tissue the removal will not be complete.

5. All raw surfaces should be sealed with the actual cautery, at a cherry-red heat, that this may seal the lymphatic drainage outlet from the raw surface, and with the hope that the heat thus applied will kill any remaining cancer cells that may have been displaced during the operation.

The advantages of the operation are: that of being especially suitable for the very early cases where there is apparently very little involvement of tissue; that it can be done quickly and without external incision; that the normal breathway is not interfered with, since tracheotomy is at no time necessary and the chances of postoperative contraction are most remote; that the operation is carried on entirely within the closed box, which should offer the very best opportunity against metastasis, spread, or involvement without the box; that convalescence is unusually short; that the surface can easily be watched by mirror, and, finally, that when convalescence has been completed there is more likelihood of nature establishing a cord with which the voice function can be reëstablished.

My cases number nine in all.

Case I. Mr. B. was operated on by intrinsic dissection early in May, 1913. He remained well for nearly a year, when there appeared a slight recurrence which was reöperated in January, 1914. He again remained well until March, 1915, when there was a recurrence which for a time yielded to radium cross-fire externally and intralaryngeally applied. In September, 1916, there was evidence of recurrence, which involved the larynx to such an extent that laryngectomy was necessary. He is well and hearty at this time and was shown at the American Medical meeting in April of this year.

Case II. Joe C., colored, was operated on in June, 1914. Tumor occupied the anterior half of the right vocal cord, extending to the anterior commissure. He is a professional singer in negro vaudeville and weighed 197 pounds. This man still sings and plays with his negro band, and some of you may have enjoyed his antics on one of the United Fruit Company's boats between New Orleans and

Panama. He is well and healthy, and so far without the least evidence of recurrence.

CASE III. Mr. H. was operated on January, 1915. The tumor occupied the whole of the left vocal cord, from the anterior commissure to its vocal process. The mass looked to be papillomatous, and the first sections showed only papilloma; later study with paraffin sections showed, however, the center portion to have undergone malignant change. He lived away from New Orleans and remained well fourteen months, when he came back with the larynx full of tumor mass undoubtedly malignant. A laryngectomy was done, and he is perfectly well at this time. He, too, was shown at the American Medical meeting.

CASE IV. Mr. T. was operated on in March, 1915. He was seventy-six years old, though unusually well preserved for his age. He returned home in due time and had a recurrence from which he died in 1917.

CASE V. Mr. C., a minister, was operated on in September, 1916. The tumor involved the left cord, extending from the anterior commissure to the vocal process. In this case the incision was started two millimeters from the anterior commissure on the right cord, and the dissection was carried across the midline to beyond the vocal process, taking about half of the cricoid cartilage away with the mass. His recovery was uneventful, and he, too, is perfectly well at the present time, though he has changed his occupation from the ministry to farming. His voice has never returned to more than a forced whisper and there seems to be no effort on the part of nature to build for him a new cord or band with which he may make some tone.

CASE VI. Mary W., cook, was operated on in July, 1917. The mass involved the center portion of the right vocal cord and was the size of a large split pea. Because of its smoothness, position and free mobility, it was thought to be a fibroma. Under suspension, however, it felt indurated beyond the apparent limits of the tumor, and the mass was found to be larger than it appeared to be on mirror examination. This was removed wide of its area of involvement, and microscopic study showed it to be a carcinoma. This was the first case I had in a female. She is now perfectly well, and a postal from California states that she is in good health. I examined her in January of this year, 1920, and could find nothing at that time to indicate a return. Her voice is decidedly altered, but has tone of a low pitch and carries very well and she is happy.

CASE VII. Mrs. P. was operated on in July, 1918. The mass involved the whole of the right vocal cord. There was no fixation of the joint, but the mass moved slowly and I could not make out the vocal cord. There was no edema of the arytenoid, and under sus-

pension it could be plainly seen that there was no subglottic involvement. She convalesced in due time, but there were disturbing granulations which had to be removed at a second sitting, two months after the first operation. The microscopic examination showed spindle-celled carcinoma at the first operation; the second sitting showed nothing but granulation tissue. She is perfectly well at this time, though her voice is nothing but a whisper. In her case I removed a large section of the arytenoid cartilage and it was from this area that the granulations grew.

CASE VIII. Dr. H. was operated on in February, 1918. The diagnosis in his case is interesting in that the cords, both of which were movable, looked exactly like the keratosis of the tonsils one frequently sees. Then, the little white horny masses were tough and could not be removed by cotton carriers at all. There was no fixation; with the mirror there was no induration. I felt sure that I was dealing with a hyperkeratosis of the larynx, though this was a new disease to me, so I suspended him and took a small section for a rush diagnosis, which was returned as prickle-celled carcinoma. I then eviscerated his larynx, taking both true and false vocal cord, shaved both arytenoids below the vocal processes, and left only a small strip of apparently normal mucous membrane in the interarytenoid space. His convalescence was uneventful; he is now perfectly well, the whole surface perfectly smooth and healed, and with two fibrous bands for vocal cords which are rigidly fixed and he has but a whisper for a voice. My last examination was in February of this year, when he was still perfectly well so far as his larynx is concerned. He weighs about ninety pounds, but in spite of this he seems in good health.

CASE IX. Mrs. H. was operated on in November, 1919. The tumor mass was the size of a grain of rice, occupying the site of a vocal nodule, and looked like an unusually large vocal nodule involving the right cord. Under suspension it was plain to see that the mass was growing from the substance of the vocal cord, and the edge which was on the free surface presented the rough surface of a papilloma. I was suspicious of this mass and removed it freely, though I could do this and still leave nearly half of the substance of the vocal cord. The base was cauterized with the actual cautery and the patient returned home after the second day. I hear from both her and her laryngologist monthly. She reports her voice returned to normal and feeling fine, and her laryngologist reports that the cord looks normal, with no evidence of any pathology whatsoever. Microscopic examination of the mass showed squamous-celled carcinoma.

There are 9 cases in all: 1 is dead of recurrence; 2 others had a recurrence, were subjected to a laryngectomy and are still well and

healthy and useful citizens. The other 6 are perfectly well: 1 six years after the operation; 1 four years after operation; 1 three years after operation; 2 two years after operation; and, at this time, 1 six months after operation.

I leave you to comment on this tabulation, and remind you again that this second report represents my effort to give you an unbiased report of the intrinsic dissection for selected cases of intrinsic carcinoma of the larynx.

Discussion

Dr. D. Crosby Greene, Boston, Mass.:

Dr. Lynch has accomplished by his wonderful technic with the suspension apparatus what those of us who have had experience with thyrotomy have accomplished by the external route. I have no quarrel with anyone who employs a method for removing cancer by which he removes the entire growth with a margin of healthy tissue. However, I think few of us are able to do this satisfactorily by means of the suspension method, and while I have nothing but praise for Dr. Lynch's technic and his results, I do not believe that the method is generally applicable. In this connection I should like to mention that I have tried the use of suspension as an aid in the thyrotomy operation in those cases where the region of the anterior commissure was involved. By the assistance of an observer, looking into the larynx from above, the operator is enabled to avoid cutting into the growth when he enters the larynx.

Dr. John E. MacKenty, New York:

I am very much interested in the wonderful presentation. Dr. Lynch has 9 cases with 8 recoveries, which I think is better than the results of the external method. In New York cases very rarely come in in the early stages; 75 per cent. of the cases I saw last year were inoperable. I did three thyrotomies, otherwise I did total laryngectomies. We are in the position of William Tell, who had one shot or else he failed; one shot, and that is all. Recurrence spells death. I believe that Dr. Lynch's procedure is available in his hands, as he is very expert with his instruments, but I would not consider it a safe procedure for the average technician. I do not believe I could carry it out with such success as I could thyrotomy. Another point is leaving the cartilaginous wall of the larynx. It leaves an indurated mass which will granulate and give trouble. Removal of the laryngeal wall with the cancer mass is of advantage in the technic of this operation.

DR. LYNCH:
I removed the perichondrium, but not the cartilage.

DR. JOHN E. MACKENTY:
I believe that it is not advantageous to leave the cartilage in on account of its poor blood supply. I use the suspension a great deal, but it is difficult to judge of the extension of the cancer of the larynx, looking down upon it in that direction; we are often surprised on opening the larynx to see the extent of the disease. I am averse to removing tissue for examination. I believe it causes dissemination of morbid cells.

DR. JAMES E. LOGAN, Kansas City, Mo.:
Does Dr. Lynch use galvanic cauterization in these cases?

DR. NORVAL H. PIERCE:
Apparently it is not necessary to leave the laryngofissural opening. I have operated upon patients by laryngofissure, and have given that preference to suspension. If these patients are exposed to radiation they die of septic pneumonia.

DR. BURT R. SHURLY, Detroit, Mich.:
Was any radium used in these cases?

DR. THOMAS HUBBARD, Toledo, O.:
Dr. Lynch said that his cases were selected. He has had the opportunity to see his cases very early.

DR. LYNCH (closing):
I purposely presented this subject to the Laryngological Association because I felt it was the final court. I have refrained from writing of this matter and from teaching it to students, because I am still undecided whether it should be spread broadcast as a procedure. I presented it for criticism to this society. This report is preliminary in nature and may be extended later on.

None of the cases had radium, either before or after operation. My experience with radium has not been satisfactory. I have had to do laryngectomy where radium had been used, there was so much slough that the case ended fatally. In my cases all the open surfaces were touched with cautery after operation with the hope that any scattered cells might be destroyed. I do not know whether that is true or not.

One thing about the intrinsic dissection: Students watching it are apt to be impressed with the fact that these cases can be dealt with early. I am getting more early cases than formerly. I have had four cases that came in the initial stages.

My paper did not deal with suspension with laryngectomy. In the last 6 cases this combination has been used. I do a one-stage operation, and the assistant keeps the patient's mouth open and free from secretion. The suspension operation is the ideal one for extirpation of the larynx and trachea. The last 2 cases took only one and a half hours each. I have had 20 cases altogether, and 6 are living. Some died of recurrences. One man drank himself to death on account of family troubles. I always refrain from removing tissue for diagnosis. The rush section, if made, is taken at operation and forms part of it.

LUNG MAPPING BY THE INJECTION OF BISMUTH MIXTURES IN THE LIVING: PRELIMINARY REPORT

HENRY LOWNDES LYNAH, M.D.

ACCIDENTAL inhalation of bismuth mixtures has occurred at times while patients were attempting to swallow the mixture for a radiographic localization of an esophageal obstruction. Again, bismuth mixtures have trickled through a cancerous tracheo-esophageal fistula, mapping the bronchial tree.[1] In cases of esophageal paralysis the mixture will not enter the esophagus at all, but will be held in the reservoirs of the pyriform sinuses and pour over between the arytenoids into the trachea, and also map out the tracheobronchial tree.

Since the report of Beeler's case, many similar observations have been recorded by such expert radiographers as Hirsch, LeWald, Stewart, Gottleib and others.

The bronchial tree has been injected many times in the cadaver, but Jackson was first to recommend the insufflation of dry bismuth powder in the living for purposes of localization.[2]

Bullowa and Gottleib,[3] in an experimental study on animals, injected bismuth and barium mixtures into the bronchi and obtained some very beautiful pictures. They were also able to study the action of the bronchi in dogs, and demonstrated a wavelike action in the larger bronchi and trachea. This, however, was seen only when the dog was held in the vertical position and not seen in the natural horizontal position of the dog.

Most of the mixture was expelled after the dogs awoke from chloroform narcosis and were again able to resume normal posture.

It occurred to the writer that bismuth solutions injected into the

1 Beeler, R. C.: Jour. A. M. A., 1915, lxv, 1178.
2 Jackson, C.: Proc. Amer. Laryn. Assn., 1918.
3 Bullowa, J. G. M., and Gottlieb, Charles, New York Acad. Med., 1919.

lung of the living patient would probably do no harm, especially in those suffering from almost incurable diseases of the bronchi and lungs, such as bronchiectasis and pulmonary abscess; and, furthermore, that those areas which had never been mapped out heretofore could be definitely localized bronchoscopically by the injection of some opaque mixture which would gravitate into the abscess cavity.

The following cases were injected bronchoscopically with aqueous and oily solutions of bismuth subcarbonate:

CASE I. F. H., man, twenty-six years of age, developed a lung abscess in July, 1919, after having aspirated sea-water while swimming. He got out too far, lost his strength and went under. He was hauled out and, by first-aid measures, soon revived. One week later he suffered with what was supposed to be a bronchopneumonia and there was much foul expectoration at that time. Within one month the acute symptoms had subsided but he continued to expectorate large quantities of pus. He was sent to New Platz, N. Y., with the diagnosis of pulmonary tuberculosis, even though no tubercle bacilli were found in the sputum. There he had several hemorrhages, the sputum showing numerous streptococci. No tubercle bacilli were found. He had fever and also complained of having a bubbling sensation in his right chest. There were severe nightsweats at times.

On February 10, 1920, he consulted Dr. F. W. Corwin, of Newark, N. J., who referred him to the writer for bronchoscopic examination. The radiographic plates which Dr. Corwin had taken showed a shadow over the right lower lobe surrounded by "pus sponge-soaked" infiltrated lung tissue. The diaphragm was attached and pulled upward. The radiographer in his report stated that there was a level of fluid and gas bubbles in the abscess cavity. This, however, we were unable to interpret. There was profuse expectoration of foul-smelling pus, and the patient stated that he coughed up as much as would fill two large preserve jars every twenty-four hours, and that he had been measuring the amount of sputum for some time. He was bronchoscoped after a further study of radiographic plates.

There was a profuse discharge of pus, which poured out of the bronchoscopic tube mouth. It was very foul-smelling and blood-tinged. A 7 mm. bronchoscope was introduced, so as to be able to study and explore the lower lobe branches. After thorough evacuation of the pus-filled bronchi, the superior lobe branch on the right side was examined and found, on coughing, to be free from pus. There was some pus coming out of the right middle lobe branch, which was directly anterior; but after this branch was sucked out no pus was seen when the patient was instructed to cough. The lower lobe branches were filled with pus. This was removed by suction,

and each branch examined in turn and the patient instructed to cough. By this means the branch bronchus from which the pus was coming could be definitely located, and the small but constant ejection of pus with each cough pointed towards the right anterior branch. This branch was sucked out, but pus would appear in the mouth of the bronchus with each cough in spite of suction. The long slanting end of the bronchoscope was insinuated into this branch. It was now noted that there were many granulations in this branch, which bled freely. About one ounce of bloody pus was aspirated at this time into a sterile bottle. This was examined by Dr. George S. Dixon, of the New York Eye and Ear Infirmary, who reported as follows: "The pus removed bronchoscopically from the lung abscess of Mr. F. H. shows a pure culture of Friedlander bacilli." This was extremely interesting, for the most virulent ears which we see in the summer, caused by swimming about New York harbor, are usually due to the Friedlander bacillus, one of the colon group. This man had a lung abscess caused by the inspiration of sea-water about New York harbor.

For definite lung mapping, the abscess cavity was injected the following week with a mixture of bismuth subcarbonate in pure olive oil, 1 in 2. The anterior branch was injected around a corner by a specially made, curved, spiral cannula. The bismuth mixture was injected slowly, so as not to infiltrate the surrounding lung tissue. Eight cc. of the mixture was injected, and within five minutes from this time the patient was fluoroscoped by Dr. Charles Gottleib and some very interesting observations were made. By fluoroscopy we were able to see the cavities filled with the opaque mixture. Plates taken before the injection did not show any definite outline of the abscess. Several plates were now taken in all positions and the set of stereoscopic plates made. Within ten minutes after the taking of these pictures the patient was again fluoroscoped and the bismuth mixture was seen to be coming out of the abscess cavity and flowing upwards. He had not coughed up to this time, for he was breathing as quietly as possible. He did have considerable cough, however, immediately after the removal of the bronchoscope; but the fluoroscopic studies made by Drs. Gottleib, Corwin and myself did not show any bismuth in the bronchi, but only in the abscess cavities. It was extremely interesting to note that, while the bismuth was coming out of the abscess cavity into the bronchial tree, it did not flow downwards but flowed upwards, and radiographic plates taken at this time showed the middle and superior lobe branches well outlined by the opaque mixture, while the lower lobe branches remained free. Shortly after this the patient complained of such a bubbling sensation that he was compelled to cough and expectorate about 2 cc. of white bismuth mixture. From these ob-

servations Dr. Gottleib and the writer agree that there is probably another mechanism besides cough and the action of cilia which causes expulsion of the secretions from the tracheobronchial tree. Another injection of bismuth was repeated one month later.

The injection of bismuth mixtures, while done for the purposes of mapping the lung for the definite location of abscess cavities, seemed to have a beneficial effect on the patient. There was no odor to the pus expectorated after the second injection, and this was so striking that the patient noticed it himself, and he said "that he no longer had a foul breath, for the bad smell and taste had disappeared." The patient was examined fluoroscopically and radiographically one month later, to ascertain how long the bismuth would remain in the abscess cavities, and also how long it remained in the lobular structure into which it had infiltrated. The bismuth, as before stated, started to make its exit from the bronchial tree within a short time after injection. It is, however, interesting to note that in the abscess cavities and lobular infiltration it remains much longer but eventually disappears. In the abscess cavities it may remain from two weeks to two months, but the shadow gradually grows less opaque until it finally disappears. This may in a measure account for the improvement of the patient and the diminution of the quantity of pus expectorated and the disappearance of odor.

Case II. The second patient injected was a young lady, twenty years of age, whom I had the good fortune to see in consultation with Drs. Willy Meyer and Richard Jordan. The patient was admitted to the Lenox Hill Hospital and bronchoscoped shortly thereafter. Some very excellent radiographs were taken by Dr. William H. Stewart, which showed what appeared to be a very large abscess in the left upper lobe, well out towards the periphery. From the surrounding "pus sponge-soaked" lung structure it appeared much larger than it really was and also suggested some pleural involvement. The patient had had a tonsillectomy performed by an expert laryngologist one week before admission. At the time of admission she was expectorating 250 cc. of pus every twenty-four hours, and her general condition was poor. She was bronchoscoped, a 7 mm. tube being used. Pus was pouring out of the larynx and continued to pour out of the bronchoscopic tube. This was sucked out and the left bronchus entered. There was an edematous bronchial stenosis opposite the upper lobe orifice and there was a small opening from which free pus was expelled with each cough. There was also a membranous plaque which also obstructed drainage from the upper lobe. The long slanting end of the 7 mm. tube was gently introduced into the mouth of the upper lobe orifice separating the edematous stricture. The membranous plaque was removed by suction. After

evacuating the upper lobe branch as well as possible, the lower lobe branches were examined, but no pus was found in this locality. Now the upper lobe branch was again entered and the patient instructed to cough. With each expulsive cough there would be a gush of pus from this branch. The bronchus was apparently draining much more freely since the edematous stricture had been opened. With a ten-inch vacuum the bronchus was once more aspirated, and after fifteen minutes the bronchoscopic tube was removed.

The following week the patient had improved somewhat but the amount of pus had not greatly decreased. We again bronchoscopically aspirated the upper lobe branch, and then decided to inject the bismuth and oil mixture to try and map out the abscess cavity. With the curved spiral cannula, eight cc. of the mixture of bismuth subcarbonate in olive oil was injected. Unfortunately the mixture was injected too forcibly and some of it squirted out of the spiral and passed downward into the lower lobe bronchus. Leakage out of the spiral will not occur if the bismuth is injected slowly, nor will it infiltrate the lobular structures of the lung. The upper lobe branches and the lung abscess were also injected, the bismuth sticking to the wall of the cavity and mapping it out. Several smaller abscesses were now seen, whereas in the plate before injection the cavity was interpreted as being very large. The bismuth did not infiltrate the lobular structures in the upper lobe.

By stereoscopic plates the abscess cavities were seen to be well out towards the periphery and anterior, while the mass which had leaked down into the lower lobe branches was well posterior. A lateral plate, taken at this time, showed the relations of the upper anterior lobe abscess cavity, which was clearly defined, to the posterior dull, opaque, fan-shaped area due to gravitation into the dorsal branch.

The bismuth was expelled from the lung, as in the other patient, within twenty minutes after the injection. As some of the bismuth had leaked downward into the lower lobe branches it was impossible to state whether or not the bismuth started immediately to be expelled outward, as in the first patient, or if it had gravitated into the lower lobe branches after it started to be expelled.

The patient was studied from time to time with the fluoroscopic screen and further radiographic plates taken. At the end of one week there was still bismuth present both in the abscess cavity and in the lower lobe of the lung where no abscess existed. This looked somewhat like an abscess cavity, but there was an irregular outline of opaque dulness which had not the metallic luster of the bismuth in the abscess cavity. This is one of the distinguishing points between the infiltration of bismuth in the lobular structure of the lung and in the abscess cavity.

This patient improved after the injection in a manner similar to the other patient. The pus decreased from her lung and the amount of measured sputum decreased from 250 cc. to 30 cc. every twenty-four hours. The odor was decidedly less and the patient's general health improved.

The bismuth mixture was still present in the lung when fluoroscoped ten days after injection, though both shadows were diminishing in density and the lung abscess was apparently clearing up. The patient has suffered no discomfort following two injections of bismuth into her lung. She eats and sleeps well and has but little cough. She has been bronchoscoped twice since the injections and no bismuth were we able to recover by suction, even though it is still present in the lung. At the later bronchoscopic examinations there was very little pus recovered by suction, for no pus was expelled from the bronchus when the patient was instructed to cough.

Of course this paper is not presented with any tone of finality, for it is only a short preliminary report of the study of the injection of opaque mixtures for the purpose of mapping abscess cavities in the lung of the living subject.

SUMMARY. 1. That bismuth substances can be injected into the bronchi and lung of a living patient without doing damage.

2. That the injection of an opaque substance into the lung of the living patient will open up an enormous field of usefulness in the study of cough, the expulsion of substances from the lung and lung drainage. It will also localize bronchial strictures in the same manner as seen in the esophagus. Furthermore, it will be of the greatest aid to the thoracic surgeon by mapping out the abscess cavity in the respective lobe of the lung.

3. A definite lung abscess cavity is seldom seen bronchoscopically and pus is usually seen coming from a branch bronchus. The abscess cavity may be well around a corner and not in that portion of the lung from which the pus is oozing. An injection of bismuth mixture, or some other opaque mixture, will clear up this error.

4. Bismuth, when it enters the abscess cavity, is interpreted by its metallic luster, and when it is in the lobular lung structure it is interpreted as a dull, opaque spot. Pus diffuses and soaks the lobular structure and this often makes the area involved appear many times larger than it really is.

5. The amount of bismuth injected in these patients was an 8 cc. mixture of bismuth subcarbonate, one part, in pure olive oil, two to

three parts. The mixture is rendered sterile before injection, by boiling.

6. The injection should be made slowly and not with a squirt, for the picture may be spoiled by bismuth lung soaking.

7. From these preliminary studies it seems that cough and the action of cilia are not the only means of expelling secretions from the lungs.

8. While bismuth mixtures were originally injected by the author for the purpose of lung mapping of abscess cavities in their respective lobes, it seems to have been of benefit to the two patients upon whom it was tried. So far it has done no harm.

Discussion

Dr. Thomas Hubbard, Toledo, O.:

I would like to hear Dr. Lynah's comments on the study and extent of bronchial dilatations. Dr. Lynah mentioned accidental aspiration in pneumonia: I had one experience of accidental aspiration of bismuth, which aided in making a diagnosis. The man, who was thought to be a globus case, was given bismuth mixture. The apparatus was not working well and we had to wait for another operator. The second examination discovered the fact that instead of being esophageal spasm it was esophageal paralysis. Considerable bismuth had gone into the lung without causing even coughing. The man was fed through a tube and gradually recovered and later developed general paresis, of which the esophageal paralysis was the first sign. I think Dr. Lynah's technic is perfect and the possibilities are immense. Besides the diagnostic feature, bismuth has certain healing properties.

Dr. John E. MacKenty, New York:

I should like to ask how much importance Dr. Lynah attributes to cleaning out the cavity and how much to the bismuth.

Dr. B. R. Shurly, Detroit, Mich.:

I would like to ask the strength of the bismuth.

Dr. Henry L. Swain, New Haven:

How much did you inject?

Dr. Lynah:

I put in 8 cc.

Dr. Thomas Hubbard, Toledo:

Did you ever try direct injection through the trachea?

Dr. Norval H. Pierce, Chicago:

I would like to refer to a by-product of this topic, that is, injection into the sphenoid. It is difficult to remove bismuth from the sphenoid. Insufflation into the bronchial tube will outline the bronchial tree, and also the sphenoid, but it is hard to determine if the entire cavity is outlined, especially if the walls are very irregular. That has been overcome to a certain extent by spraying in albumen fixing solution, to which bismuth will adhere. I would be very glad if some other men would do some work along this line.

Dr. Lynah (closing):

The cases had improved before the bismuth was injected. They can be got well if they can be kept long enough out of the hands of the thoracic surgeon. The bismuth was only injected for experimental purposes, not for curative.

SOME INDICATIONS FOR OPERATION ON THE NASAL SINUSES IN CHILDREN

L. W. DEAN, M.D.

OPERATIVE procedures for nasal sinus disease in children are not often indicated. The acute infections of these cavities are readily cured or disappear of themselves. Those cases which are classed as chronic empyemias yield much more readily than in the adult to non-operative procedures. This is due to two things. First, the age of the patient excludes long chronicity. Second, at this age nasal obstructive lesions are not common.

During the last three years we have made a routine examination of the nasal sinuses of 1108 infants and children under fourteen years of age. A rather large number of chronic empyemias have been diagnosed. Most of these have been apparently cured by the removal of diseased tonsils and adenoids. Approximately 80 per cent. of our cases have had this favorable termination. Even some hemolytic streptococcic infections of the sinuses have disappeared after this operation without further treatment. The hemolytic streptococcic infections we have found to be particularly resistant to treatment.

Cases associated with atrophic rhinitis and syphilis we have not found to be so beneficially influenced by this procedure. We have found, however, sinus disease in these two classes of cases to rapidly improve with simple ventilation and drainage, together with the usual local and general treatment. In syphilitic cases this improvement has been especially marked. When treatment without operative procedure has failed it is only in very rare instances that extensive operations are indicated. Certainly they should never be resorted to in children unless there is imperative need of immediate removal of the infection, or if after months of treatment combined with the minor operative procedures for ventilation and drainage a marked chronic empyemia persists.

While the pathology and the systemic complications are the principal factors in determining the need of these extensive operations, the size of the sinuses in influencing the pathological changes is an important factor. We secure information regarding their size from the *x*-ray plate. The findings are very often surprising. As a diagnostic procedure in children the *x*-ray examination is not accurate. Since July 1, 1919, in 197 cases in children with blurred antra only 81 were found to be diseased on culture.

At the recent meeting of the Southern Section of the American Laryngological, Otological and Rhinological Association I reported a case of hemolytic sphenoidal sinus disease in a child five years and five months old. In reporting the case a mistake was made in the age; it was stated to be seven years. This patient had an extensive operation with the hope of aiding a very severe nephritis. The operation was only advised after treatment had failed. The condition of the patient was most critical. The pediatrist desired thorough drainage of the diseased sinuses. A Sluder operation was attempted under gas and oxygen anesthesia, the anesthesist maintaining a perfect anesthesia with the cone over the mouth alone. The immediate effects of the operation were only beneficial so far as the general condition of the patient was concerned. Unfortunately the nephritis was not effected, and since the case was reported the patient died.

At the autopsy in this boy of five years and five months, on the right side, was found a sphenoidal antrum 18 mm. wide, 10 mm. deep, with an antero-posterior diameter of 19 mm. The left sphenoidal antrum was 13 mm. wide by 12 mm. deep, with an antero-posterior diameter of 15 mm. These very large sinuses were filled with a hyperplastic edematous membrane. This membrane was so thick that when the large sphenoidal antra were opened they were found completely filled with the swollen membrane. Much of the swelling was due to anasarca of the hyperplastic membrane. The remnants of ethmoidal cells that had not been removed were similarly diseased. The autopsy showed that the operation was not as thorough as I had anticipated, and suggests the necessity of improvement in our operative technic. Microscopic findings were as follows:

Grossly the mucous membrane lining the sphenoids appears to be very edematous. It is very much thickened, translucent, and of a

soft, gelatinous consistency. On microscopic examination it is found to be covered with ciliated columnar epithelium. The tissue interspaces are enormously increased in size and are filled with a non-staining substance. Throughout the entire tissue is a marked increase in round-cell infiltration. This is particularly marked about the bloodvessels. The bloodvessels are quite prominent and are crowded with a large number of polymorphonuclear cells, which may be seen within the tissue interspaces and especially just below the basement membrane and between the epithelial cells. Some are also seen lying free upon the surface.

Tissue curetted from the ethmoid cells is also edematous and on microscopic examination shows a more marked inflammatory reaction than that seen in the sphenoids. There is an extensive infiltration of round cells and a marked hyperplasia of connective tissue elements. In some places the columnar epithelium has been replaced by epithelium of the cuboidal type. In other places the epithelium has been replaced by granulation tissue, leaving an ulcerating surface. At several points where granulation tissue is found in mucous membrane it extends into the bone in such a way as to leave no doubt that the bone is involved in an inflammatory process.

We wish today to report three cases where after treatment of the nasal sinus disease, together with ventilation and drainage of the sinuses when indicated, the systemic infection was not controlled. We are firmly convinced that the exigencies of the situation and the result secured justified the procedures adopted. In each of these cases the Wassermann test on the blood was negative, the von Pirquet reaction was negative, and guinea-pigs injected with material from the nasal sinuses did not develop tuberculosis.

Two of these cases were discussed before the Chicago Oto-Laryngological Society, and one before the Southern Section of the American Laryngological, Otological and Rhinological Association I reported. We are now prepared to report the end-results.

In operating upon the nasal sinuses in children we have not lost sight of the deleterious influence on the development of the bones of the face that might result from the destruction of these cells in young children. We have always held prominent the very important functions of the nose, and only as a very last resort have injured structures that are essential to the performance of these functions.

CASE I. D. M., female, aged eight years. On September 15, 1916, when patient was four and one-half years of age, she was referred to us by the orthopedic surgeon with a diagnosis of multiple infectious arthritis and to have a search made for the focus of infection. We found present chronic tonsillitis and adenoids. The tonsils and adenoids were removed. At that time, September, 1916, we were not accustomed to make a careful routine examination of the nasal sinuses in our multiple arthritis cases in children. We are of the opinion that in 1916 a nasal sinus infection was present but overlooked. Following the removal of the tonsils and adenoids the arthritis continued gradually to progress and was not checked until the sinus disease was eradicated three and one-half years later. We feel this child would now be in a very much better condition if this sinus disease had not been overlooked. Because of this and similar experiences we always ask the pediatrist or orthopedic surgeon to return cases sent to us for removal of the foci of infection about the upper respiratory tract if a nasal discharge persists or if there is a suspicion that a focus of infection remains.

This patient was returned to our service in November 30, 1919, by Doctor Steindler, the orthopedic surgeon, because the progress of arthritis in similar cases had been checked by our finding and eradicating a nasal sinus infection.

The arthritis began when the child was two and one-half years of age, following an attack of measles. Since the removal of the tonsils and adenoids, three and one-half years ago, there had been a gradual increase in the arthritic condition. At this time the following joints are swollen, stiff and painful: joints of fingers, both wrists, left elbow, knees, ankles, toes and neck. Her temperature ranges daily from 98° to 103°. She is patiently enduring almost constant pain. Even movements of the head are distressing.

Examination of nose and throat: Tonsils and adenoids cleanly removed; pharyngeal membrane slightly inflamed; nasal mucosa reddened and inflamed; posterior end of each inferior turbinate hyperplastic; mucosa about the ostium of sphenoid on each side thickened and edematous—it contains numerous dilated bloodvessels; *x*-ray shows slight blurring of the left antrum of Highmore; it shows a very large sphenoidal sinus for a child of eight years; it suggests that the mucosa of the sphenoidal antrum is thickened; at times nasal discharge was found.

On December 12, 1919, examination and culturing of the nasal sinuses gave the following results: Highmorian antra contained no macroscopic pus; cultures developed a very sparse growth of streptococcus viridens, practically a negative result. The right sphenoidal antrum was about 11 mm. long; by sounding, its wall was found to be roughened; it contained macroscopic pus; cultures gave a

hemolytic streptococcus which when injected into a rabbit caused death in forty-eight hours; from abscesses in the endocardium of the rabbit the same streptococcus was secured. Examination of the left sphenoid gave similar results: a rabbit injected with the hemolytic streptococcus secured from the left sphenoid became critically ill but did not die; in three weeks the animal developed arthritis of the left foot and left hip.

Energetic treatment of the sphenoidal disease for fifteen days resulted in no improvement of temperature or arthritis.

Because of the difficulties we have experienced in the past in eradicating hemolytic streptococcic sphenoidal disease in children when it was complicated by multiple arthritis, and because of the necessity of eradicating the focus of infection as soon as possible, a Sluder operation, right, was performed on December 22, 1919, and on the left January 8, 1920. The posterior ethmoidal cells were but slightly diseased. The sphenoidal antra contained pus; they were lined by a very thick pyogenic membrane.

The report of the microscopic examination of the lining membrane of the right sphenoidal antrum was as follows: It showed very marked pathologic changes. In some portions the epithelium has been entirely denuded, the surface being covered with a dense fibrous tissue; other points are covered with granulation tissue. The epithelium which remains varies from a ragged, irregular, ciliated columnar to a stratified cuboidal. The basement membrane is very prominent; the mucous glands are hypertrophied; there is an enormous increase in connective tissue. A marked round-cell infiltration may be noted and many plasma cells and pus cells are packed into some areas. This mucous membrane is from ten to twenty-five times thicker than normal. This corresponds to what Skillern calls the hyperplastic type with ulcerosus.

The treatment of the sinus disease was continued after the operation.

Six weeks after the second operation the temperature curve was almost normal and the patient was very much improved. For four months after the second operation the patient remained in our service for treatment and observation. Today she is a changed girl; she is happy and contented; the suffering is gone. The swelling of the joints has diminished; there is no pain from pressure on or motion of the joints. The patient can walk some, something she has not done for months. The movements of the head are becoming rapidly better. The temperature curve is normal. In a few days she will be returned to the orthopedic service for physiotherapy, etc.

CASE II. R. F., white, male, aged twelve years. Referred by Dr. Steindler, on June 5, 1919, for diagnosis and removal of foci of infection. His diagnosis: Multiple infectious arthritis.

The patient is confined to his bed, is very thin and anemic, and gives the impression of constant suffering. He takes cold easily; has no nasal discharge or obstruction; has occasional attacks of sore-throat. Tonsils twice operated, two years ago, resulting in improvement of his rheumatism. Most of the joints, including those of cervical vertebra and temporomandibular articulation, are involved. Heart and kidneys are apparently normal. Daily temperature from 98.8° to 100.2°.

Examination: There is a remnant of faucial tonsil on each side, with a fair-sized bunch of adenoids; cervical glands not palpable; some mucopus in each side of the nose. The left antrum of Highmore was blurred in the *x*-ray plate.

On January 10, 1919, the remnants of tonsils and the adenoids were removed; the Highmorian antra were cultured; the washings were reported sterile.

From the tonsils a hemolytic streptococcus, a staphylococcus, and the streptococcus viridens were recovered. A rabbit injected intravenously with a 1.5 cc. of a forty-four-hour culture of the hemolytic streptococcus developed arthritis in each shoulder-joint. From the synovial fluid in the joints a hemolytic streptococcus was cultured. No gross changes were apparent in any of the internal organs.

The patient was returned to Dr. Steindler for observation, with the request that he be returned for further examination if there seemed to be a focus of infection remaining. On May 4 Dr. Steindler returned the patient to our service. He reported that, while the condition of the patient was improved, he still has acute exacerbations of this arthritis, and the daily slight rise in temperature persisted.

Examination of nasal sinuses: Left antrum of Highmore contained pus so thick it could only with difficulty be aspirated; the washings from the right Highmorian sinus showed no macroscopic pus. The bacteriologic examination of the washings from the sinuses revealed a hemolytic streptococcus from the right Highmorian antrum; a hemolytic streptococcus from each fermented lactose and salicin; neither fermented mannite nor inulin.

A rabbit was injected intravenously with 3 cc. of a twenty-four hour culture of a hemolytic streptococcus from the left antrum. It developed arthritis in the right elbow-joint; also in the left ankle-joint. The paranasal sinuses of the animal were negative on culture; the lungs and pleura were normal; there was fibrinous pericarditis; there were parenchymatous changes in the liver; the spleen and kidneys were apparently normal. A hemolytic streptococcus was cultured from the elbow-joint.

On May 5 a deflected septum which was present was corrected.

The nose was treated, using negative pressure and nasal irrigations of normal salt. Patient was out of doors as much as possible.

Following this operation the patient's general condition improved, but the temperature and joint condition remained as before.

On May 23 the Highmorian antra were drained through the inferior meatus. The inferior turbinates were rotated upwards and an opening made in the antromeatal wall. The turbinates were replaced and the operation completed without sacrificing any turbinate tissue. The Highmorian antra were irrigated with sterile normal salt solution, followed by 1 per cent. argyrol daily, and occasionally with 5 per cent. silver nitrate solution.

One month later, on June 21, the patient insisted that the joints were better. His daily elevation of temperature to 100° persisted, however, and the appearance of the patient was bad. He had developed a bedsore which caused much distress. There was only a little discharge from the Highmorian antra. At this time pus was detected coming from the region of the left sphenoid. The lingual tonsil had been frequently examined. It always appeared normal.

On June 23, 1919, the left sphenoid and left ethmoid were operated. The wall of the sphenoid was rough. A polyp was removed from the anterior ethmoidal region. It was covered with columnar epithelium; it contained mucous glands; it was distinctly inflammatory, as shown by the large number of round cells below the basement membrane and around the bloodvessels and glands; it was very edematous; the connective-tissue cells have undergone mucoid degeneration. A very careful examination failed to reveal any definite evidence of involvement of the upper posterior sinuses on the right side. Consequently, they were not disturbed. The nose was treated daily.

On August 23, the patient reports he is feeling fine; he can move his head better; the joints are not painful; there are no evidences of acute trouble in the joints. However, the patient looks bad; he gives the impression that he is gradually failing; daily afternoon temperature is between 100° and 100.4°. The ethmoidal and sphenoidal regions are perfectly clean. The openings into the Highmorian antra are patent. Some mucopus is present each morning in washings from the antra. The washings still contain the hemolytic streptococcus.

On August 25, a Denker operation was performed on each Highmorian antrum.

Findings in the right antrum: Caries of the floor; mucous membrane much hypertrophied. Three good-sized polyps were removed. The polyps showed mucoid changes and marked purulent inflammatory changes. The findings in the left antrum were similar to those of the right. A hemolytic streptococcus was secured from each

antrum. A rabbit inoculated with 4 cc. of culture, twenty-four hours old, became ill; it would not eat for two days; it gradually recovered; no arthritis was noted.

Following this last operation the patient improved wonderfully. The temperature in five weeks was normal and remained so, except for the slight exacerbation so common in children. On November 26, approximately eleven months after he was admitted to our service, he was returned to the orthopedic ward. As the result of the nine months of study of, operation on, and treatment of this boy the progress of his arthritis has ceased. It is now eighteen months since he left our service. During that time he has had no acute exacerbation of his joint trouble. He has been receiving orthopedic treatment for the ankylosed joints. He still goes about using his crutches, but in a very energetic way. I have seen him playing football on his crutches, not being concerned over the possible traumatism of his joints.

All of his teeth are vital. The only damage done his nose was the removal of the left middle turbinate.

CASE III. C. M., white, male, aged thirteen years. Referred by Dr. Steindler, on February 11, 1919, for finding of and removal of foci of infection. His diagnosis: Multiple infectious arthritis.

The trouble began during the preceding summer without apparent cause. The first thing noticed was the gradual development of stiff knees with some tenderness. In the following December, after influenza, the ankles and elbows became involved; the knees began to swell and were tender; the patient was unable to stand upon his feet because of pain in the ankles. There is no history of sore-throat, tendency to attacks of acute rhinitis, or of nasal obstruction. There is considerable nasal discharge.

Patient is confined to bed; he looks very bad, giving the impression of constant suffering. Almost every joint in the body is swollen and painful on pressure. The temporomandibular joints are swollen so that the incisor teeth cannot be separated by more than one-half inch. The cervical vertebræ are ankylosed, the head being fixed tilted to the left, with the chin pointing to the right. The daily range of temperature is from 98° to 101.2°.

Examination: Nose—small spur right and left; mucopus in each side of the nose; *x*-ray shows the Highmorian antra blurred, other sinuses clear; washings from right antra discarded because of an error in technic, left sterile. Throat—chronically diseased tonsils; moderate-sized adenoids.

Diagnosis: Chronic tonsillitis and adenoids, with sinus disease not definitely diagnosed. It was recommended that the tonsils and adenoids be removed and the patient placed under observation.

On March 18, 1919, the tonsils and adenoids were removed. From the tonsils a hemolytic streptococcus was secured.

On April 12, the patient developed an acute exacerbation of his arthritis and a second search for foci of infection was made. The daily elevation of temperature had been constant. The lingual tonsil appeared reddened; this seemed to be just a part of the general inflammation of the throat. The nasopharyngoscope showed the neighborhood of the ostia of the upper posterior sinuses to be edematous and reddened. No pus could be seen coming from the sphenoids or posterior ethmoids. Washing and aspiration of Highmorian antra gave, from the right, a bloody fluid; from the left, mucopus. Cultures from the right antrum were sterile; from the left, a hemolytic streptococcus was secured. Two cc. of a forty-eight hour culture injected intravenously into a rabbit developed, in four weeks, arthritis of the ankle-joints.

An opening for ventilation and drainage was made through the inferior meatus into the Highmorian antra. The after-treatment was irrigation with sterile normal salt, followed by argyrol 1 per cent.; occasionally 5 per cent. silver nitrate was used. Coffin's treatment was given twice daily. Two weeks following the operation the patient was no better; his appearance was bad; the daily afternoon elevation of temperature from one to one and one-half degrees persisted.

On April 30, the upper posterior sinuses were again examined. Mucopus, very thin, was found draining from each sphenoidal region along the posterior border of the septum; about the sphenoidal openings the membrane was thickened and there were numerous petechial hemorrhages. There was some flakes of pus secured from each Highmorian antrum. Cultures from each antrum and the superior meatus on each side of the nose gave a hemolytic streptococcus. Rabbits inoculated intravenously with 3 cc. of a twenty-four hour culture of the organism from the antra produced arthritis of the knee- and shoulder-joints. The hemolytic streptococcus was recovered from these joints.

On May 1, the sphenoids and posterior ethmoids were drained as thoroughly as possible without removing the middle turbinates, and the openings into the antra were enlarged. There was pus in each sphenoid. The after-treatment was the same as before. The patient developed an ear infection which complicated the situation for several weeks. The diet was carefully watched and the patient was out in the sun on all favorable days. A purulent discharge persisted from the sphenoidal and ethmoidal regions.

On June 18, a hemolytic streptococcus secured from the Highmorian antra produced arthritis in a rabbit. The patient's condition was gradually improving, but the daily elevation of temperature persisted, showing that the process was not checked.

On July 21, the patient developed an acute pharyngitis. The upper posterior sinuses were discharging mucopus.

On July 23, a Sluder operation was performed on the ethmoids and sphenoids on each side. Tissue removed from the ethmoidal region showed increase in cellularity; many wandering cells, lymphocytes, and polynuclear cells. Most of surface covered with columnar epithelium, at some points stratified squamous, and in some areas the surface is denuded of epithelium and covered with pus cells. In four weeks the upper sinuses were clean, but the antra of Highmore still contained the hemolytic streptococcus.

On August 24, the patient was much improved; afternoon rise of temperature to 100°; sphenoidal regions clean; some pus in each Highmorian antrum.

On August 27, a modified Denker operation was performed on each side and the lingual tonsil was cauterized. Polyps and necrotic bone were found in each antrum. A rabbit injected with a hemolytic streptococcus secured from the antra of Highmore developed arthritis. In six weeks the nose and sinuses were clean; the temperature was normal; the joints much improved. The patient has increased much in weight and says he is feeling fine. He spends much of his time playing.

From October 1 to November 28, there was no trouble in the nose or throat. The joints continued to improve.

On November 28, there was no tenderness of the joints on pressure, and the patient was returned to the orthopedic service for the treatment of ankylosed joints.

In this case it was necessary to sacrifice each middle turbinate; the inferior turbinates were preserved practically intact. Today this patient is remarkably improved. He is plump; his appetite is good; he gets around rapidly on his crutches; he has had no acute exacerbation in his joints; he is still receiving orthopedic treatment.

With rather a large number of cases of multiple arthritis referred to the laryngological clinic it has only been necessary to treat or operate the sinuses in a very few cases. When we have found nasal sinus disease present in this condition, and the etiological factor is the hemolytic streptococcus, we have found great difficulty in eradicating the nasal sinus disease as compared with non-complicated sinus disease in children.

We feel that all cases of systemic infection in children that are ordinarily due to foci about the upper respiratory tract, if not checked by the removal of diseased tonsils and adenoids, should come in the hospital for study of the nasal sinuses. We have only been

able to study them satisfactorily by having the patients in the wards, where they are under constant supervision. If the nasal sinus disease is present we find it necessary to hospitalize these patients for six to nine months in order to get satisfactory results. This gives the best opportunity for that careful study which must precede all operative work in the sinuses.

With the cases just cited we feel that the focus of infection was in the nasal sinuses and that it could only be removed by operation on these sinuses. The removal of middle turbinate and the destruction of sinuses have been justified by the results. In these three cases, if the foci had not been obliterated, the result would probably have been an ankylosis of all joints, utter helplessness, and a slow, painful death.

As the result of the work our patients, although cripples, are well nourished, happy, free from pain, enjoy play, and with proper education will be self-supporting. These children are our best friends; their gratitude compensates us many times over for the time and work necessary for the proper handling of their cases.

Discussion

The Chair:

Dr. Dean deserves a great deal of credit for his painstaking work, extending over a long period of time, and opening up so many new channels of investigation.

Dr. Ross Hall Skillern, Philadelphia:

This is the third paper I have heard from Dr. Dean on this subject, and the more I hear the more admiration I have for his careful work. We do not see these cases in Philadelphia for perhaps three reasons: (1) we may not have them; (2) I am not sure that I would recognize them; and (3), most important, the parents will not allow us to keep the children in the hospital long enough to study them carefully. One cannot make a conclusive diagnosis without long and careful study. I hope some means will be found in the future to enable us to keep these children in the hospital long enough to permit the necessary study and care.

Dr. Harmon Smith, New York:

During the past winter I had an unusual number of children with sinus involvement, but in the majority of instances did not attempt to ascertain which sinus was involved nor the type of organism

responsible for the condition. Most of them had bronchitis which the internal medication of the general practitioner had failed to overcome. After shrinking the puffy mucosa with a solution of adrenalin (one to sixteen of rosewater), I either douched their noses with a hot alkaline solution by means of the Douglas douche, or employed the postnasal douche with the short nasal tip, as first suggested by Chappell. Then, if the child was tractable, I used a 5 per cent. argyrol solution in my sinus suction syringe, which not only sucked out the remaining pus in the sinuses but also injected into them the argyrol solution. I know this to be true, as upon subsequent visits I could suck and irrigate out argyrol-colored pus after ordinary irrigation had first been performed. The majority of these cases recovered completely within two to three weeks from both the sinus involvement and the bronchitis.

For a number of years we have employed at the Manhattan Eye, Ear and Throat Hospital, for irrigating purposes, filtered sea water to which has been added one minim of carbolic acid to the ounce of sea water. This makes an admirable irrigating solution, much better than normal saline made from table salt.

Dr. B. A. Randall, Philadelphia:

In my thirty-five years' duty at the Children's Hospital I have seen many cases of diseased sinus. In extreme cases I had to resort to a crude, and perhaps brutal, form of procedure to get drainage. I passed alligator forceps into the sphenoid, opened and withdrew them, breaking outward the front wall, thus securing drainage of the sphenoid. The ethmoid is different. Dr. Skillern later devised a special instrument for the purpose.

Dr. C. W. Richardson, Washington, D. C.:

Doctors Dean and Coffin deserve great credit for the work they have done in connection with sinusitis in children. We have all met these cases, and at times we find great difficulty in differentiating what sinuses are affected, or whether the sinuses are affected at all where evidences point that way.

I recently had a case of this character which impressed me so much that I feel called upon to narrate it here. The child came to me, in April, with apparently a well-developed mastoiditis suppurativa affecting the right side: free purulent discharge from the ear; marked tenderness over the mastoid; an acute suppurative otitis, no ruptured membrane on the left side. I opened up the abscess in the left ear, and gave explicit directions as to what was to be done in case the mastoid infection on the right side became sufficiently serious to demand operative intervention, as I was going to New Orleans for a week at that time.

I noticed that the child had a slight exophthalmos in connection with the left eye, and on my return I found this condition very much more marked in the left eye, although the mastoid infection had subsided in the right side and the ear on the left side had cleared up. This exophthalmos was directly forward, not being directly downwards or outwards, as would be the case in an infection in the neighboring sinuses. I sent the child to an eye specialist for his opinion, and the case passed from my observation for about ten days.

When it returned to me I was quite astonished at the amount of increased exophthalmos in the left eye and the development of exophthalmos in the right eye. As the child appeared very ill, I had it sent immediately to the Children's Hospital, so that it might be kept under careful clinical observation. An *x*-ray was made which evidently conveyed the impression to the roentgentologist that there was an infection of the ethmoids and sphenoids, but I never saw the plate until later, and therefore made no personal interpretation of them. The first blood count showed 68,000 white blood cells. Examination of blood: polynuclears, 4 per cent.; lymphocytes, small, 74 per cent.; lymphocytes, large, 22 per cent. In two days the white blood count had run to 78,000. Examination of the blood current showed no bacteriemia. Unfortunately only one examination was made. The pathologist, in examination of the smears, stated that he thought the case looked like one of leukaemia. The fourth day after the child was in the hospital the eye consultant came out, while I was operating on other cases, to drain the orbit. I was with them at the time, and after the puncture of the orbital cavity they found no pus or fluid therein. As the child was under an anesthetic, I considered it a wise procedure to enter the ethmoid and sphenoidal cells from without, which I did with a negative result. Three days after this I had another *x*-ray examination made by a more expert roentgentologist, and the report was made that the ethmoids and sphenoids had been completely exenterated.

We had thought of various conditions as possibly giving rise to this unusual manifestation: infection of the cavernous sinus, infection of the ethmoids and sphenoid cells; and possibly a new growth in the orbital cavity. It was not until we got the high blood count that we thought of orbital leukaemia. Tonsils and adenoids quite enlarged; general lymphatic system, no deviations practically from the normal. No enlarged cervical glands excepting the amount usually found in connection with adenoids and tonsils.

History showed that the child developed an exophthalmos shortly after a fall on the ice in January, the exophthalmos seeming to commence several weeks after the violence, or, in other words, about the beginning of February.

Dr. Henry L. Swain, New Haven, Conn.:
What made the eyes bulge?

Dr. Richardson:
The swelling of the tissue within the orbit.

Dr. Lynch:
What was the final outcome?

Dr. Richardson:
The child is not dead yet.

Dr. Swain:
We are straying away from Dr. Dean's thesis. In our work we have often been confronted with cases of acute exophthalmos associated with orbital abscess. We have often incised or operated only to discover no focus of pus within the orbit. This is to be deplored. Last winter I had one case in which infection and dangerous exophthalmos were caused by the extraction of a lower molar tooth, the only remaining one. The infection passed up on the inner surface of the ramus of the jaw, out into the pterygomaxillary fossa, and thence into the orbit. There was no pus in that orbit, simply a great swelling. I have never heard of calling it leukaemia of the orbit and am absolutely ignorant of that condition. This was a purulent infection, with edema and infiltration, and the exophthalmos so stretched the optic nerve as to make it amaurotic for all time. In the case I have spoken of, I did not enter the orbit with any incision, but opened several abscesses lower down in the cheek and mouth.

Dr. H. P. Mosher, Boston:
I have been uncomfortable since Dr. Dean read his first paper on this subject, feeling that I had been missing some of these cases. Had I found them, like Dr. Skillern I could not have had the hospital facilities to treat them the necessary length of time—eight or nine months. This paper and others which we have had at this session refute the Chairman's attempt to Oslerize the Society.

I should like to ask Dr. Dean how early it is feasible to wash out the antrum in a child, and at what age the sphenoid is operable?

Dr. Joseph H. Bryan, Washington, D. C.:
The question of sinus involvement is very interesting and important. We have all met these cases to a greater or less degree. Dr. Dean's experience has been more decided than mine, as far as operation is concerned. One sees cases that have constant involvement of the sphenoid at the expense of the other sinuses. Dr. Robertson in the A. E. F. and we at the Walter Reed Hospital found that the sphenoid was more frequently involved. The size of the sphenoid

is almost constant. These are desperate operations, but nevertheless they are justified. Many think that, because a child is young, no radical measures should be done.

DR. JAMES E. LOGAN, Kansas City, Mo.:

We should be grateful for Dr. Dean's work on sinus conditions. I should like to know if Dr. Dean has ever used autogenous vaccines before or after operating in the hemolyticus cases? This has proved a very potent factor in clearing up the case before operation. I have used it as a regular procedure.

DR. GREENFIELD SLUDER, St. Louis, Mo.:

We owe a debt of gratitude to Dr. Dean for his work on the sinuses in children. This question was raised at the American Medical Association three years ago. Now, Dr. Dean has advanced our knowledge and cleared up another difficult problem. He says he does not operate quickly or lightly on the bones of children, and I am glad to hear that statement, as I have had the same feeling for many years. My conclusions are that no matter how much bone you take out of a child's nose, the activity of the bone cells is such that in three months' time the bone will be replaced. You take desperate chances in bone removal in children.

I have had a case of orbital phlegmons from the paranasal cells in a child. The only satisfactory drainage of the orbit is by the route of infection, that is through the nose into the nose. Drainage into the transverse meridian is very difficult and complicated. I have operated on the middle turbinate with a small handle knife and cut through the capsule to the ethmoid quickly. Three months later the orbital phlegmons recovered and the drainage recovered, and the bone resumed the convolutions of the middle turbinate. Operation was completely obliterated. Do not operate on the paranasal sinusus in children except in conditions of dire distress. Dr. Dean's failure in the first case was not due to faults in his technic, but to rapid reproduction of bony growth on the part of the child.

Sphenoidal headaches in childhood are a difficult question. They are not nasal suppurations. Hyperplastic sphenoiditis, without pus, is difficult to diagnose because of the difficulty of the postnasal image. In such cases I have avoided operation and have secured results by the sedulous pursuit of the lesion for treatment and not for surgery.

Dr. Dean has called attention to the size of the sphenoid in childhood. W. B. Davis, in his monograph on the sinuses, describes a most ingenious device by which he removed the face and patched it up so that at autopsy the scar was hardly visible. He secured material from the early days of infancy, followed back to the sixtieth day of fetal life, and proved that sphenoid development began at

that time; at two years it had progressed as far as the foramen rotundum, and at five years to the meeting of the vidian canal. We may consider it as a sinus to be dealt with at that age.

Dr. Clement F. Theisen, Albany, N. Y.:

I would like to ask about another class of cases that has puzzled me very much. Children from five to fourteen years, with apparently a vasomotor rhinitis, with profuse discharge and supra-orbital headache; no pus in the nose, no evidence of sinus involvement by the *x*-ray. Weak adrenalin solutions sometimes help these cases very much.

Dr. John E. MacKenty, New York:

We have derived much inspiration from Dr. Dean's paper. It was worth while coming to Boston for, if for nothing else. We are very much at sea on this question and need light thrown on it. We have many facts in mind, but they are uncorrelated. In adults we can trace back the beginning of the trouble to childhood. They are persistent cases and most difficult to treat. These are the plain cases Dr. Sluder has described. The sinus disease of childhood leaves the individual more or less crippled in after life.

Regarding the bacteriology in these cases, the Streptococcus hemolyticus is one of the most diffcult infections to deal with and eradicate. In the long chronic cases the Staphylococcus aureus is the most common germ present.

The sphenoid sinus is the most devilish sinus to treat. All the others are gentlemen, compared with the sphenoid.

In these chronic cases bone tends to reproduce as fast as you can remove it.

I have seen ocular trouble with children and have had three cases of retrobulbar neuritis requiring radical operation. There was present on examination no profuse nasal discharge, but some change of coloring of the mucous membrane on the side affected. I operated on suspicion; in all cases vision was restored to a great extent.

I would be glad to hear a word upon the treatment of chronic sinusitis in children; children often have sinusitis in the winter, becoming latent in the summer. I use suction and have had some success with autogenous vaccine. The child can be trained to use the suction apparatus at home. Used with the nasal douche, the water is sucked through the nose, thus avoiding danger to the ears.

The question to settle is how much we are justified in operating on the sinus of children; how far may we dare to go in a given case?

Dr. Burt R. Shurly, Detroit:

An old-fashioned procedure that we found useful in these cases was a daily postnasal douche of bismuth and limewater, with suction

or negative pressure. This cleared up the sepsis very quickly. Dr. Dean has given us a new line of thought that ought to instruct pediatrists and orthopedic men, as they see these cases first.

DR. GREENFIELD SLUDER, St. Louis, Mo.:

I should like to know how Dr. Dean reaches his diagnosis. Dr. Mac Kenty says he operates on suspicion. He notes a change of color of the membrane. I do not believe that is suspicion; I believe that is the diagnostic lesion. If we notice that sign we will save many more eyes than we have been doing.

DR. DEAN (closing):

As my time is very limited I will try and emphasize just a few of the points brought out in the discussion.

I have performed extensive operations on the nasal sinuses in children only a very few times. The patient that I reported today, five years and four months of age, is the youngest case that I have seen with an operative sphenoid.

The most essential thing in diagnosing nasal sinus disease in infants and young children is to make a prolonged study of the case. Study of the case for a week or even longer is often necessary. Every possible method of examination must be used. The naso-pharyngoscope is of particular value. A microscopic examination of the contents of the sinuses, together with culturing of the same, gives a most definite result. An *x*-ray picture is always necessary to tell whether or not a given sinus is present, and if present its location and size.

To secure the contents of the Highmorian antrum for microscopical examination and culturing the following procedure is used: With an *x*-ray plate before us a trocar is introduced into the sinus through the inferior meatus. Even if the floor of the Highmorian antrum does not extend below the inferior turbinate if the *x*-ray plate is carefully watched the sinus may be readily entered without danger of complications. Through this trocar a very slender sterile needle is inserted into the sinus and its contents aspirated. Within the last few days, in a boy two years of age, suffering from trophoneurosis of obscure origin, such an examination gave from one Highmorian antrum thick yellowish-white pus.

The culturing of the sphenoid is not so exact as the Highmorian antrum. In this instance, after cleansing the upper nasal chambers with 50 per cent. alcohol, a slender German-silver cannula is inserted into the sphenoidal sinus and its contents aspirated. Naturally the needle becomes contaminated in its passage through the nose, and it is always questionable as to whether organisms cultured are from the sinus or from the nose. When, however, the material

thus secured is found to contain pus cells or pyogenic organisms, we feel certain that sphenoidal sinus disease is present. In cases where we have painted the neighborhood of the ostium of the sphenoid with a solution of methylene blue the methylene blue has not appeared in the material aspirated from the sphenoid.

I was glad to hear Dr. Sluder's remarks regarding the reproduction of bone in the wall of the sphenoid. I had not thought of the reproduction being so rapid as Dr. Sluder finds it to be.

In answer to Dr. Theisen, will say that all children studied were under thirteen years of age, and no special study was made of vasomotor rhinitis.

I was very much interested in Dr. Richardson's report of his case. I believe it to be a case of chloroma. I feel certain that his case will come to autopsy and the characteristic greenish tumor will be found.

A NEW OR HITHERTO UNDESCRIBED FORM OF MAXILLARY SINUSITIS

ROSS HALL SKILLERN, M.D.

Miss P., aged fifty, presented herself in September last with the following history:

During the early months of 1919 she contracted a severe cold in the head, with swelling of the upper lip and the formation of so-called fever blisters, which were especially annoying in their persistence. Instead of the usual course, the cold continued in a more or less chronic form with occasional acute exacerbations. During March a post-nasal discharge, containing blood but no pus, made its appearance. Later the blood became darker and more profuse, while the discharge assumed a thicker and heavier consistency but no more copious. This continued gradually changing its character until by July the expectorated blood assumed the appearance of clots resembling small pieces of liver, which occasionally were mixed with thick yellow pus. Cacosmia was never in evidence, neither was there an appreciable odor to the secretion. The discharge was aways obtained via the post-nasal passages, none had been expelled through the anterior nares. Headache, neuralgia or local tenderness had never been in evidence, nor were other symptoms of sinus involvement particularly marked. The chief complaint of the patient was the expectoration of these liver-like clots of blood with the utmost frequency, which even made it necessary to cause their expulsion several times during the night, thereby greatly interfering with the necessary rest. On this account she had also practically abstained from social intercourse or even places of amusement, as the constant expectoration into a handkerchief had become exceedingly mortifying. It was chiefly on this account and the haunting fear of a hidden malignancy that prompted her to seek relief.

On presentation, in September, no evidences of an active inflammation were present either externally or by rhinoscopic examination. The nose appeared to be fairly normal, no traces of blood or purulent secretion in the region of the middle turbinate or indeed elsewhere being discernible. The nasopharyngoscope disclosed but little change in the normal mucosa and nothing to suggest the presence of a sinus involvement. The teeth were entirely negative.

As a routine measure in such cases, the Lichtwitz needle was introduced into the right maxillary sinus with a negative result, the injected saline solution returning unchanged. On needle puncture of the left antrum, however, as soon as the air was forced into the sinus, there escaped an ounce or more of apparently pure unclotted blood, the quantity of which was considerably increased on lavage with the normal salt solution. No sign of pus, either granular or *en masse,* was present. The lining mucosa of the sinus did not appear to be greatly thickened, as the lumen of the cavity was found without difficulty by the point of the needle, and the sound made by the injected air proved without question that the point was not embedded in thickened mucosa. Irrigation was continued until the flow returned clear, after which 50 per cent. alcohol with 1/2000 bichloride sufficient to fill the sinus was injected and the needle withdrawn. Bacteriological examination of the blood showed an abundance of streptococcus hemolyticus.

The injections were continued daily, the discharge gradually losing its hemorrhagic appearance only to assume more and more a purulent content, the total amount of secretion remaining about constant. It was therefore apparent that the irrigations were exerting little influence on the course of the disease, the character of the secretion, however, was changing from sanguineous to purulent. At the end of fifteen days, after about the same number of treatments, the blood had to all intents and purposes disappeared, leaving a thin, purulent, granular secretion which mixed readily with the irrigating fluid and formed with it a milky appearance. The alcohol injections were continued, gradually being increased in strength until the pure 95 per cent. was reached with no apparent influence upon the infection.

About this time a swelling appeared upon the septum, which rapidly developed into an abscess. This was incised and in a few days subsided, but was followed by a bloody discharge from the right side of the nose. The secretion hitherto had been entirely unilateral and confined to the left side. Needle puncture of the right antrum brought forth a large quantity of bloody fluid identical with that which had originally appeared from the opposite sinus. Previous to this the right side had not been affected.

The treatments now consisted of needle puncture and irrigation of both antra with a 3 per cent. solution of hyperchlorite of soda, well diluted. The character of the secretion gradually changed to a granular milky one, diminishing greatly in amount, so that the patient experienced fairly comfortable nights and was not so annoyed by the frequent use of the handkerchief as was formerly the case.

Despite this improvement and the tri-weekly irrigations the course of the disease now appeared to become stationary as far as the char-

acter and amount of the discharge were concerned. Various strengths of alcohol and bichloride, iodine and nitrate of silver were applied, one on one side and the other on the opposite, in order to test the comparative efficiency of each, and while at times it appeared as though a certain remedy was proving of value actually only to result in disappointment. The present condition of the patient is unsatisfactory in that she is fairly comfortable under bi-weekly treatments, but if untreated the disease shows a great tendency to revert to the hemorrhagic form.

This case is unique in my experience. The peculiar bloody discharge, unaccompanied by any subjective sign of inflammation, with its tendency to diminish but become purulent after irrigations and on noninterference to revert to its original type, is puzzling to say the least.

The advisability of a radical operation has been thoroughly discussed, and finally decided upon, where it is hoped by pathologic investigations the exact status of the infection will be determined.

Discussion

Dr. H. P. Mosher, Boston:

I was very much interested in this paper. I have not had a case just like this, but as I look back I recall a few cases which suggest it. I have operated on three cases of apparent mucocele of the frontal sinus in which I found the sinus filled with a red jelly-like mass which proved to be a sterile blood-clot. There had been bleeding into the sinus, as there had been bleeding into the antrum in Dr. Skillern's case, but the ostium became blocked and the blood did not escape into the nose. The modified Killian operation in these three cases gave a good result.

Dr. John E. MacKenty, New York:

Was the blood-coagulation time noted, to see if the patient was inclined to bleed easily?

Dr. Skillern:

Blood-tests were not made.

REPORT OF A CASE OF EXTRADURAL AND SUBDURAL ABSCESS FOLLOWING SUPPURATING FRONTAL SINUSITIS AND OSTEOMYELITIS OF THE FRONTAL BONE

JOSEPH H. BRYAN, M.D.

On May 6, 1919, L. McG., a fairly well-nourished boy, aged fifteen years, was seen by me in consultation with Dr. Charles L. Billard, his medical attendant, who gave me briefly the following history of the case:

"I was called to see the patient at his home in Waterford, Va., January 13, 1919. On examination I found a distinct swelling over the left frontal sinus, and pus was to be seen under the middle turbinate in the left nostril. The swelling in the forehead was not detected at this time, because the boy was kept in a dark room on account of the light hurting his eyes. During the previous fall and winter he had been in good health, except for some 'nasal catarrh,' and he had on several occasions complained of headaches, particularly when walking and riding his bicycle. During his present illness he has been running a temperature around 100° or 101°, and it was assumed, because of the prevalence of influenza in the neighborhood, he had an attack of this disease.

"On account of the seriousness of his condition he was brought to Washington the following day and admitted to the Episcopal Eye, Ear and Throat Hospital, and the next day, assisted by Dr. O. A. M. McKimmie, his left frontal sinus was opened. There was a large amount of pus immediately beneath the periosteum and the anterior wall of the sinus showed a small perforation. Practically all the anterior wall of the sinus was removed, the sinus well curetted and the wound packed with gauze and drained externally. He did very well for a week or two, but there was always a large amount of purulent discharge. At the end of two weeks he developed an abscess of the left upper lid. Because of the presence of this abscess, and because of the large amount of discharge, he was operated upon again January 31, 1919. The wound through the eyebrow was enlarged and the sinus thoroughly exposed. There was considerable granulation tissue present, and a sequestrum of bone was removed from the

inner wall of the sinus, leaving a perforation into the cranium and exposing the dura over an area of about one-eighth of an inch.

"April 15, owing to a continuance of the discharge, he was operated upon again, with a view of finding some diseased bone that might be the cause of the continued discharge, but none was found. About this time his right maxillary sinus became infected.

"An interesting occurrence in connection with this case is the fact that after the second operation, on the second or third day, while he was being dressed, a cannula was inserted in the wound and the sinus washed out with a warm boric acid solution. No great pressure of the fluid was used, but about four hours later he complained of severe headache, numbness in the right hand, and there was some thickness of speech. In view of the fact that there was a perforation over the dura it is likely that the pressure of the irrigating fluid was the cause of the symptoms just mentioned."

On examination of the boy, on May 6, I found the whole of the left frontal region markedly swollen, pitting on pressure, and bloody purulent secretion exuding through the fistulous opening at the inner angle of the orbit. There was no headache, temperature normal and the patient expressed himself as feeling well. The situation was considered serious notwithstanding the general condition of the patient, and another operation was advised and consented to by the parents.

He was sent to the Episcopal Eye, Ear and Throat Hospital, and on the following day, under ether anesthesia, the following operation was done: A free incision extending from the outer angle to the inner angle of the orbit; a vertical incision was then made in the median line for an inch and a half, joining the inner extremity of the previous incision. The flap thus formed of skin and periosteum was detached from the frontal bone as high as the eminence. The periosteum was not firmly attached to the bone and a large quantity of bloody pus and granulation tissue was found beneath it. As far as the eminence the bone was mottled and soft. With a sharp curette the softened bone was removed through the entire diseased area without perforating the inner table. The cavity was then packed with gauze soaked in a solution of dichloramine-T in chlorocosane and the margins of the wound left open.

The secretions were so profuse as to require fresh dressings twice a day for a week. They gradually subsided, however, and the wound commenced to show a tendency to heal. The convalescence was a long and tedious one, and it was not until the latter part of July when the external wound was allowed to close for at least two-thirds of its extent. On account of the profuseness of the discharge that still existed the inner margin of the wound was kept open by gauze

packing. Palpation over the left half of the frontal region gave the impression of firm bony substance beneath the skin, and there was no swelling or pitting on pressure. The secretions continued to flow in considerable quantities, and at one of the dressings, in searching for some diseased bone that might be present and causing the continued discharge, the probe passed into the cranial cavity through the opening in the posterior wall of the sinus. The probe passed up

FIG. 1

to the vertex of the skull, and on withdrawal the secretions flowed more freely. No diseased bone was detected. The general condition of the patient during this period remained excellent—pulse and temperature normal, and at no time was there any headache or other cerebral symptoms. Wassermann reaction was negative.

During my vacation, in the month of August, the case was cared for by my colleague, Dr. Billard, who kept the wound open and maintained drainage.

On my return in September I found the patient's general condition good. Locally the wound had practically closed, save for the fistulous opening at the inner angle of the orbit, through which the secretions continued to flow in considerable quantity. A probe was introduced, as on a former occasion, through the opening in the posterior wall and could be passed without meeting any resistance to the vertex of the skull. A long cannula was then introduced and a thick bloody purulent secretion was evacuated amounting to about six drams. This was done every other day, with the usual amount of secretion being evacuated. An *x*-ray examination was then made with the probe *in situ*. The plate showed the probe either in the anterior frontal lobe or between the frontal lobe and skull. Unfortunately this plate has been lost and no illustration can be given. Another *x*-ray examination was then made after injecting through the sinus opening a 10 per cent. solution of nitrate of thorium. This revealed a large abscess between the skull and the anterior frontal lobe and established the fact that we had a large extradural abscess to deal with. This is brought out very clearly in Fig. 1. Thorium proved a valuable aid in enabling us to decide between a cerebral and an extradural abscess.

September 25. Under ether anesthesia the following operation was done: A vertical incision extending from the hair-line to the root of the nose was made, joining a transverse incision through the brow from the external to the inner angle of the orbit. The flap thus formed was detached from the bone, leaving a full exposure of the left half of the frontal bone. The periosteum was firmly adherent, and it was noted that the osteomyelitic condition had completely healed, the bone being perfectly firm, showing no degeneration in any part of the largely exposed field. A section of bone about one inch in diameter, commencing at the median line and extending outward on a line with the eminence, was removed, exposing a large abscess sac just under the frontal bone and external to the dura. This sac was filled with a bloody purulent secretion, which, when drawn off, measured about half an ounce. The walls of the sac were quite thick and lined with granulation tissue. A fistulous tract, about two inches in length, was found extending from the sac to the inner angle of the orbit. After emptying the sac the granulations were gently removed and tincture of iodin applied to its walls. A large drainage tube was then inserted and drawn through the fistulous tract to the inner angle of the orbit and the vertical and transverse incisions closed with interrupted sutures.

A bacteriologic examination of the pus from the extradural abscess showed non-hemolytic streptococci in pure culture.

Except for several stitch abscesses in the line of the vertical incision the patient progressed rapidly and was discharged from the

hospital in ten days. The abscess was drained by means of a drainage tube, the insertion of a cannula into the sac and by suction. The secretions continued quite profuse for a while, but gradually subsided, and during the early part of December had apparently ceased, when the external opening was allowed to close. I saw him frequently during the remainder of this month and he always expressed himself as feeling well. As there were no local or general symptoms present when examined by me on his weekly visits, I could not but feel that the danger of a relapse had passed.

January 5, 1920. Word was received from his home in Virginia that he was ill with influenza, his physician reporting he had an acute bronchitis and a severe inflammation of the accessory sinuses. He gradually recovered from this illness and again reported for observation at my office February 14. His condition was excellent save for a general pallor of the skin, which was attributed to his recent illness, and he was directed to report again in two weeks.

February 16. An urgent message was received from his mother, saying he was very ill and she was bringing him to Washington. I saw him at six o'clock in the evening and noted the boy was critically ill, with a marked septic appearance, temperature 103°, swelling over the left frontal region and complaining of severe headache. I attempted to pass the cannula through the old opening at the inner angle of the orbit, but the parts were too thoroughly healed to admit of its passage. The following morning, his condition being no better, he was sent to the Episcopal Eye, Ear and Throat Hospital, when the following symptoms were noted: a dull apathetic expression, nystagmus of the right eye and twitching of the muscles of the face and nausea. Leukocytosis, 23,000.

Awaiting the arrival of his father the operation was deferred until 8.30 P.M., when a vertical and transverse incision was made through the lines of the previous operation and a flap detached from the whole left half of the frontal bone. The periosteum was firmly attached and the outer table of the bone was found to be healthy. The opening into the abscess sac made at the previous operation had been filled in with new bone formation. A larger segment of bone was removed, bringing into view the sac, which was filled with secretion under great tension. About half an ounce of fluid was removed. Another segment of bone was removed from the above opening to the inner angle of the orbit, bringing into view the fistulous tract leading to the extradural sac. The walls of the sac and the sinus were very thick and indurated. Some necrotic bone was removed from the inner table of the frontal bone at the opening leading to the sinus. As far as the eye could determine there was no break in the walls of the sac or of the sinus leading to it. After cleansing the sac of its contents the walls were cauterized with tincture of

iodin and the sinus and sac packed with iodoform gauze, the outer third of the transverse incision sutured and the rest of the wound left open.

February 18. The patient reacted in three hours from the anesthetic, but remained for the rest of the night in a semicomatose state. Respiration labored and at times cyanosed. Dressings moist from wound drainage. On removal of packing no secretion was present. Wound repacked with plain gauze and outer dressing applied.

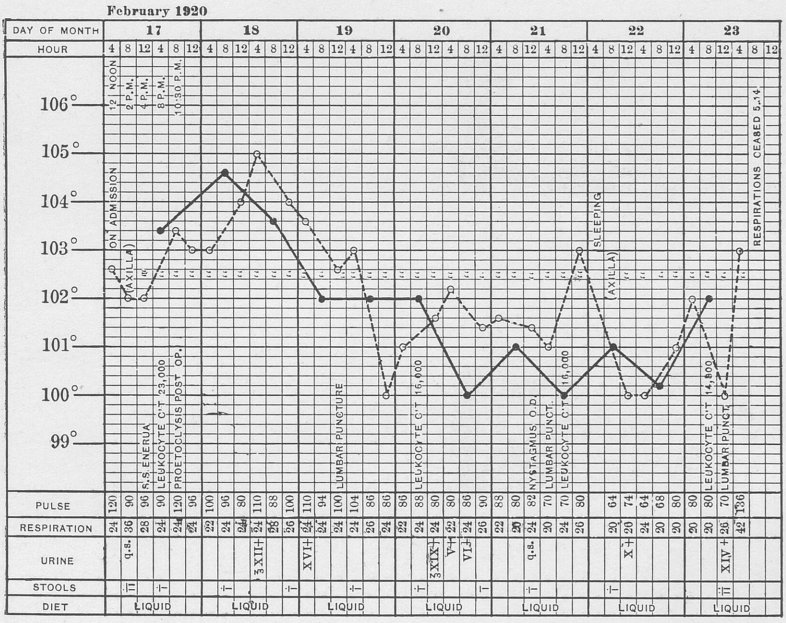


FIG. 2

February 19. Semicomatose condition continues; retains nourishment, can be temporarily aroused; apparently understands questions but cannot answer. Some loss of motion in the right arm. Wound redressed; no secretion in the sac or fistulous tract. Lumbar puncture. Examination of the spinal fluid: Cell count, 370 per c.mm.; globulin; culture on blood agar, no growth. Seen in consultation with Major H. J. Hayes, U. S. Army.

February 21. Nystagmus of the right eye; twitching of the muscles of the face and mouth; evacuations involuntary. Leukocyte count, 16,000. Lumbar puncture. Examination of spinal fluid: cell count, 49 per c.mm.; globulin; cultures on blood agar, no

growth. 6.30 P.M. nystagmus of the right eye followed by facial muscular twitching, extending to the entire right side, then becoming general. Convulsions from 7 P.M. to 1 A.M. relieved by inhalations of chloroform.

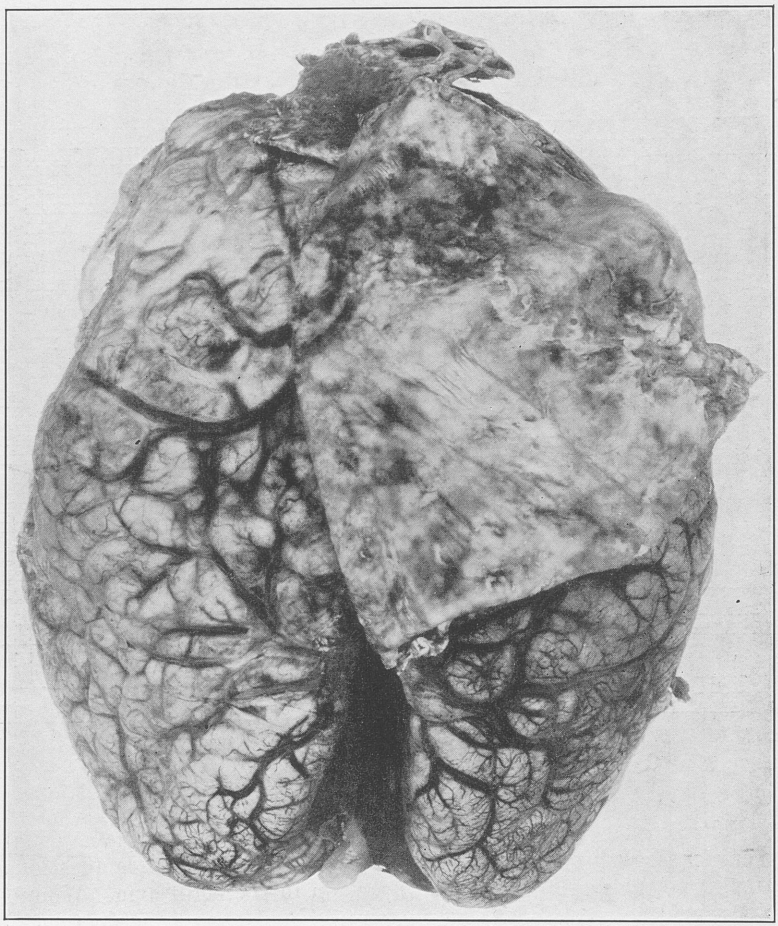


FIG. 3.—Brain. Left dural flap reflected to show under surface; depression in anterior part of left cerebrum.

February 22. Convulsions continued through the forenoon, when the patient's condition seemed to improve; more rational and taking nourishment better. No change in wound observed at dressing.

Eye examination by Dr. Morrison showed nerve ends not swollen. Veins slightly enlarged; no pressure. Both eyes in good condition. Leukocyte count, 14,000.

February 23. Convulsions frequent during the night and in the forenoon; controlled by chloroform. Nourishment refused. Growing weaker, and died at 5 P.M. For temperature, pulse and respiration, see accompanying chart.

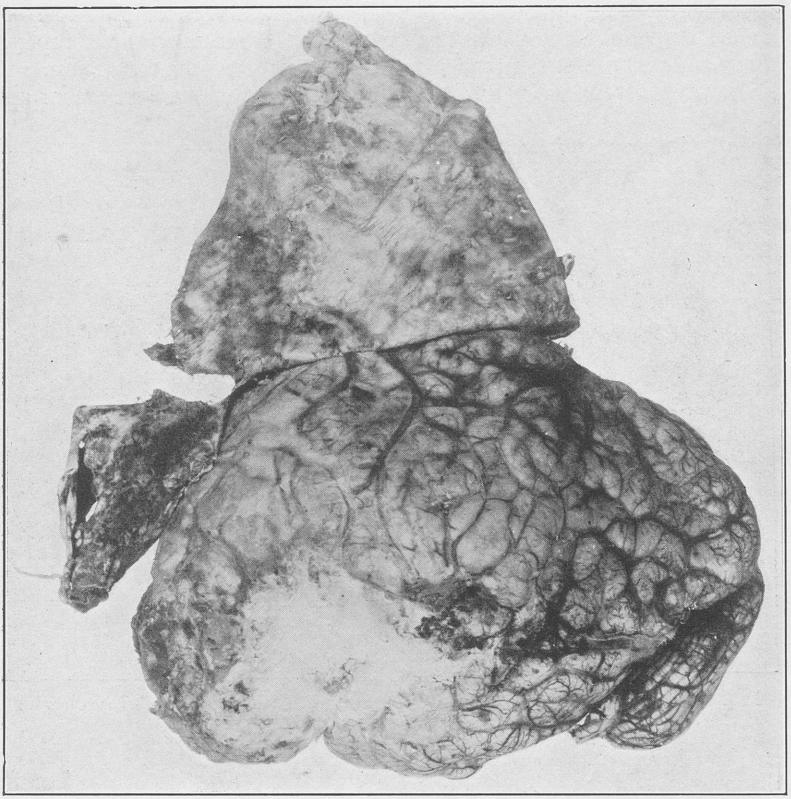


FIG. 4.—Left hemisphere showing subdural abscess and leptomeningitis; extradural abscess sac. Operation wound tract. Dura reflected upward.

Neurologic Notes by Major Hayes, U. S. Army. The patient is in a comatose state and is unable to coöperate in the examination. The pupils are dilated following the use of a mydriatic. Extraocular movements not obtained on account of the mental condition of the

patient, but there is no apparent weakness of any of the muscles of the eyes. The tongue is about in the median line and the face a trifle flattened.

Upper Extremities: Right side: There is a slight loss of power on this side. Muscle tone about normal. No atrophy and no tremors except during convulsive seizures. Deep reflexes present and are more active than on the left side. Left side movement is quite free in all directions. Muscle tone normal. No tremors or atrophy. Deep reflexes present, but not as active as those on the right side.

Lower Extremities: Right side: Movement of good range in all

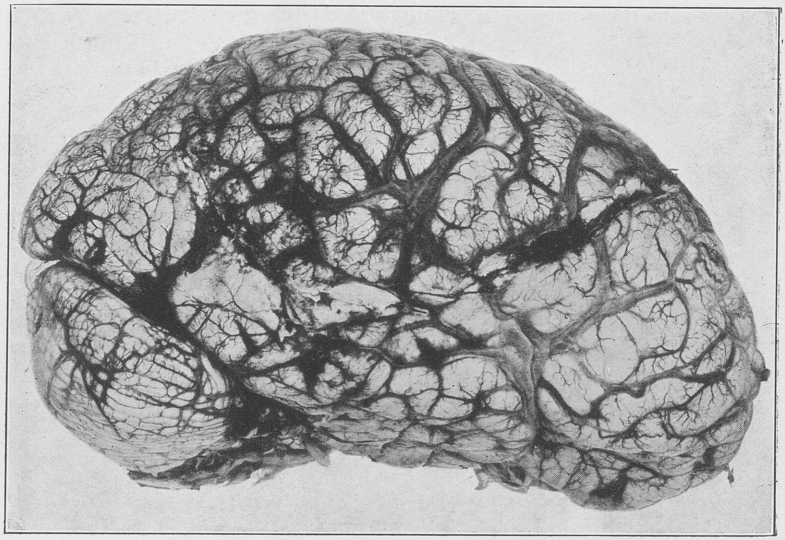


FIG. 5.—Right hemisphere; vascular injection; exudate along vessels in Rolandic area.

directions. Muscle tone about normal. No tremors or atrophy. Deep reflexes present and about equal to those on the left side. Babinski negative. Left side: Movement good in all directions. Muscle tone about normal. No tremors or atrophy. Deep reflexes active, and about equal to those on the right side. Babinski negative. Sensory examination negative. Kernig's sign present on both sides.

From the neurologic viewpoint this patient presented several points of interest which, while well known, are of sufficient interest to record: It was noted that he was not able to call the names of objects wanted and that he misplaced words. This condition pointed to a lesion of the temporal lobe or tracts. Unfortunately the para-

plesia could not be worked out on account of the patient's mental condition, but this and the convulsive seizures aided to a large extent in the localization of the pathologic process.

The convulsive seizures were of the true Jacksonian type, always starting in the facial muscles, and in a number of instances were confined to the face and forearm of the right side.

Interesting, also, is the relation of the findings in the spinal fluid to the pathology which existed. The first spinal puncture, done about six days before death, showed a cell count of 340 cells and a negative culture. Fluid examined again, on the fourth day, showed a cell count of 43 cells and a negative culture; and a third examination, two days before death, showed a cell count of 100 and a negative culture. While we realized a meningitis might exist for two or three days and not give more positive findings than those shown in this case, we are quite certain that we were dealing with a process which was not in free communication with the spinal fluid. The acute condition was so rapid in progress, however, that a decompression was considered inadvisable when it was possible to recognize the condition which existed.

Bacteriologic Report by Major Henry J. Nichols, U. S. Army. The organism found in this case has been identified as the enterococcus. This is undoubtedly the same organism that was found in the previous operation. It is widely distributed and occurs in the mouth, nose and pharynx. It is usually saphrophytic but occasionally becomes pathogenic, and cases of meningitis have been due to it as well as cases of bronchopneumonia. This case must be considered as unusual from the bacteriologic as well as from the surgical viewpoint.

The enterococcus was found frequently in the war wounds in France.

Report of Autopsy of the Head by Major George R. Callender, U. S. Army. There is an operation wound just to the left of the median line, extending from the base of the nose upward for about 8 cm. Wound includes the bone to the dura for about 5 cm. Cavity, except the bony wall, covered by a granulating membrane.

Head opened by removing V-shaped sector of calvarium. Rather thick yellow pus exudes from saw cuts in the dura of the left hemisphere. Anteriorly there is a thickened area of dura, the floor of the wound cavity measuring 8x2 cm. The dura over the left cerebral hemisphere is thickened.

On removing the dura the entire left hemisphere is seen to be covered with a purulent exudate which, over an area roughly 8x5 cm., with the center at the junction of the Rolandic with the Sylvian fissure, becomes fibrinous and of a paler color. The under surface of the dura is swollen, granular and injected. The pia-arachnoid is

markedly thickened, injected and swollen, obscuring the markedly injected vessels beneath.

The anterior half of the left cerebrum is flattened on the side, and where the thick fibrin forms a mass there is a depression about 1 cm. deep at its center.

The left cerebrum shows marked vascular injection, with some opacity about the vessels in the lower Rolandic area. Frontal sinus involved in operation wound. Ethmoid cells show injected mucosa. Sphenoid antrum filled with yellowish, cloudy fluid. Mucosa injected and swollen.

Streptococci in short and long chains are abundant in the exudate in and on the surface of the brain, as shown in sections.

The photographs of the brain are of considerable interest.

SUMMARY. 1. This case presents many points of interest both from the pathologic and surgical sides. The obstinate character of the original inflammation in the frontal sinus; the exposure of the dura in the course of one of the operations through which the infection passed to produce the extradural abscess.

2. It is unfortunate there was no bacteriologic examination made from the sinus secretion at the time of the original operation.

3. The value of nitrate of thorium as an aid in differentiating between an extradural and a cerebral abscess during an *x*-ray examination.

4. The complete relief of the osteomyelitis, generally a progressive condition.

5. The fulminating process developing so rapidly and resulting in a subdural abscess after the extradural abscess had seemed to be relieved.

MENINGITIS DUE TO FRONTAL-SINUS SUPPURATION, WITH A REPORT OF THREE FATAL CASES

RALPH BUTLER, M.D.

THERE is no more important phase of rhinology, and none which is worthy of more serious thought and study, than that of inflammation of the nasal accessory sinuses and their serious complications. Our knowledge in regard to the treatment of sinusitis leaves much to be desired, and it seems advisable to report our successes and still more our failures, so that, eventually, evidence may be at hand for the drawing of correct conclusions in regard to the prevention and cure of dangerous complications.

Considering the vast number of cases of sinus suppuration which are being treated, or are getting on without treatment, the number of reports of intracranial involvement from them are relatively few, and in searching the literature one is impressed by the number of intracranial cases of otitic as compared with those of nasal origin. That these complications of sinus inflammation are not common is borne out by statistics. Treitel[1] reported from the Berliner Pathologischen Institute that he found but 1 case of meningitis and 2 cases of brain abscess from frontal sinusitis in 6000 autopsies; while Pitt,[1] in 9000 consecutive autopsies at Guy's Hospital in the years 1869 to 1888, found but 1 case of rhinological brain infection and that was an abscess in the frontal lobe. However, the thoroughness with which he studied the sinuses has been questioned. More recently, in 1909, Bruhl[2] states that in an observation of 35,000 nose, throat and ear cases, during the previous ten years, he saw a great many otitic fatalities from pyemia, brain abscess and meningitis, and only 1 case of intracranial disease from frontal-sinus suppuration; while Jansen,[3] with an operative experience of 800 cases, reported 3 of purulent meningitis, without operation, about 6 of large extradural abscess and 1 of serous encephalomeningitis. In the same year Gerber[4] published an exhaustive report of frontal-sinus compli-

cations collected from the literature, in which he tabulated 51 cases of meningitis without brain abscess, 6 of which had had sinus thrombosis, and 65 cases of brain abscess, 27 of which also had meningitis and 2 had thrombosis. In 1913, Boenninghaus[5] was able to collect only 5 additional cases of purulent meningitis due to frontal-sinus suppuration, thus bringing the total to 56. Since that date we have found 5 more cases, the references to which are included in the bibliography of this paper (6, 7, 8, 9 and 10). Some of the recent foreign literature has been inaccessible, because of the war, and no doubt unreported cases have occurred.

Meningitis may complicate either chronic or acute sinusitis, is more common in the male sex and during the second and third decades. Gerber[4] reports 3 under ten years of age and the same number over sixty years. It usually starts over the silent area of the brain, and the symptoms may be obscured by those due to neighboring sinusitis or orbital complications. Usually it runs a rapid course and terminates fatally within five days, although the symptoms may be intermittent or the course prolonged. In one of our cases, herein reported, the pathologist estimated that localized meningitis had been present for six months. In this case both fever and leukocytosis were absent.

The infection may be transmitted through a congenital or a carious defect in the posterior wall of the sinus, through the veins or lymphatics, by infection of the diploë, or by the formation of an osteomyelitis.

In 1913, Zwillinger[11] demonstrated that colored fluid injected into the perimeningeal lymph spaces could be recovered in the lymphatic plexuses of the mucous membrane of the frontal sinus. Furthermore, it has been shown that the veins of the sinuses communicate with each other and through the bones with the meninges and the cranial sinuses. The relative or absolute closure of the nasofrontal duct may be a factor in some cases. It has been stated that the larger the frontal sinus the greater the danger of intracranial complications.

After purulent leptomeningitis has developed, the prognosis is very bad. Only 3 of Gerber's 51 cases recovered, and 2 of these were serous meningitis. A few cases of purulent meningitis have recovered, *e.g.*, Beck[12] reports the cure of a case of otitic origin in

which pneumococci were found in the cerebrospinal fluid. The Haynes operation was performed in this case.

There is considerable evidence to show that the mortality has been increased by operations on the sinuses, *e.g.*, Boenninghaus[5] reported a mortality of 10 cases following 375 Killian operations, or 2⅔ per cent. He collected 15 cases of death from intracranial complications which were the direct result of the Ogston-Luc operation on the frontal sinus. Of these cases, 4 died from meningitis in from two to six days after operation, 1 from subdural abscess and sinus thrombosis eight days after operation, 8 from osteomyelitis in from seven weeks to two years after operation, and 2 from brain abscess. In 1909 Hajek[13] reported 2 postoperative fatalities and stated that Gerber compiled a series of 36. These statistics are by no means conclusive, as many cases have not been reported; *e.g.*, Hajek speaks of 6 cases reported privately.

As there is considerable operative risk, the cosmetic results are not always satisfactory and complete cure is uncertain, many surgeons hesitate to do a radical operation unless intracranial infection is suspected or the bone diseased. Even conservative surgeons agree that one must not hesitate beyond this point.

The following case illustrates the value of even a late operation:

About two months ago I operated on the left frontal, ethmoidal and maxillary sinuses of a boy, fourteen years old, who had marked proptosis of the left eyeball. On operating, we found the dura exposed in the ethmoidal and frontal regions, with a local meningitis; the roof and inner wall of the orbit were largely destroyed, and staphylococci were found in pure culture. The patient has shown no evidence of extension of the intracranial involvement. The Wassermann test was negative.

The results were not so fortunate in the following cases:

Case I. On December 18, 1918, Dr. L. asked me to see his son, fourteen years old, who had been suffering for about two weeks from an acute inflammation of the left frontal sinus, with swelling and tenderness. He had had an attack of influenza, during the latter part of September, from which he seemed to recover with the exception of a condition of malaise. He became exhausted on the slightest exertion and did not look well. Previously he had been a normal, healthy boy.

As I saw him in his home, my examination was incomplete. How-

ever, there was neither tenderness nor swelling over the sinuses, the postural tests were negative and there was no abnormal secretion in the nose or throat. I suggested a blood count, an *x*-ray examination of the sinuses and examinations by an ophthalmologist and a neurologist. The rœntgenologist could not determine whether the left frontal sinus was absent or full of exudate. The blood-count showed 20,000 leukocytes. The neurologist, Dr. William G. Spiller, examined him two days before he died and gave a negative report.

I urged his father to send him to the Lankenau Hospital for study, as the cause of the leukocytosis and weakness had not been determined. He was admitted to the hospital during the evening of December 20th, but I was not notified of his presence until the following forenoon, when I received a telephone message that he had become unconscious the previous evening and showed signs of meningitis.

Drs. Spiller, Page and I saw him in consultation at 2 P.M. on the day after admission. He was comatose; the neck was stiff; the pupils did not react to light and accommodation—the left one widely dilated, the right contracted and there was a hemorrhage in each fundus. The examinations of the ears, lungs, heart and abdomen were negative. The right arm and leg showed spasmodic twitching; the Babinsky was present in the right foot; both patellar reflexes were slightly increased; Koenig's and Brudzinski's signs were positive.

The blood-count showed hemoglobin, 90 per cent.; red blood cells, 4,870,000; white blood cells, 26,300; polymorphonuclears, 72; lymphocytes, 11; large mononuclears, 10; transitionals, 7. The cerebrospinal fluid was cloudy and showed a count of 226, mostly red cells and Gram-positive diplococci resembling pneumococci. On admission his temperature was 99°, pulse 60, respiration 20; the following morning 100.5°, 70 and 20. A second *x*-ray examination showed an exudate in the left frontal sinus. All agreed that the sinus should be opened. This was done and it was found to be filled with a thick brown fluid. The mucous membrane was moderately inflamed, the walls were intact and the nasofrontal duct was patulous. The patient required little ether and the pulse and respiration were normal during the short operation. While the wound was being sutured the patient suddenly stopped breathing, probably from paralysis of the respiratory center. Efforts at resuscitation failed. No autopsy was obtained.

CASE II. T. D., aged twenty-one years, native of Poland, came to the eye clinic at the German Hospital September 30, 1908, and was referred to the nose and throat department by Dr. W. T. Shoemaker.

The patient gave the following history: He had been kicked by a horse, above the right eye, fourteen years ago. Three months later he noticed a swelling over the inner end of the eyebrow, which slowly increased in size. There were no symptoms except moderate bilateral "dizzy" headaches in wintertime and loss of the sense of smell on the diseased side. .

Examination showed a swelling about as large as a pigeon's egg along the inner end and extending below the right eyebrow. There was no tenderness. The periphery of the elevation was hard and bonelike, the center doughy and cystic.

The appearance of the inside of the nose was practically normal except that there was crowding of the middle turbinal on the right side, caused by the moderate inward bulging of the external wall of the nose. There was some yellowish, non-fetid secretion in the left anterior nasal chamber and in the nasopharynx. Sense of smell was lacking on the right side. Transillumination showed both frontals dark. The skiagraph was unsatisfactory. The eyes were normal.

Diagnosis of mucocele of the frontal sinus was made.

October 2d, after removing the anterior end of the middle turbinal, we opened the frontal sinus and found the cavity very large, measuring two inches in the antero-posterior as well as the lateral diameter. The cavity was filled with thick, ropy mucus. There was no communication between the sinus and the nose, therefore a very large passage was made and a rubber drainage tube was inserted, one end being left in the incision in the eyebrow while the rest of the incision was closed with sutures.

The patient did fairly well, and the drainage tube was removed from the wound in the eyebrow at the end of a week, and ineffectual efforts were made to keep the internal portion *in situ*. However, in spite of persistent attempts to keep it open with bougies and tubes, the artificial duct closed and the swelling reappeared.

On October 29th, I reopened the wound in the eyebrow and found the sinus nearly filled with flabby granulations and some thick mucus. I then inserted a gold tube with a large flange, treated the granulations with silver nitrate and closed the external wound. The patient made an uninterrupted recovery with marked improvement in his mental condition.

Four years later, December, 1912, he came to my office with an acute purulent infection of the right frontal sinus, with drainage of pus through and about the gold tube, which was still in place, surrounded by granulation tissue. After a few treatments he improved and then disappeared from my observation for another four-year period, when, in the summer of 1916, he returned with a recurrence of acute symptoms. He refused to go to the hospital in spite of urgent advice and I did not see him again until June, 1917, at

which time pus was coming through the upper eyelid and the tube was badly blocked. He still refused to go to the hospital and failed to report for treatment.

About a month later, I was called to his home by his family physician and found him with a typical attack of meningitis, from which he promptly succumbed. It was impossible to do even a lumbar puncture in his squalid surroundings and in the presence of a dozen or more of his Polish friends, and the family refused to allow him to be taken to a hospital.

Unfortunately an autopsy was unobtainable.

CASE III. F. S. was admitted to the Polyclinic Hospital December 9, 1912. He was large, well proportioned and looked much younger than his age of seventy-seven years. During the past seven years he had been a night-watchman and previously a glassblower. His chief complaint was loss of vision and a discharge above the right eye. For the past two years he had had a bilateral, intermittent, creamy-yellow, anterior nasal discharge. During the last six weeks he had had three attacks of swelling of the right cheek and bilateral swelling of the eyelids. During the last attack he used poultices, following which a fistula formed over the right eye and through this there had been a discharge of pus. Three weeks previously he had had polyps removed from the right nostril. He had never had pain. With the exception of a loss of forty pounds in weight during the last two years, dyspnea on exertion and occasional swelling of the feet, the rest of the general history was negative. He denied venereal disease.

The examination showed tenderness over the floor of the right frontal sinus, with induration of the tissues of the upper part of the right orbit and a supraorbital fistula extending into the frontal sinus, from which pus was draining. Both nostrils were filled with pus, which could be traced on the right side to the middle meatus. The right middle turbinal was large and polypoid. The view of the left naris was obstructed by a deflected nasal septum. There was no pus in the pharynx and the choanæ were free. A culture of the pus was sterile. The *x*-ray examination showed marked clouding of the right frontal and roughening of its median wall, with a slight clouding of the right antrum and of the ethmoids on both sides.

December 11, 1912, the right middle turbinal was removed and pus was washed from the right antrum.

Dr. Reber reported the external ocular muscular movements good; incipient cataract, haziness of discs and retinæ, with overfilling of veins and arteries in both eyes, but more marked in the right one. He advised operative interference to preserve the integrity of the right eye.

The blood-count was normal, with 5520 leukocytes. The urine showed a trace of albumin and a few epithelial casts. The temperature and pulse were normal.

December 14, 1912, eight days after admission, an external operation was performed. The front wall, containing the fistula, was removed and the sinus was found filled with pus, the pulsation of which suggested a communication with the brain. The posterior wall was necrosed over an area of about 1 cm. in diameter, through which the inflamed dura could be seen and pulsation could be felt. At this point the operation had to be discontinued because the patient was doing badly, and after inserting a gauze drain he was returned to bed. He seemed to be in fairly good condition the following day, with normal pulse and temperature. The urine, however, showed casts and albumin.

On the third day after operation the patient became irrational and had one general convulsion, which the neurologist attributed to uremia. His examination showed increased knee-jerks, clonus on left, readily exhausted on right; no Bablinsky; marked subsultus of tendon in both arms; apparently no palsy of arms or legs, which he moved voluntarily. Left pupil responded to light; right eye bandaged. Blood pressure: systolic, 210; diastolic, 80. The patient died during the night of the 17th, apparently from uremia.

The autopsy showed bilateral chronic suppuration of the frontal, ethmoidal and sphenoidal sinuses and of the right antrum of Highmore, and chronic suppurative meningitis with secondary atrophy of the cortical substance of the frontal lobes of the brain, estimated to be six months' duration. Infection probably pneumococcic. Gram-positive diplococci.

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Discussion

Dr. R. H. Skillern, Philadelphia:

A few times I have lost cases of meningitis after the Killian operation. One point to be considered is the route by which this infection travels to the brain. In one case the man died after three days. At autopsy I studied the case with the pathologist to try and discover the manner in which the infection had reached the brain. It was impossible to find out; the whole brain was a mass of inflammatory reaction, but there was no path to be traced. These cases that die are old cases that have lasted for years and years and have built up for themselves a kind of resistance toward the disease. When we operate, if we break down the resistance, they go off very quickly.

Dr. C. W. Richardson, Washington, D. C.:

We occasionally see these cases of meningitis following immediately after operative intervention. I cannot believe they are the results of the operation. They develop too early in the history of the case. In my experience these cases have always been those in which there was continued, persistent and intolerable headaches for weeks before the operation. I had two such cases, in which the meningitis developed apparently the night of the operation, and I believe I am right in my opinion that the meningitis really existed, but was not detectable before the patient was operated upon. Dr. Coffin, in a paper written some few years ago, called attention to this very thing.

Dr. Henry L. Swain, New Haven, Conn.:

I would like to say one word on the question of the origin of any case of meningitis, as it is often put up to us to decide in our hospital work. I have in mind a most interesting case.

A patient came in with meningitis and a running ear. The otologist was called in to operate upon the latter. I felt that the meningitis might not be due to the ear. We did a lumbar puncture, and the fluid, which was distinctly purulent, gave pneumococcus in pure culture. A smear from the ear yielded a staphylococcus; a smear from the nose, a pneumococcus. The case got well without operation; but if we had rushed in and done the usual things in operating on the ear, in all probability we would have killed the patient. The treatment given, beyond the usual routine care, was to do lumbar puncture when indicated by signs of pressure, and administer ergot. The patient is still alive after twelve years.

NOMA NASALIS

B. ALEXANDER RANDALL, M.D.

DR. RANDALL asked permission to report verbally a case which had unusual features:

A farmer, sixty-eight years of age, came with very offensive nasal discharge, false membrane, crusts and caries, which had grown rapidly worse during the six months or more of its duration. The right Highmore had been opened through the alveolus, but was practically normal. A square inch of the bony septum was denuded, but the mucosa of the left side was intact, the disease being confined to the right, where the outer wall and floor were bare, the inferior turbinal destroyed and the anterior third of the middle turbinate lost and a part of its covering pendulous in the floor of the naris. The disease had invaded the lacrymal passage, causing dacryocystitis, and the nasal process of the maxilla was bare, but white and firm.

The first presumption of malignant disease seemed negatived by the free antrum. The patient responded quickly to iodides, and later gave negative Wassermann. Roentgenologist, dermatologist, rhinologist and general surgeon seemed equally puzzled, but inclined to ascribe the condition to lues.

Penetration of the hard palate gave a small blackish area of slow progress, the septal plate of the ethmoid gave way, the posterior ethmoids and sphenoid shared in the involvement and all tonic measures seemed unavailing. A pustule now formed on the right ala, spread into a typical black *noma sphacelus,* and gave, as I believe, the key to the whole process.

Diphtheria antitoxin was given in 1000-unit dose, but without evident gain; and the patient, with marked erysipelatous-looking nasolacrymal region, was sent home, where his conditions promised to be more alleviating than by himself in the city. A cursory search has not found a report of noma of the nasal tissues.

DELAYED SECONDARY HEMORRHAGE COMPLICATING TONSILLECTOMY[1]

VIRGINIUS DABNEY, M.D.

As long as the operation of tonsillectomy is performed, whatever be the method, just so long must the hemorrhage, immediate or remote, accompanying the procedure be a matter of prime importance to the conscientious laryngologist. Where a slow severance of the tonsil base is secured and all hemorrhage controlled before the patient is taken out of the operating room, it is my belief that a true secondary hemorrhage is comparatively rare, especially if the number of those who escape this unfortunate complication be compared with those who do bleed secondarily. Certainly a hemorrhage ten days after operation is rare indeed, and one such I will report in this paper.

During the past twelve years I have had under my care only four cases of secondary hemorrhage delayed beyond twenty-four hours after operation for removal of the faucial tonsils. Of this number the first two were done under cocain infiltration, without adrenalin, with the Mackenzie tonsillotome; the last two under ether and with the cold snare. One of these cases came under my care after operation by another laryngologist in a neighboring city.

Case I. Some twelve years ago I was called upon to remove the tonsils of a vigorous country girl of eighteen years who had had many peritonsillar abscesses with the usual inflammatory adhesions and fibrous tissue formation as a result. She gave no history of excessive bleeding nor did the dissection of the tonsils result in any unusual amount of blood loss. The operation was done under 5/10 per cent. cocain (no adrenalin), using a Mackenzie tonsillotome, and the patient went home in two hours and was put to bed. Two days later I had to stop a very free general capillary hemorrhage from the entire posterior pillar of one side by the use of ice placed

[1] Read by title before the American Laryngological Association, June 17, 1919.

and held firmly in the fossa. This procedure in the course of a half hour caused permanent cessation of the flow. There had been no hemorrhage between this time and the day of operation, nor did there appear to be any loss of the clotting power at this time. The pillars showed no injury.

CASE II. A few months later I removed the tonsils of a man of twenty-five years in good health and of splendid courage under pain, using the same technic as in the first case, but here there was free bleeding during the operation and a secondary hemorrhage six hours later that gave me much concern till it was controlled. Ten days later this patient fell in the street from weakness resulting from a profuse hemorrhage which began as he was walking quietly and did not stop till he fell, as stated. There seemed a certain amount of deficiency in the clotting power of the blood throughout this case, but no injury to the pillars was apparent.

CASE III. In this case the cause of the hemorrhage was ultimately quite plain, though the delay in its appearance is yet obscure. His tonsils had been removed a week before, and his history as given to me by him was, in brief, that he had been in the operating-room nearly two hours owing to difficulty in arresting the flow of blood. He remained in the hospital after the operation five days and had no trouble while there. Two days after returning to Washington he was wakened by a sensation of strangling and found his mouth full of blood. I found his throat so rebellious and the flow of blood so persistent and profuse that a careful examination was impossible. As he was living in the suburbs and I had no assistance, I tried local applications which included ice, silver nitrate, glycerite of tannin and pressure with gauze sponges, all of which seemed to control the flow for a few minutes at a time. However, after six hours of this procedure I brought him to the hospital, anesthetized him with great difficulty, as he was vomiting freely much blood all the time, and in a few moments found the bleeding point, a jagged tear in the middle third of the posterior pillar, such as could have been made by a punch or the end of a sponge forceps. This is mere conjecture, of course, as I was not present at the operation. Clamping the pillar soon stopped the hemorrhage. This patient had an arrested tubercular kidney and hip.

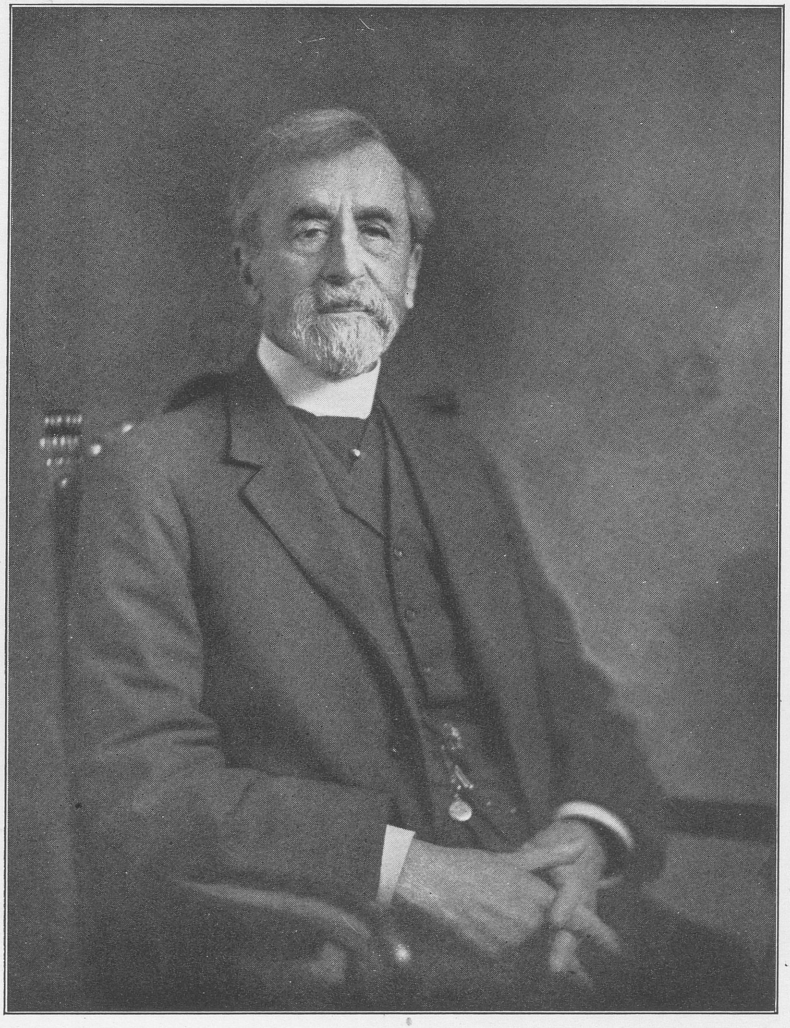
CASE IV. The small buried tonsils in this young girl of nineteen years were dissected bluntly and snared away with little loss of blood except in one place, which required a clamp for a few moments. The tonsils had been partially removed some years before, and there was the usual scar tissue, of course, rendering the

dissection slow and trying. The operation was done under ether with the snare, and the patient had no complications during her three days' stay in the hospital. Three days after this, six days after the operation, I found a clot the size of a hazelnut in one fossa and a thin stream of blood trickling down behind it. She reported that her throat had been bleeding two hours before she called me. I removed the clot and packed the fossa with a soft gauze sponge, which I removed in twenty-four hours, during which period there had been no loss of blood. However, in a few moments after removing the packing it began again, necessitating a repacking, which ended the trouble permanently. Her history threw no light on the trouble, as she had never had any severe hemorrhages and was an excellent physical specimen. Her father had had pulmonary tuberculosis, but the process had been arrested for several years.

It is my belief that the cause of these secondary extravasations when thus delayed cannot be definitely stated, but it seems reasonable to assume that in some instances the explanation may lie in the separation of a slough, which forms in all cases to some extent, especially where there has been much trauma. Where this slough involves vessels its separation might readily cause some hemorrhage. Again, exertion resulting in increased force in the blood stream against the walls of small vessels thinned at operation, might cause the flow of blood through rupture of the thinned areas. A tuberculous or syphilitic taint would enhance the possibility, of course.

The further I travel along the road of laryngology the more sensitive I become to tonsillar hemorrhage, the greater becomes my respect for bleeding areas in the denuded fossæ. This confession bespeaks, I hope, rather caution than timidity, and that wisdom which is said to come with age. I hope I am the safer man thereby; certainly the patient is.

Memorials



HENRY KEMBLE OLIVER

HENRY KEMBLE OLIVER

1829—1919

Dr. Henry Kemble Oliver, the oldest laryngologist in America, and our oldest Honorary Fellow, died at his home in Boston, Mass., October 27, 1919, rounding out at more than ninety years a lifetime of unusual interest and beauty. Dr. Oliver, as were his ancestors before him, was born in Salem, Massachusetts. His own birthday was October 26, 1829. His father, Henry Kemble Oliver, was the son of Daniel Oliver (teacher, state adjutant-general, and State treasurer) and of Elizabeth H. Kemble, his wife. He was related to the Cheevers, Cooks and other well-known Massachusetts families. His early life was spent in Salem, where he attended the English High School from 1843 to 1845, and the Salem Latin School from 1845 to 1848. He then entered Harvard College, graduating in the class of 1852 with the degree of A.B., and from Harvard Medical School in 1855. His preceptors were the instructors of the Vermont Medical School. Having served during the last year of his undergraduate course as intern in the Massachusetts General Hospital, he entered upon practice in Boston. He became connected with the Boston Dispensary and with the Outpatient Department of the Massachusetts General Hospital, to which latter institution he was subsequently appointed visiting physician.

He early began the study of diseases of the throat with such books as he could find, since there were no instructors. This simple statement suggests much of interest.

Dr. Oliver's grandmother was fond of music and was a fine singer, as were all but one of her eight children. The grandfather was puritanically opposed to it and forbade his son—afterward Dr. Oliver's father—to study and practise music. The youth developed considerable musical talent, however, and later in life wrote a

number of hymns, the best-known being "Federal Street," named after the street upon which stood the family residence in Salem. With such an example and inheritance it is not strange that Dr. Oliver's attention should have been turned toward the physiology and pathology of the larynx.

He spent the years 1855-57 abroad, in the general study of medicine, and in the summer of 1860, again visited Paris, where he procured a steel throat-mirror, with which he began experimenting upon his return to Boston in the early autumn. He says: "I embraced every opportunity to become expert in the use of the mirror obtained abroad, and when I felt justified, sought disciples. The first regular teaching took place in a room placed at my disposal by the late George E. Shattuck, M.D. Illumination was restricted to the use of the sun's rays or to diffused light with various makeshifts to concentrate it upon the mirror. Here were gathered together such medical students as could be made interested in the new science." At the breaking out of the War of the Rebellion, Dr. Oliver went into the service of the Sanitary Commission. At the close of the war he returned to Boston and resumed the teaching of laryngoscopy—at this time with greatly improved apparatus.

Again, Dr. Oliver says: "In the winter semester of the Harvard Medical School, upon December 18, 1866, the writer was appointed 'University Lecturer on Laryngoscopy.' This was the first appointment in this special subject in the school." Mr. Charles F. Adams, Treasurer at Harvard University, has searched the University Records and has found upon them that "At a meeting of the Faculty of Medicine held December 15, 1866, Dr. Henry K. Oliver was nominated as University Lecturer upon the Laryngoscope. In the Catalogue of 1866-67 his name appears as Lecturer." Dr. Solis Cohen's appointment as Lecturer in the Jefferson Medical College, Philadelphia, antedated this by about ten months. The names of Dr. Cohen and of Dr. Oliver are, on the very best authority, the first to be officially recorded as having held authorized positions as teachers in regularly organized medical institutions. Even the unsupported claim of Dr. L. Elsberg, that he established a throat clinic in 1861, must give way before the assertion of Dr. Oliver that his was opened in 1860.

Dr. Oliver's published articles relating to laryngology, appearing early in the history of the specialty, showed originality, fine power of observation and a cultivated literary style. Among the most important were: "Removal of a Tumor from the Vocal Cords by the Aid of the Laryngoscope," published in the *American Journal of the Medical Sciences* in 1867; "Restoration of the Voice at a Single Sitting in a case of Nervous Aphonia by Manipulation of the Larynx," also articles on "Laryngeal Growths," in the *Boston Medical and Surgical Journal* in 1866 and 1867.

Dr. Oliver never married. His church was the Unitarian. In politics, he was independent.

A lover of Nature, he tells us that his favorite recreations were ornithology and painting. His friend, Dr. Farlow, says of him that he was an excellent taxidermist, and that when in college he used to go South in the winter to secure ornithological specimens for the Boston Museum of Natural History. Some of his specimens went to the Agassiz Museum in Cambridge. Dr. Farlow also says: "He was also an artist. I have one of his water-color paintings of Etretat, France, which he gave me. He seems to be very fond of music. In fact, a man of many cultivated interests."

Withdrawing from practice a number of years ago, he lived in quiet retirement, fully possessed of his mental faculties, enjoying his friends, his books and his pursuits, until the years fourscore and ten, slowly accumulating, finally bore him peacefully away.

Such, in brief, is the record of one who, born a gentleman, through the refinement of his character, the excellence of his intellectual attainments, the fervor of his patriotism and the value of his contributions to science, added much to the welfare of his generation and to the luster of his family name.

THOMAS AMORY DE BLOIS, M.D.

THOMAS AMORY DE BLOIS, M.D.

1848—1920

Thomas Amory DeBlois, M.D., larngologist, died at his home in Boston, February 27, 1920, at the age of seventy-two years. He was the eldest son of John Amory DeBlois (Harvard, 1816) and Emily J. (Rousse) DeBlois, of Virginia, of French descent. The father, descendant by birth from an old Boston family, was a cotton merchant in Columbus, Georgia, and there the son was born January 27, 1848. When the boy was only seven years of age, in 1855, the father died and the widow brought her young son to Newport, R. I., where he began his education in a private school. When he was twelve, he went to Vevey, Switzerland, for a two-years' schooling at Pension Sillig, and in 1863, at the age of fifteen, he entered the U. S. Naval Academy at Annapolis, graduating in 1868 as midshipman, advancing to ensign the following year, and to lieutenant-commander in 1873. The two years 1875-76 he was stationed at the U. S. Navy Yard at Pensacola, Florida.

Deciding to study medicine, he entered Dartmouth Medical School and received the degree of M.D. in 1878; the same year he took an additional M.D. at the University of New York City, giving special attention to diseases of the throat under the instruction of Dr. F. H. Bosworth. He continued his connection with the Navy until 1881, when he settled in Boston. Before resigning, he started a clinic for diseases of the throat, but was soon ordered South to join his ship for a long cruise. He had not reached the place of embarkation before he decided that medicine had a stronger hold on him than the sea, and on February 1, 1881, he sent in his resignation, returned to Boston and again took charge of his embryo clinic, which had been under the care of a colleague during his absence, who was much surprised to see him return so soon. He retained his clinic until 1890.

Another appointment was as Physician to Diseases of the Throat at the Boston City Hospital in 1884, where he had as colleagues Dr. F. H. Hooper, Dr. J. W. Farlow and Dr. G. A. Leland for many years, giving up only when he had reached the age limit of sixty-four. From 1893 to 1906 he was Clinical Instructor in Laryngology in the Harvard Medical School.

He was elected a member of the American Laryngological Association in 1882 and was its Vice-President in 1900. He was also a member of the New England Otological and Laryngological Society, the Massachusetts Medical Society and the Society for Medical Improvement. Being much interested in mechanical appliances of all sorts, he devised a number of instruments for use in his specialty and modified others to meet his own requirements, as he was a man of large frame and many of the ordinary instruments were not well adapted for his use without some modification.

During all these years his interest in naval matters continued and he was associated with Capt. John C. Soley in forming the Massachusetts Naval Militia, the first organization of the kind in the United States. He was also surgeon to the schoolship *Enterprise*.

A favorite recreation of his was fencing, in which he excelled even in his youth, taking a first prize when at the Naval Academy. Later in life he was one of the most expert fencers at the Boston Athletic Association, where his superior skill was recognized by all.

He was of a jovial nature, hospitable, a good raconteur and sociable to a high degree.

He married, at Newport, R. I., October 3, 1871, Louisa D. Anderson, of New York, who died in 1910. Surviving him are a daughter, Elizabeth Amory, and a son, Lewis Amory, a graduate of Harvard, S.B., 1899, and now manager of the safety department of the DuPont Company, of Wilmington, Delaware.

CHRISTIAN RASMUS HOLMES

CHRISTIAN RASMUS HOLMES
1857—1920

THE announcement of the death of Christian Rasmus Holmes, which occurred in New York, January 9, 1920, was a surprise as well as a painful shock to the most of his innumerable friends. Few had heard of his illness. We thought of him as he had always been to us—the bright, energetic, buoyant, delightful associate, the man of unceasing activities and of splendid accomplishment. It is hard for us to realize that so much of pleasant companionship to ourselves and of extraordinary usefulness to the world has been all cut off so untimely.

Dr. Holmes's birthplace was Viele, a town at the head of the Viele Fiord, on the Eastern Coast of Jutland, Denmark, near the once-fortified town of Fredericia, where in 1849 took place the victory of the Danes over the besiegers of Schleswig-Holstein. He was born October 18, 1857. His early schooldays were spent in Denmark. Later he studied in Germany. Upon the death of his father, who had already come to the United States, he joined his mother in Cincinnati, Ohio, where he entered upon the study of medicine, graduating from the Miami Medical College in 1886. After serving an internship at the Cincinnati Hospital, his first professional work was as assistant to Dr. Joseph Aub, of Cincinnati, the well-known otologist, whose successor in this specialty he became.

From 1888 to 1909 he was Ophthalmologist and Otologist to the Cincinnati Hospital. From 1890 to 1904 he was Professor of Otology at Miami Medical College. Since 1908 he was Consulting Ophthalmologist to Cincinnati Hospital and since 1904 Professor of Otology at the University of Cincinnati.

For many years Dr. Holmes had been interested in the work of developing the hospital facilities of Cincinnati and of utilizing

them to the best advantage of the public. For this purpose he realized the necessity of first securing the coöperation of the two leading medical colleges in Cincinnati. This he did by harmonizing their various factions and interesting them in his plan. For ten years he strove toward this end, visiting hospitals in Europe and America, accumulating and studying data and assimilating them with his clear, comprehensive mind. With his ability as an organizer he developed an educational campaign to place before the citizens of Cincinnati the necessity and value of a new City Hospital, that would make possible the best in hospital construction, the realization of higher standards in medical education and the best equipment and care for the community. To those of his intimates familiar with his methods of work it was a rare satisfaction to follow the progress of these efforts. It included the consummation of the merger of the Medical College of Ohio and the Miami Medical College into the University of Cincinnati in 1909; it proved the value of popular education in medicine and hygiene, an interesting phase of this task which he developed by organizing courses of lectures by trained lecturers to prepare the citizens of Cincinnati for their needed coöperation, culminating in a popular vote by a large majority to indorse the plans of construction, equipment and charter of the new Cincinnati General Hospital. In framing the charter which made the Medical Department of this hospital a part of the University of Cincinnati, whose trustees should have the sole right to elect the staff and supervise the nursing department, he achieved a splendid modern plan of civic coöperation and, incidentally, succeeded in the establishment of one of the first and foremost teaching hospitals of America. It was indeed a great accomplishment.

Commenting upon this, our President says: "Dr. Holmes was a man of exceptionally fine character. He did a monumental work in bringing to completion the Municipal Hospital in Cincinnati and the Medical College in connection therewith. In recognition of this the Rockefeller Foundation has devoted $250,000 for the establishment and maintenance of a Christian R. Holmes Chair of Internal Medicine at the College."

His humane, idealistic and progressive ideas in and for the medical profession made him and his influence a tower of strength

for the higher and better qualities of the profession. He was an indefatigable student, a painstaking searcher in scientific literature, a thoroughly qualified ophthalmologist and otorhinologist and a frequent and able contributor to the literature of his specialties. (He was especially endowed with one of the most profoundly effective qualities as a medical practitioner—he was possessed to an eminent degree of strong "common sense.") His discussions in every medical organization in which he participated were clear, authoritative and illuminating.

Upon our entrance into the World War he was commissioned Major, M.R.C., in 1917, and placed in charge of the Eye, Ear, Nose and Throat Department at the Base Hospital, Camp Sherman, Chillicothe, Ohio, where he remained until the end of hostilities, meanwhile developing a service in the department of head surgery which was considered a model throughout the Base Hospitals of the Army.

As a teacher of special medicine Dr. Holmes was preëminently qualified and received general recognition. He was Professor of Otology in Miami College, 1890-1904; Professor of Ophthalmology in the Laura Memorial Medical College and Presbyterian Hospital, 1892-1903; and Professor of Otology and Dean of the Medical Department of the University of Cincinnati since 1904. He was Ophthalmologist and Otologist to the Cincinnati Hospital 1888-1899 and Consulting Ophthalmologist to this Institution since 1908.

He was Third Vice-President of the American Medical Association in 1902-1903; Chairman of the Section on Laryngology and Otology, 1899; Chairman of the Section on Ophthalmology, 1905-1906. He was President of the American Academy of Ophthalmology and Otolaryngology, 1901-1902; President of the American Ophthalmological Society, 1908-1909; President of the American Laryngological, Rhinological and Otological Society, 1908-1909; President of the American Otological Society, 1917-1918.

In 1892 Dr. Holmes was married to Miss B. Fleischmann, of Cincinnati, a lady whose ability and position enabled her to be of material help and encouragement to her husband in the fulfilment of his splendid philanthropic ambitions as well as a loving and loyal associate in their domestic life.

Executive Sessions
1920

ANNUAL MEETING OF THE COUNCIL

The annual meeting of the Council of the American Laryngological Association was held Saturday evening, January 10, 1920, at the residence of Dr. Harmon Smith, 44 West Forty-ninth street, New York, immediately following dinner, to which Dr. Smith had invited the Council. The President, Dr. Norval H. Pierce, presided and the following members of the Council were present: Drs. Packard, Smith, Ingersoll, Clark, Bryan, French, Halstead and Coakley. Dr. Goodale was unable to be present on account of sickness.

A communication from Dr. Delavan stated that the mailing list of the *Transactions* was being revised and that Dr. Delavan would gladly pay for the cuts of the members of the Association which had been used in the *Transactions,* as he could make further use of them. It was moved, seconded and carried that a vote of thanks be extended to Dr. Delavan for this contribution to the *Transactions* and for the excellent work which he has done.

Boston, Mass., was selected as the place for the next meeting of the Association, and the date was to be definitely determined later, as soon as the date of the meeting of the American Otological and American Laryngological, Rhinological and Otological Associations was determined, the meeting of the American Laryngological Association to immediately precede the other meetings.

Dr. J. Payson Clark was requested to determine the hotel which should be designated as the headquarters of the Association, and after conferring with Drs. Greene and Mosher, to arrange for a series of papers on the following subject: "The Methods of Application and the Results of the Use of Radium in the Treatment of Neoplasms (Malignant and Non-malignant) of the Nose and Throat." All of the Fellows of the Association are requested to report their experiences and the results of their use of radium in cases of neoplasms.

It was moved, seconded and carried that Drs. Clark, Coakley and

Smith be appointed a committee to arrange for the symposium on the use of radium. It was resolved:

That Mr. Herbert Tilley, of London, England, be invited to address the Association at its next meeting as the guest of honor.

Dr. Fererri, of Rome, Italy, and Dr. Dan MacKenzie, of London, England, were recommended for Corresponding Fellows.

Dr. Charles J. Imperatori was recommended for Active Fellowship.

Dr. George E. Shambaugh, of Chicago, was recommended for membership on the Candidates' Nominating Committee.

It was recommended that an assessment of $10 be made upon each Fellow to meet the necessary expenses of the Association.

It was moved, seconded and carried that three copies of the discussions of the papers at the meeting of the Association be made: One for correction by the Author, one to be held by the Secretary and one to be sent to the Abstract Editor.

The Council was informed of the death of Dr. Christian R. Holmes, of Cincinnati, and instructed the Secretary to write a letter to Mrs. Holmes expressing the deep regret of the Council.

J. M. INGERSOLL,
Secretary.

SECOND MEETING OF COUNCIL, MAY 28, 1920

BOSTON, MASS.

THE President, Dr. Norval H. Pierce, invited the Council to dine with him at the St. Botolph Club. Present: Dr. Norval H. Pierce, Dr. Francis R. Packard, Dr. Harmon Smith, Dr. John M. Ingersoll, Dr. J. Payson Clark, Dr. Joseph H. Bryan, Dr. Thomas R. French, Dr. Thomas H. Halsted, and Dr. Cornelius G. Coakley. Dr. Joseph L. Goodale was unable to be present on account of sickness.

The Council recommended the following action:

1. That the Association appropriate $50 for the incidental expenses of the Abstract Editor.

2. That all of the extra volumes of the *Transactions* of the Association be delivered to Dr. J. Payson Clark, inasmuch as the money from the sales of the volumes naturally is sent to the Treasurer.

3. That the communication from the American Surgical Association recommending that the meeting of the American Congress of Physicians and Surgeons be held every fifth year instead of every third year, as at present, be approved.

4. That Dr. Thomas H. Halsted be elected to the Board of Governors of the American College of Surgeons.

5. That the extra assessment to be made soon by the Treasurer, to cover the increased expenses of the Society, be omitted in the case of Dr. Walter J. Freeman, on account of his critical illness.

6. That the Secretary write to Mrs. S. A. Friedberg, expressing to her the sympathy of the Association on account of the death of Dr. Friedberg.

7. That Dr. Norval H. Pierce bring to the attention of Oto-Laryngologists throughout the country the provisions of the Casselberry prize fund.

It was the opinion of the Council that the prize provided for in this fund should be awarded at the next annual congress of the

Association if in the judgment of the Council any work was submitted which deserved all, or a part, of the prize, or that the money might be used at the discretion of the Council for the encouragement of research work.

8. That a committee of three, consisting of the President, the retiring President and the Secretary, constitute a program committee.

9. That the communication from the International Medical and Research Survey be laid on the table.

10. That the number of copies of the *Transactions* to be printed this year be 250 instead of 300.

11. That the assessment of $90 for the American Congress of Physicians and Surgeons be paid by the Treasurer, and that the Treasurer collect $5 from all of the Fellows who failed to pay their registration fees.

The Council then adjourned.

NORVAL H. PIERCE, M.D.,
President.

JOHN M. INGERSOLL, M.D.,
Secretary.

EXECUTIVE SESSION, THURSDAY, MAY 27, 1920

BOSTON, MASS.

THE President, Dr. Pierce, in the Chair.

Election of Corresponding Fellows: Prof. Gherardo Ferreri, of Rome, Italy, and Dr. Dan McKenzie, of London.

The Secretary was instructed to cast a ballot for these names, and these members were therefore elected.

Election of Active Fellow: Dr. Charles J. Imperatori, of New York. The Secretary said that he had neglected to ask Dr. Imperatori to provide a thesis; as this was one of the conditions of membership, he asked that this stipulation be omitted and that Dr. Imperatori be elected and be asked to present a thesis later.

Dr. Swain seconded the motion. A ballot was then taken for the election of Dr. Imperatori, and he was elected to membership.

The names of Drs. Bryan, Lynch, Delavan, Rhodes and Swain were listed for the Nominating Committee, the nominations were closed and they were declared elected.

Drs. Richards and Rhodes were elected the Auditing Committee.

EXECUTIVE SESSION, FRIDAY, MAY 28, 1920.

Annual Business Meeting, May 28th, 10 a.m.

I. The Report of the Secretary

Since our last annual meeting in Atlantic City, June 16, 17 and 18, death has removed one Active Fellow, Dr. Christian R. Holmes, January 9, 1920. We shall all miss his interest in each one of us and in the Association. Dr. Thomas A. DeBlois, Emeritus Fellow, died on February 27, 1920.

The total number of Active Fellows is 84.

The Secretary realizes that there have been some failures in his work in spite of the loyal support which he has received and his own earnest endeavor.

It was moved, seconded and carried that the report be approved.

II. The Report of the Treasurer to May 15, 1920

Receipts

Balance from old account	$1808.22
Dues collected	1320.17
Sale of *Transactions*	200.00
Interest on deposits	24.67
	$3353.06

Expenses

Stenographer, 1919 meeting	$112.92
McConnell Press	1567.23
Secretary, 1918-19 and 1919-20	600.00
Abstract Editor	50.00
Edgar Printing and Stationery Company	27.00
Treasurer's Expenses	10.24
Collecting checks	2.70
	$2390.09
By balance in bank	962.97
	$3353.06

ASSETS OF THE ASSOCIATION

INVESTED

DeRoaldes Prize Fund	$500.00
Accrued interest to February 1, 1920	128.87
	$628.87
Casselberry Legacy	$5000.00
Accrued interest to February 1, 1920	490.80
	$5490.80

CURRENT

Unpaid dues	$60.00
Bank balance	962.97
	$1022.97
Total assets	$7142.64

Liabilities uncertain.

Respectfully submitted,

J. PAYSON CLARK, *Treasurer.*

Audited and approved, May 28, 1920.

J. E. RHOADES
GEORGE E. RICHARDS
Auditing Committee.

DR. WILSON asked for information as to the Casselberry Fund.

DR. CLARK: This was a fund of $5000, left to the Association. The interest, when it reached $500, or more, was to be used, at the judgment of the Council, for the advancement of research work in laryngology. The Council have the disposition of the fund, and the money is to be given as a prize, to be used for research, or for encouragement of original work.

DR. WILSON: What is the interest now?

DR. CLARK: $490.66, the bonds are 6 per cent. bonds and in one year's time there will be $700.

In regard to the *Transactions,* the last volume cost an unusually large sum; it was an extra large volume and the cost of printing was very high. The volume cost $1754.85. Dr. Delavan sub-

scribed to the payment of this the $300 allowed him for secretarial expenses. The *Transactions* were advertised and $200 worth were sold. The advertising cost $66. Good book publishers said that the volume was worth $6 per volume. The budget for 1920-21 has been roughly drawn up, and it seems that a $10 assessment will be necessary.

DR. RICHARDS: Did you get estimates for printing the *Transactions?*

DR. CLARK: If printers are not accustomed to the work the printing is not satisfactory.

DR. DELAVAN: I move that the Treasurer's report be accepted.

DR. LOGAN: Seconded. Motion carried.

III. REPORT OF THE LIBRARIAN

DR. BRYAN: No additions have been made to the library since the beginning of the war. I have a request from an Italian publication, asking us to exchange journals with them. I have handed this over to the Treasurer.

Moved and seconded to accept this report. Carried.

IV. REPORT OF THE ABSTRACT EDITOR

The Abstract Editor of the Association begs to report that all original communications presented at the Forty-first Annual Congress, held on June 16-18, 1919, were either abstracted by the authors or by himself.

The discussions, after being abstracted by your Editor, were sent to the individual members for correction and were returned a little slower than usual, owing to the lateness of the date of the Congress and the subsequent absence from their homes of the members during July.

On July 28 the abstracted proceedings were sent to Dr. H. W. Loeb and the galley-proofs were returned on September 18 for correction.

On October 14 the corrected galley-proofs were received and promptly mailed to the usual journals.

The amount of money granted by the Association for the necessary expenses was received and duly disbursed.

EMIL MAYER,
Abstract Editor.

It was moved and seconded that this report be approved. Carried.

V. REPORT OF THE DEROALDES PRIZE FUND COMMITTEE

DR. DELAVAN: This report is not due until 1921, as the fund is administered on a three-year basis.

VI. REPORT OF THE COMMITTEE ON CONTROL OF CANCER

DR. DELAVAN: This Association was formed in this country. It is the American Society for the Control of Cancer, and its object is to disseminate among the people the knowledge of the disease and the dangers of delay in its treatment, and advise them of the best means for their relief. It has been organized six years. This year shows a remarkably great and interesting development in its activities. The growth has been wonderful, with a minimum of expense. The tuberculosis movement cost thousands and thousands of dollars to get started. The amount of money spent on this Society is insignificant.

DURING the past year some changes and a number of promising developments have taken place in the American Society for the Control of Cancer. Dr. Charles A. Powers, of Denver, has been elected President to succeed Mr. George C. Clark, deceased, and Mr. F. J. Osborne, formerly connected with the Interdepartmental Social Hygiene Board and the New York State Health Department, appointed Executive Secretary following the resignation of Mr. Curtis E. Lakeman, who is now the Secretary of the Department of Organization, League of Red Cross Societies, at Geneva, Switzerland. Dr. Howard C. Taylor has succeeded Dr. LeRoy R. Broun as Chairman of the Executive Committee.

One of the most encouraging circumstances of the last few months

has been the renewed interest and energy shown by the members of our Board of Directors, many of whom upon return from Government service have entered with enthusiasm into the campaign to organize State and local committees. Such committees, either revived or newly established, are now actively at work in Massachusetts, Colorado, Indiana, West Virginia, Maryland, Pennsylvania, Georgia, North Carolina and Missouri, while new State Chairmen have been appointed by the President in Florida, Kentucky, Tennessee and several other States. Along with this district committees, with a Chairman specially appointed as Director, for a given area of the country. The New England States are being organized as a whole, with Dr. Robert B. Greenough, of Boston, as Director; a South Central district, including Louisiana, Mississippi and Alabama, under the leadership of Dr. C. Jefferson Miller, of New Orleans; while Dr. Fred T. Murphy, of Detroit, and Dr. Frederick J. Taussig, of St. Louis, have been asked to take the leadership in their districts, represented by Michigan, Illinois and Wisconsin, and by Missouri, Oklahoma, Arkansas and Eastern Kansas; Dr. William J. Mayo has been requested to serve in a similar capacity as a Regional Director for the States of Minnesota, Iowa, North and South Dakota. This work has all been made possible by the wide acquaintance and personal activity of Dr. Powers.

One of the more important of recent innovations was the preparation of a cancer exhibit. This exhibit comprises fourteen hand-colored drawings illustrating the proper and improper method of treating cancer. The first seven tell in serial picture form the story of a fatal case of epithelioma of the lip—fatal because of neglect on the part of the patient and poor management by the physician. This is contrasted with a successful early operation and complete recovery from cancer of the breast. These pictures were first shown at the American Medical Association meeting in New Orleans last month, and while designed especially for lay audiences, they aroused much interest and favorable comment among the members of the profession who saw them. The exhibit is available for use by our State and local committees wherever desired.

A cancer campaign is now being conducted by the Society in New

York City. This is the first attempt to carry out such a campaign on a large scale by the Society, and many valuable lessons are being learned for use in other cities. Besides special cancer programs arranged for the profession through The Academy of Medicine, the New York, the Kings County and the Queens-Nassau Medical Societies, thirty meetings for the general public have been arranged in the high school auditoriums of the city. This campaign should go far not only to educate the laymen concerning the essential facts of cancer control but to bring to the medical profession itself the latest available information concerning the proper management of this disease.

In conclusion, a word must be said concerning the membership campaign which has been carried out under the direction of Mrs. Robert G. Mead, Chairman of the Finance Committee. Through her personal efforts and those of the members of the Board of Directors about 250 new members have been secured. It is the hope of the Society to continue to increase its membership by allying both professional and lay persons with the movement. No organization can be firmly established or in a position to do its best work without adding new blood, new ideas and new workers through a steady accretion of members. Each new member who receives regularly all the literature and information that we have accumulated to date is in this way constituted an agent to help us get before the public the known facts about cancer.

The prospects for the extension of the influence of the Society were never brighter, and we trust that the American Laryngological Association may continue to coöperate with us in this difficult but most important educational work.

I have had a pamphlet prepared, with the most elaborate and painstaking care, by the directors of the organization. Each member was deputed to deal with the subject upon which he was best qualified to speak, so that, as far as possible, the best that could be known of each branch of the subject would be published.

Dr. Hubbard: The movement for the presentation of this subject is very interesting and effective. A lantern-slide talk has been given before the medical societies, so as to get the approval of the medical societies of each district and through them the interest of

laymen. The material is all standardized so that there is nothing objectionable. The work is getting a very good hold in Columbus and Toledo.

VII. Report of the Candidates' Nominating Committee

Dr. Sluder: This Committee was organized in 1912-13, for the purpose of making an effort to secure young men of promise as members of the Association. The first year nothing was done or accomplished. The war intervened. I have talked to a number of men who would come within the jurisdiction of this Committee and have written letters. The Committee consists of eleven men besides myself, and as a result of inquiries I have two names to propose. I will mention the experience I have had with eleven letters: Dr. George B. Wood has proposed one candidate. One member said he did not know anyone to propose. The remaining ten did not answer. I wrote to young men I knew and thought they would like to send me reprints of their work. I knew of three who would be eligible. That is two years ago, and I have yet to receive the reprints. We apparently are unknown to the world. It is incomprehensible to me that there is such indifference. I presume they do not know who constitute the American Laryngological Association. The question is what to do with these names. One name has been put up in the regular way to the Nominating Committee. Dr. Ingersoll thought that this committee had jurisdiction over the nominations, but this is not so. Dr. Imperatori was proposed by Drs. Arrowsmith and Harmon Smith.

Dr. Ingersoll: The names were sent you to let you know who had been proposed.

Dr. Sluder: We have approached the younger men and have not met a response. This is somewhat of a blow. That is the sum total of the Candidates' Nominating Committee's report. The names go automatically to the Council.

Dr. Bryan: Dr. Sluder has tried to do this work and he has not been supported. I do not suppose he had half a dozen names sent

him. The Chairman cannot work alone. The Committee was appointed to comb the country for promising men.

DR. RICHARDS: Who constitute the Committee?

DR. INGERSOLL: Dr. Greenfield Sluder, Chairman; Dr. Joseph H. Bryan, Dr. Algernon Coolidge, Jr., Dr. Hill Hastings, Dr. George E. Shambaugh, Dr. Robert Clyde Lynch, Dr. D. Bryson Delavan, Dr. Herbert S. Birkett, Dr. John M. Ingersoll, Dr. Robert Levy, Dr. Henry L. Swain, Dr. George B. Wood.

DR. PIERCE: This is the fault of the individual members of the Association. They did not take the trouble to look over the available material. It is a part of the disease affecting the whole Association.

DR. BRYAN: I have an amendment to propose which would deal with this question. I should like to know if it is in order now.

DR. PIERCE: The Chair will rule that you are in order.

DR. BRYAN: It is evident to you all that there is no growth taking place in the Association. We have eighty-four members, and the workers have reached a period where it is difficult for them to continue the work they have been doing. We cannot go on this way. The names should be followed up more carefully. To say that "So-and-so is a good fellow and has done some good work" is not enough. Many good men have been held back through personal or local prejudice. Local opinion is to be considered to a certain extent, but it should not stand in the way of getting men who would be good members. It seems to be an unwritten law that candidates should receive endorsement from their own locality, and that is well as far as it goes, but the standing of men as regards other cities should be taken into first account. Many names that appeared in the past should have had more consideration than they did. I would therefore like to offer this amendment. It is based upon the policy of one of our allied societies, the Association of American Physicians, who have a junior membership. I think this

would bring new life into the association. The amendment will not be acted upon at this meeting.

(Draft of the proposed amendment read.)

I believe that this will bring a new class of men before us, and we can keep more closely in touch with them professionally as well as personally.

DR. PIERCE: Discussion is now in order.

DR. HARMON SMITH: There is only one objection so far as I can see. The candidate is restricted for five years. I think we should be allowed to admit him at any time thought proper during those five years. If he is qualified he should be admitted to full membership.

DR. BRYAN: The five-year limitation was based upon the policy of the Association of American Physicians, and it has worked out well. I am not insisting on the time limit; possibly a shorter term would be desirable.

DR. LOGAN: I am in favor of this amendment. I think it would work out well. The Otological has an associate membership which has done a good deal to awaken enthusiasm in that society.

DR. WILSON: I should like to ask one question. Do you know any society in which the members are required to present a communication in a certain time? There are many members here who never communicate anything. In some societies it is compulsory to present some thesis.

DR. SMITH: We have a law relative to that; a paper must be presented within three years.

DR. BRYAN: If you enforce that rule you will have only a handful of members left.

DR. COAKLEY: I am in favor of this proposed amendment; the only objection that I see is that the amendment is not as explicit as it might be as regards the wording. I think it might be revised according to the wording of the rest of the constitution.

DR. BRYAN: I should be glad to change the phraseology, which is only tentative.

DR. SMITH: I move that a committee be appointed to consider the wording of the amendment.

DR. SLUDER: I second that.
Adopted.

DR. SLUDER: This is a step forward in the right direction. If you establish an associate membership it opens up possibilities for the Candidates' Nominating Committee and we shall be able to take in younger men than those proposed. We should be able to take in men of any promise whatever.

DR. PIERCE: I will appoint as a committee Drs. Bryan, Coakley and Logan.

DR. CLARK: In connection with the Candidates' Nominating Committee, I notice that there are none from Baltimore.

DR. SLUDER: At first five were proposed, then the number was extended to twelve. I don't know how Baltimore happened to be overlooked. I think we should get younger men and secure their efforts and, humanly speaking, their affections. There are many men here who could snap their fingers at the membership when it was offered them, because they felt, and truly, that it was their due ten years before. We can find such instances all along the line.

VIII. REPORT OF THE COMMITTEE ON TONSIL INVESTIGATION

DR. RICHARDS: A plan was outlined at Atlantic City, but the war interrupted the work and nothing was done. I hope we shall accomplish some work on the vexed question of the tonsil and find a medium between the extreme radical party who take every tonsil out and the overconservative who neglect to seek for tonsils that may be a hidden source of infection. I hope that we shall have something worth while as the result of the work. It may take three

or four years before we have the final report. I request that our committee be continued.

DR. COAKLEY: Seconded.

DR. LOGAN: We have had this committee continued as long as I can remember. It is such an important question, and it has become a habit with Dr. Richards to promise a report next year.

DR. RICHARDS: It might be of interest to state what our findings were as regards tonsils in the Orient. In Turkey there was relatively little in the way of adenoids or tonsils or suppurative otitis media. It struck me that the difference in the mode of living might have had something to do with inflammatory infections of the upper air tract. The study of the environmental conditions of those who suffer from such infections would be part of the field. These lesions are rare in persons whose chief article of diet is bread and whose mode of living is less complicated.

DR. WILSON: Certain animals have no tonsils. We should seek some light on the pathogenesis of tonsillar lesions.

DR. LOGAN: We should find out something about the races who inhabit our own country. Certain of these, the negro for example, do not suffer from tonsillar lesions.

IX. REPORT OF THE AUDITING COMMITTEE

DRS. RHODES and RICHARDS reported that they had examined the books of the Treasurer and found them as stated.

THE CHAIR: I rule that the report stand approved.

X. REPORT OF THE NOMINATING COMMITTEE

The Nominating Committee reported the following list for membership upon the Board of Directors for the ensuing year: Dr. Harris P. Mosher, Dr. Harmon Smith, Dr. W. B. Chamberlin, Dr. George M. Coates, Dr. J. Payson Clark, Dr. J. H. Bryan, Dr.

J. L. Goodale, Dr. T. H. Halsted, Dr. C. G. Coakley, Dr. N. H. Pierce.

The report of the committee on the amendment to be presented on the following day.

XI. The Report of the Biographer and Historian

This report was read by Dr. Delavan.

Miscellaneous Business

Dr. Ingersoll: The question of the appropriation of $50 for the use of the Abstract Editor will come under this heading.

Dr. Mosher: I move that this sum be given.

Dr. Bryan: Seconded.
Approved.

The Council recommended Dr. Halsted as Governor of the American College of Surgeons. Dr. Theisen seconded this.
Approved.

A letter was then read by the Secretary from the Congress of American Physicians and Surgeons, assessing the Association for dues.

Dr. Packard: I was present when the list was read to the Council. Most of the men were under a misapprehension. I did not attend the Congress, but I am willing to pay my dues. Does the Secretary collect the money or does the Treasurer send it?

Dr. Ingersoll: It goes to the Treasurer.

Dr. Sluder: I was there. I will send the money to the Treasurer.

Dr. Ingersoll: The total amount is $95. Our Association is responsible for $90. Evidently some of us were guilty. This

appears to be a *bona fide* claim on the Association and ought to be met.

DR. COAKLEY: I move that the men be communicated with and charged $5, and if there is a deficit it can be made up from the treasury. Dr. Theisen seconded this. Carried.

DR. DELAVAN: The 1918 volume of *Transactions* was published on our Fortieth Anniversary, and no expense and pains were spared to make it the best of its kind, so that we might hand it down to posterity. I secured bids on the printing, but found that our own printer would do better work and more reasonably. The cost, however, was considerable. I had a beautiful vision of the *Transactions* being self-supporting and that the sales should pay for the printing. I had one hundred extra copies made, as the initial expense is the greatest, and extra copies cost but a fraction. If these copies could be sold it would pay for the expense. Publishers state that they are worth at least $6 per copy. I want the coöperation of the Association in selling these *Transactions.* We have sent out a carefully worded circular to those who have been accustomed to buy the volume and have received some gratifying answers. The volume compares very favorably with other published *Transactions,* and is only equalled by the publications of the Laryngological Section of the American Medical Association. The Treasurer needs the money, and if these books were sold there would be no need of the $10 assessment.

DR. CLARK: The $10 assessment has been voted by the Council.

DR. COFFIN: It would be better to have the $10 assessment.

DR. PIERCE: It would be better to have a surplus in any case. I will put it to the motion and ask those in favor of the assessment to say "aye."

Carried unanimously.

DR. PIERCE: The Chair appoints Dr. Emil Mayer as Abstract Editor. I should like to speak now about the Casselberry Fund and

the DeRoaldes Prize. The Secretary should make announcement of these at the beginning of this fiscal year and every member of this Association should be notified. The Casselberry Fund is open to all comers, so that the members of the Triological Society should receive notification. The money should be used now instead of accumulating as a fund. The fund may be used for research work, so that any heads of departments, laryngological, otological or rhinological, may have the use of it if they submit a plan for research work. The English special journals will also be notified of the availability of this fund.

EXECUTIVE SESSION, SATURDAY, MAY 29, 1920

DR. CLARK: A point has been raised as to having the meeting of the Congress every five years instead of three.

DR. INGERSOLL: Other societies, components of the American Congress, have suggested the desirability of meeting every five years instead of every three years, and the various societies have been asked to pass judgment and to indicate their preference as to the time period.

DR. H. L. SWAIN: I move that the Congress be made every five years instead of three.

DR. BRYAN: I think this is unwise as it will result in less and less interest. The final result will be the disappearance of the Congress altogether. Many men want to bring that about.

DR. DELAVAN: I fully agree with Dr. Bryan.

DR. RICHARDSON: If this idea is accepted it will be the end of the Congress.

DR. L. A. COFFIN: What is the reason given for this move?

DR. PIERCE: Expense, and the fact that there is an increasing deficit after each Congress. Gentlemen, it is moved and seconded that the American Congress meet every five years instead of three; what is your pleasure? Motion defeated.

DR. BRYAN: I will now present the amendment to the Constitution.

Amend Article I by inserting after the words "Honorary Fellows" the words "Associate Fellows."

Amend Article II, clause 5, by adding:

Associate Fellows shall not exceed 20 in number. They must be proposed and seconded by Active Fellows and elected by the Council

at its annual meeting in January. The term of membership of each Associate Fellow shall not exceed six years from the date of his election by the Council. Associate Fellows shall have the privilege, with the approval of the Council, of making scientific contributions at the annual meetings of the Association and of partaking in all discussions of scientific papers, but shall not have any vote or participation in the executive affairs of the Association.

Any Associate Fellow who shall not have been nominated by the Council to the Association and elected to Active Fellowship before the termination of his period of Associate Fellowship shall thenceforth cease to be an Associate Fellow and may not again be elected an Associate Fellow.

J. H. Bryan,
C. G. Coakley,
Jas. E. Logan.

Dr. Hubbard: What about dues?

Dr. Clark: That comes in the By-laws.

Dr. Bryan: The amendment has to lie over until next year, but the By-laws do not have to take that course.

Dr. Clark: The By-laws can be amended by a three-fourths vote of all members present.

Dr. Swain: After six years what becomes of the candidate?

Dr. Bryan: He becomes an active fellow in regular order, or at any time during the six-year period. It works well with the Association of American Physicians.

Dr. Dean: At the end of the six years he is dropped if not elected.

Dr. Richardson: The arrangement was unsatisfactory in the Otological Society and was dropped. What is the *raison d'être* of this move?

Dr. Bryan: This was framed to bring the society into contact with younger men not eligible for active fellowship. It was thought

that it would lead to the development of and securing of good material for the Association that might otherwise be missed. The younger men are liable to be lost in the shuffle.

DR. SLUDER: Why was the scheme a failure in the Otological?

DR. RICHARDSON: The men felt it beneath their dignity to be put on probation, and it was just as easy to get men without probation.

DR. BRYAN: We are trying to throw out safeguards for the society, and at the same time to secure promising young men. In the Ophthalmological and Otological all members are past their probation after three meetings. There is no limitation to the number of members. The Ophthalmological has 200 members.

DR. DELAVAN: This motion cannot be acted upon until next year; in the meantime it can be carefully considered.

DR. CLARK: Has Dr. Bryan spoken of the change in the Third clause? That will have to be changed to read that the "Association consists of Honorary, Corresponding and Associate Fellows."

DR. PIERCE: The Council has appointed a program committee to consist of the President (outgoing), the President (incoming) and the Secretary. It is only by the coöperation of these officers that any final action can be taken in regard to the program.

ELECTION OF OFFICERS

Dr. Hubbard and Dr. L. A. Coffin were appointed tellers.

Twenty-three votes were cast in the affirmative for the following Board of Directors whose names had been presented by the Nominating Committe: Dr. Harris P. Mosher, Dr. Harmon Smith, Dr. W. B. Chamberlin, Dr. George M. Coates, Dr. J. Payson Clark, Dr. J. H. Bryan, Dr. J. L. Goodale, Dr. T. H. Halstead, Dr. C. G. Coakley, Dr. N. H. Pierce.

After a short recess the Board of Directors announced that the following had been elected officers of the Association for the year 1920-21:

President—Dr. Harris P. Mosher.
First Vice-President—Dr. Harmon Smith.
Second Vice-President—Dr. W. B. Chamberlin.
Secretary—Dr. George M. Coates.
Treasurer—Dr. J. Payson Clark.
Librarian—Dr. J. H. Bryan.

Council: Dr. Jos. L. Goodale, Dr. T. H. Halsted, Dr. C. G. Coakley, Dr. N. H. Pierce.
Biographer (appointed): Dr. D. B. Delavan.
Abstract Editor (appointed): Dr. Emil Mayer.

Dr. Pierce appointed Drs. Swain and Randall to escort the new President to the Chair.

Dr. Pierce: Mr. President, I turn over the gavel, and hope you will last long enough to have as good a meeting as I have had.

Dr. Mosher: I thank the Society very deeply for this honor. I hope I can approach the form of the retiring president. That is unequalled in the history of the Society.

Dr. Swain: I move a vote of thanks to the President, the Secretary and the Boston Fellows for their services toward the success of this meeting.

Dr. Bryan: Seconded.

Dr. Mosher: The Boston men fully appreciate this vote of thanks.

Dr. Delavan: I move the meeting be adjourned.
Seconded and carried.

Executive Sessions
1919

Owing to the fact that through an error made by the printer the report of the Executive Session of the Annual Meeting in 1919 was omitted from the Forty-first volume, the Council at its annual meeting in New York, January 15, 1921, ordered the inclusion of an *abstract* of the Transactions of the Executive Session of 1919 in the Forty-second volume of Transactions.

REPORT OF THE EXECUTIVE SESSION OF THE FORTY-FIRST ANNUAL MEETING, 1919

EXECUTIVE SESSION, JUNE 16, 17 AND 18, 1919

Dr. Henry Kemble Oliver was elected an Honorary Fellow.

The following were elected to Corresponding Fellowship in the Association:

Dr. Adam Brown Kelly, Glasgow, Scotland.
Dr. Donald Rose Patterson, Cardiff, Wales.
Dr. James F. McKernon, New York City, N. Y.
Dr. John Rogers, Jr., New York City, N. Y.

The following were elected to Active Fellowship in the Association:

Dr. E. Ross Foulkner, New York, N. Y.
Dr. Lee Maidment Hurd, New York, N. Y.
Dr. Henry Lowndes Lynah, New York, N. Y.
Dr. Ross Hall Skillern, Philadelphia, Pa.

Dr. Harmon Smith and Dr. Greenfield Sluder were appointed an Auditing Committee to audit the Treasurer's accounts.

The Secretary reported that since the last annual meeting the Association had lost by death the following Fellows:

Dr. Arthur de Roaldes, Honorary Fellow.
Dr. John Henry Lowman, Active Fellow.
Dr. Walter Franklin Chappell, Active Fellow.

The following reports of the two meetings of the Council were read and the entire report of the Secretary accepted and ordered filed.

THE ANNUAL MEETING OF THE COUNCIL AT THE YALE CLUB, NEW YORK CITY, JANUARY 11, 1919

There were present Drs. Bryan, Clarke, French, Goodale and Winslow, the President, Dr. Coakley, occupying the chair. Owing

to the temporary indisposition of the Secretary, Dr. Harmon Smith, Dr. Delavan was duly elected by the Council to fill the position for the evening, without voting power.

The date decided upon for the next annual meeting of the Association was June 16, 17, 18, 1919, and the place Atlantic City, with headquarters at the Hotel Chelsea.

The Secretary was authorized by the Council to notify the Laryngological, Rhinological and Otological Society and likewise the Oto-Laryngological Section of the American Medical Association that it would not be possible to accept their courteous invitation to arrange a conjoint meeting with them at Atlantic City, since the American Laryngological Association is under the jurisdiction of the American Congress of Physicians and Surgeons, which organization determines the date of meeting of its component parts.

It was voted to extend an invitation to Sir St. Clair Thomson, of London, to be the guest of the Association at the coming Atlantic City meeting and on that occasion to present an address.

No recommendations were made for Honorary Fellowships.

For Corresponding Fellowships, the following gentlemen were recommended: Dr. Adam Brown Kelly, Glasgow, Scotland; Dr. Donald Rose Paterson, Cardiff, Wales; Dr. James F. McKernon, New York City; Dr. John Rogers, Jr., New York City.

For Active Fellowships, the Council recommends Dr. E. Ross Faulkner, New York City; Dr. Lee Maidment Hurd, New York City; Dr. Henry Lowndes Lynah, New York City; Dr. Ross Hall Skillern, Philadelphia.

Drs. Bryan and Delavan were appointed delegates to the American Congress of Physicians and Surgeons.

It was recommended that the President appoint the Councilors at the next meeting.

Dr. Emil Mayer, New York City, was appointed Abstract Editor.

The selection of a subject for a symposium for the coming meeting was delegated to Dr. J. H. Bryan, with power to act.

With regard to the time of the coming meeting of the Congress of American Physicians and Surgeons, the Council of that body has appointed the dates June 16 and 17 as, under all circumstances, the best. They have determined upon Atlantic City as the place of

meeting, in view of the impossibility of securing proper accommodations in Washington.

There will be no afternoon sessions of the component sections on June 16 and 17, as at that time the General Sessions of the Congress will be held.

Dr. Francis R. Packard, 304 South Nineteenth Street, Philadelphia, has been appointed the member of the Committee of Arrangements to represent the American Laryngological Association; and Dr. Philip R. Marvell, 1616 Pacific Avenue, Atlantic City, N. J., as the Chairman of this Committee.

The Chairman of the Congress is Dr. Simon Flexner.

Sir William Osler, with other distinguished representatives of the medical profession, are expected to be present.

The subject to be discussed by the Congress will be Re-Education or Reconstruction; to be considered from the Medical, Neurological, Surgical, and Orthopædic aspects.

It has not seemed practicable to make any arrangements by which our programme can be combined with the programmes of other societies.

It is necessary that the titles of papers to be read at the meeting be announced to the Secretary prior to May 20.

Already the programme of the meeting promises well, while the attendance will include many returned from active war service whose presence will be not only welcome but of exceeding interest.

D. Bryson Delavan,
Secretary.

Second Council Meeting, Held at the Hotel Chelsea, June 15, 1919

Present: Drs. Bryan, Clark, Delavan, Goodale, McCoy, Winslow and Coakley, the latter occupying the chair.

It was announced that the reception of the President of the Congress of American Physicians would be held at the Hotel Traymore, on Monday evening. Also that the business meeting of the American Laryngological Association would be convened on Tuesday morning, at nine o'clock.

Five candidates' theses were presented to the Council for consideration.

It was ordered, that the theses of Drs. Skillern and Lynah be printed in the current volume of the *Transactions;* that the thesis of Dr. Kenyon be referred to a committee consisting of Dr. Delavan, Dr. Greene and Dr. Ingersoll, who should judge whether in view of its length it could be included in the volume of *Transactions;* and that the remaining theses should be returned to their authors.

It was moved, that the name of Dr. Henry Kemble Oliver, of Boston, Mass., be recommended for election to an Honorary Fellowship in the Association, in view of his great services in laryngology in the United States. Carried.

It was moved, that the mailing list of the Transactions of the Association be revised. Carried.

A committee consisting of Dr. Clark and Dr. Smith was appointed to arrange for the annual dinner.

D. BRYSON DELAVAN,
Secretary.

The report of the Treasurer, having been audited and found correct, was accepted and ordered to be placed on file.

TREASURER'S REPORT

TREASURER'S STATEMENT TO JUNE 1, 1919

RECEIPTS

Balance from old account	$429.07
Dues collected	1,335.15
Sale of Transactions	52.00
Interest on deposits	11.66
Inheritance tax (Casselberry legacy)	118.14
Die for de Roaldes' medal	175.00
	$2,121.02

EXPENSES

Flowers (Dr. Ingals' funeral)	$15.00
Alfred Moore (lantern)	30.00
Stenographer	100.00
McConnell Press	153.70
Laryngoscope Company	5.25
Treasurer's expenses	8.25
	$312.80
By balance in bank	1,808.22
	$2,121.02

ASSETS OF THE ASSOCIATION

INVESTED

de Roaldes prize fund	$500.00	
Interest to February 1, 1919	276.51	
	$776.51	
Casselberry legacy	$5,000.00	
Interest to February 1, 1919	300.35	
	$5,300.35	

CURRENT

Unpaid dues	$60.00	
Bank balance	1,808.22	
	$1,868.22	
Total assets		$7,651.94

Liabilities uncertain.

Respectfully submitted,
J. PAYSON CLARK, *Treasurer.*

Audited and approved:
HARMON SMITH,
GREENFIELD SLUDER,
Auditing Committee.

NOTE.—The die for de Roaldes' Medal and the inheritance tax on the Casselberry Fund, paid by the Association, was paid back out of the accumulated interest of the respective funds before balancing these accounts.

The report of the Abstract Editor was read and ordered to be placed on file.

The Abstract Editor reported that all original communications presented at this meeting were abstracted, either by the authors or by himself.

The discussions were abstracted and sent to the various members for correction (55 discussions to 28 members) on July 15.

The completed abstracted proceedings were sent to the Editor of the *Annals of Otology,* etc., on July 28.

Galley-proofs were received from the latter on September 18 and mailed to the various journals on September 24, 1919.

The Librarian reported that no additions had been made to the library since the beginning of the war.

Dr. Delavan reported for the de Roaldes Prize Fund Committee that two essays had been received, but that the Committee did not deem either one of them of sufficient merit to deserve the award of the prize.

Dr. Delavan also reported for the Committee on Control of Cancer that the activities of the Society for the Control of Cancer are being carried on in spite of the interruption of the war. The chief activity of the last year has been the regular publication of a bulletin of the Association which is widely distributed, and the preparation of two treatises, for the instruction of the medical public and the lay public respectively. The Association urgently solicits the co-operation of the profession as well as the laity who are interested in the control of this disease.

The Candidates' Nominating Committee reported that great difficulties had been encountered in the prosecution of its work and that little progress had been made. Dr. Sluder explained that one reason why results had not been obtained was because most of the younger men had been absent in government service, but he felt that in spite of this the members of the committee had not been sufficiently active or had shown much interest. He asked that the committee be continued for another year.

Dr. Mayer, Dr. Swain and Dr. Bryan discussed Dr. Sluder's report and all agreed that the work of this committee was most important and that it should receive the hearty support and co-operation of the Association as a whole.

Dr. Swain reported for the Committee on Nominations the following ten names as Directors of the Association for the ensuing year:

Dr. Norval H. Pierce	Dr. Joseph H. Bryan
Dr. Francis R. Packard	Dr. Thomas R. French
Dr. Harmon Smith	Dr. Joseph L. Goodale
Dr. John M. Ingersoll	Dr. Thomas H. Halsted
Dr. J. Payson Clark	Dr. Cornelius G. Coakley

Dr. Delavan presented the report of the Biographer which was accepted and ordered to be printed in full in the Transactions.

The Committee on the Teaching of Otolaryngology reported through Dr. Coakley that it had met with similar committees for the other national societies and that the following report had been adopted:

"*Whereas,* The pressing need of standardizing the training in Oto-Laryngology has been markedly emphasized by the war, the com-

mittee appointed by this section of the American Medical Association acting in conjunction with similar committees from the American Laryngological Association, the American Otological Association, the American Laryngological, Rhinological, Otological Society, and the American Academy of Ophthalmology and Oto-Laryngology makes the following recommendations:

I. That a standardized course in Oto-Laryngology of not less than two years be required.

II. That efforts be made to bring about the realization of this plan of standardizing the training in Oto-Laryngology through the following channels:
1. The Association of American Medical Colleges.
2. The Association of Graduate Schools of American Universities.
3. The American College of Surgeons.
4. The Rockefeller Foundation.
5. The faculties of the American Universities."

Under miscellaneous business, Dr. Mayer suggested that the abstracting of the proceedings of the Association and the supplying of such abstracts to different medical journals be discontinued on account of the large amount of labor required and the cost to the Association. After discussion, however, it was unanimously decided to continue this work under the able direction of Dr. Emil Mayer.

Dr. Richardson stated that the Committee on Oto-Laryngology of the Council of National Defense had practically concluded its work in October, 1918, since at that time all its members were in the United States Army and its further work was carried on as part of the army work. He moved that this Committee be discharged.

Dr. Loeb amended the motion by adding the thanks of the Association for the wonderful work of this Committee in helping to win the war, and the motion, as amended, was unanimously carried.

At the close of the Scientific Session on June 18, 1919, the Association went into Executive Session and elected the ten Fellows named by the Nominating Committee to be Directors of the Association for the ensuing year.

These Directors, immediately upon their election, retired to elect officers for 1920 and the following selection was announced:

President—Dr. Normal H. Pierce.

First Vice-President—Dr. Francis R. Packard.

Second Vice-President—Dr. Harmon Smith.

Secretary—Dr. John M. Ingersoll.

Treasurer—Dr. J. Payson Clark.

Librarian—Dr. Joseph H. Bryan.

Councillors: Dr. Thomas R. French, Dr. Joseph L. Goodale, Dr. Thomas H. Halsted, Dr. Cornelius G. Coakley.

Dr. D. Bryson Delavan was appointed Biographer and Historian.

The appointment by the Council of Dr. Emil Mayer as Abstract Editor was confirmed.

A vote of thanks was given to Dr. Delavan for his splendid work as Secretary during the past year. The work was carried through under unusual difficulties, on account of the war and because of the Fortieth Anniversary.

On motion the meeting adjourned.

LIST OF FELLOWS

1920

Active Fellows

1917. Arrowsmith, Hubert, 170 Clinton Street, Brooklyn, New York.
1915. Barnes, Harry Aldrich, 305 Beacon Street, Boston, Massachusetts.
1908. Barnhill, John F., 408 Penway Building, Indianapolis, Indiana.
1904. Berens, T. Passmore, 35 Park Avenue, New York.
1893. Birkett, Herbert S., 252 Mountain Street, Montreal, Canada.
1891. Bryan, Joseph H., 818 17th Street, Washington, D. C.
1913. Butler, Ralph, 1926 Chestnut Street, Philadelphia, Pennsylvania.
1915. Canfield, R. Bishop, Ann Arbor, Michigan.
1917. Chamberlin, William B., Osborn Building, Cleveland, Ohio.
1897. Clark, J. Payson, 71 Marlborough Street, Boston, Massachusetts.
1902. Coakley, Cornelius G., 53 West 56th Street, New York.
1917. Coates, George Morrison, 1736 Pine Street, Philadelphia, Pennsylvania.
1899. Cobb, Frederick C., 11 Marlborough Street, Boston, Massachusetts.
1905. Coffin, Lewis A., 616 Madison Avenue, New York.
1903. Coffin, Rockwell A., 234 Clarendon Street, Boston, Massachusetts.
1893. Coolidge, Algernon, Jr., 613 Beacon Street, Boston, Massachusetts.
1918. Cox, Gerard Hutchinson, 8 East 54th Street, New York.
1913. Dabney, Virginius, 1633 Connecticut Avenue, Washington, D. C.
1917. Dean, Lee Wallace, Iowa City, Iowa.

1881. Delavan, D. Bryson, 40 East 41st Street, New York.
1919. Faulkner, E. Ross, 410 Park Avenue, New York.
1914. Fetterolf, George, 2047 Chestnut Street, Philadelphia, Pennsylvania.
1901. Freeman, Walter J., 1832 Spruce Street, Philadelphia, Pennsylvania.
1905. Freer, Otto T., 25 East Washington Street, Chicago, Illinois.
1879. French, Thomas R., 150 Joralemon Street, Brooklyn, New York.
1897. Frothingham, Richard, 616 Madison Avenue, New York.
1913. Goldstein, Max A., 3858 Westminster Place, St. Louis, Missouri.
1898. Goodale, Joseph L., 258 Beacon Street, Boston, Massachusetts.
1905. Grayson, Charles P., 262 South 16th Street, Philadelphia, Pennsylvania.
1906. Greene, D. Crosby, Jr., 483 Beacon Street, Boston, Massachusetts.
1917. Greene, Joseph B., Asheville, North Carolina.
1905. Halsted, Thomas H., 831 University Block, Syracuse, New York.
1896. Hardie, T. Melville, 34 Washington Street, Chicago, Illinois.
1903. Harris, Thomas J., 104 East 40th Street, New York.
1915. Hastings, Hill, 924 Trust & Savings Bldg., Los Angeles, California.
1893. Hope, George B., 159 West 72nd Street, New York.
1895. Hopkins, Frederick E., 25 Harrison Avenue, Springfield, Massachusetts.
1895. Hubbard, Thomas, 515 Nicholas Building, Toledo, Ohio.
1919. Hurd, Lee Maidment, 15 East 48th Street, New York.
1920. Imperatori, Charles Johnstone, 17 East 38th Street, New York.
1904. Ingersoll, John M., 1021 Prospect Avenue, Cleveland, Ohio.
1907. Jackson, Chevalier, 1830 South Rittenhouse Square, Philadelphia, Pa.
1878. Johnston, Samuel, Greenway Apartments, Baltimore, Maryland.
1918. Kenyon, Elmer L., 104 South Michigan Avenue, Chicago, Illinois.
1894. Leland, George A., 354 Commonwealth Avenue, Boston, Massachusetts.

1914. Levy, Robert, Metropolitan Building, Denver, Colorado.
1918. Lewis, Fielding Otis, 261 South 17th Street, Philadelphia, Pennsylvania.
911. Lockard, Lorenzo B., Metropolitan Building, Denver, Colorado.
1913. Loeb, Hanau W., 537 North Grand Avenue, St. Louis, Missouri.
1897. Logan, James E., 1208 Wyandotte Street, Kansas City, Missouri.
1919. Lynah, Henry Lowndes, 127 West 58th Street, New York.
1915. Lynch, Robert Clyde, 634 Maison Blanche Building, New Orleans, Louisiana.
1913. McKimmie, Oscar A. M., 1330 Massachusetts Avenue, N. W., Washington, D. C.
1914. MacKenty, John E., 43 West 54th Street, New York.
1883. Mackenzie, John N., 605 Washington Place, Baltimore, Maryland.
1896. Mayer, Emil, 40 East 41st Street, New York.
1904. Mosher, Harris P., 828 Beacon Street, Boston, Massachusetts.
1914. Munger, Carl E., 81 North Main Street, Waterbury, Connecticut.
1901. Myles, Robert C., 11 East 48th Street, New York.
1903. Packard, Francis R., 304 South 19th Street, Philadelphia, Pennsylvania.
1906. Pierce, Norval H., 31 Washington Street, Chicago, Illinois.
1908. Randall, B. Alexander, 1717 Locust Street, Philadelphia, Pennsylvania.
1903. Renner, W. Scott, 341 Linwood Avenue, Buffalo, New York.
1897. Rhodes, John Edwin, People's Gas Building, Chicago, Illinois.
1884. Rice, Clarence C., 123 East 19th Street, New York.
1905. Richards, George L., 124 Franklin Street, Fall River, Massachusetts.
1902. Richardson, Charles W., 1317 Connecticut Avenue, Washington, D. C.
1913. Roy, Dunbar, Grand Opera House, Atlanta, Georgia.
1907. Shambaugh, George E., 122 South Michigan Avenue, Chicago, Illinois.
1909. Shurly, Burt R., 32 Adams Avenue W., Detroit, Michigan.
1919. Skillern, Ross H., 1928 Chestnut Street, Philadelphia, Pennsylvania.

1909. Sluder, Greenfield, 3542 Washington Avenue, St. Louis, Missouri.
1908. Smith, Harmon, 44 West 49th Street, New York.
1911. Stout, George C., 1611 Walnut Street, Philadelphia, Pennsylvania.
1889. Swain, Henry L., Colonial Building, 191 Church Street, New Haven, Connecticut.
1903. Theisen, Clement F., 172 Washington Avenue, Albany, New York.
1892. Thrasher, Allen B., The Groton, 7th and Race Streets, Cincinnati, Ohio.
1892. Wagner, Henry L., 518 Sutter Street, San Francisco, California.
1892. Watson, Arthur W., 126 South 18th Street, Philadelphia, Pennsylvania.
1908. Wilson, J. Gordon, 104 South Michigan Avenue, Chicago, Illinois.
1906. Winslow, John R., The Latrobe, Charles and Reade Streets, Baltimore, Maryland.
1905. Wood, George B., 1830 Spruce Street, Philadelphia, Pennsylvania.
1890. Wright, Jonathan, Windy Rock, Pleasantville, New York.

Honorary Fellows

1915. Bosworth, Francke H., 41 Park Avenue, New York.
1914. Cohen, J. Solis, 2113 Chestnut Street, Philadelphia, Pennsylvania.
1914. De La Sota Y Lastra, Ramon, 7 Calle de Torqueros, Seville, Spain.
1914. Lefferts, George Morewood, Katonah, New York.
1910. Moure, E. J., 25 Cours du Jardin Public, Bordeaux, France.
1909. Semon, Sir Felix Rignalls, Great Missenden, Bucks, England.
1914. Thomson, Sir St. Clair, 64 Wimpole Street, W., London, England.

Corresponding Fellows

1901. Collier, Mayo, 145 Harlet Street, Cavendish Square, London, England.
1893. Desvernine, Carlos M., 52 Cuba, Havana, Cuba.
1920. Ferreri, Gherardo, University di Roma, Rome, Italy.

1901. GRANT, DUNDAS, 18 Cavendish Square, W., London, England.
1919. KELLY, ADAM BROWN, 26 Blythswood Square, Glasgow, Scotland.
1902. LERMOYEZ, MARCEL, 20 Rue de la Boetie, viie, Paris, France.
1897. LUC, H., 15 Rue de Chanaleilles, viie, Paris, France.
1903. MCBRIDE, P., 20 South Drive, Harrogate, England.
1919. MCKERNON, JAMES F., 62 West 52nd Street, New York.
1896. MACDONALD, GREVILL, 85 Harley Street, Cavendish Square, London, W., England.
1894. MACINTYRE, JOHN, 179 Bath Street, Glasgow, Scotland.
1920. MACKENZIE, DAN, care of Messrs. Adlard & Son, Bartholomew Close, London, England.
1896. MYGIND, HOLGER, 31 Havnegade, Copenhagen, Denmark.
1901. NATIER, MARCEL, 10 Rue de Ballechasse viie, Paris, France.
1919. PATERSON, DONALD ROSE, 15 St. Andrew's Crescent, Cardiff, Wales.
1919. ROGERS, JOHN, JR., 303 East 30th Street, New York.
1894. SAJOUS, C. E., 2043 Walnut Street, Philadelphia, Pennsylvania.
1896. SCHMIEGELOW, ERNEST, 18 Norregade, Copenhagen, Denmark.
1903. TILLEY, HERBERT, 72 Harley Street, Cavendish Square, London, W., England.
1913. TURNER, LOGAN, 27 Walker Street, Edinburgh, Scotland.
1901. WINGRAVE, WYATT, 11 Devonshire Street, Portland Place, London, W., England.
1894. WOLFENDEN, R. NORRIS, The Grange, Kent, England.

Emeritus Fellows

1914. BROWN, J. PRICE, 28 College Street, Toronto, Canada.
1918. FARLOW, JOHN W., 127 Bay State Road, Boston, Massachusetts.
1918. HINKEL, F. WHITEHALL, 581 Delaware Avenue, Buffalo, New York.
1912. LINCOLN, WILLIAM, 210 Lennox Building, Cleveland, Ohio.
1914. PORTER, WILLIAM, Ocean Springs, Mississippi.
1914. ROBINSON, BEVERLY, 42 West 37th Street, New York.

PAST OFFICERS

Presidents

(Year of Election)

1879.	Louis Elsberg	1900.	H. L. Swain
1880.	J. Solis-Cohen	1901.	J. W. Farlow
1881.	F. I. Knight	1902.	J. H. Bryan
1882.	G. M. Lefferts	1903.	J. H. Hartman
1883.	F. H. Bosworth	1904.	C. C. Rice
1884.	E. L. Shurly	1905.	J. W. Gleitsmann
1885.	Harrison Allen	1906.	A. W. de Roaldes
1886.	E. Fletcher Ingals	1907.	H. S. Birkett
1887.	R. P. Lincoln	1908.	A. Coolidge, Jr.
1888.	E. C. Morgan	1909.	J. E. Logan
1889.	J. N. Mackenzie	1910.	D. Braden Kyle
1890.	W. C. Glasgow	1911.	James E. Newcomb
1891.	S. W. Langmaid	1912.	George A. Leland
1892.	M. J. Asch	1913.	Thomas Hubbard
1893.	D. B. Delavan	1914.	Alexander W. MacCoy
1894.	J. O. Roe	1915.	G. Hudson Makuen
1895.	W. H. Daly	1916.	Joseph L. Goodale
1896.	C. H. Knight	1917.	Thomas H. Halsted
1897.	T. R. French	1918.	Cornelius G. Coakley
1898.	W. E. Casselberry	1919.	Norval H. Pierce
1899.	Samuel Johnston	1920.	Harris P. Mosher

Vice-Presidents

1879.	F. H. Davis	
1880.	W. C. Glasgow	J. O. Roe
1881.	E. L. Shurly	W. Porter
1882.	C. Seiler	E. F. Ingals
1883.	S. W. Langmaid	S. Johnston
1884.	J. H. Hartman	W. H. Daly
1885.	H. A. Johnson	G. W. Major
1886.	E. C. Morgan	J. N. Mackenzie
1887.	J. N. Mackenzie	S. W. Langmaid
1888.	W. C. Glasgow	C. E. Sajous
1889.	E. Holden	C. E. Bean
1890.	J. O. Roe	J. H. Hartman
1891.	M. J. Asch	S. Johnston
1892.	S. Johnston	J. C. Mulhall

1893.	J. C. Mulhall	W. E. Casselberry
1894.	C. C. Rice	S. H. Chapman
1895.	J. Wright	A. W. de Roaldes
1896.	T. M. Murray	D. N. Rankin
1897.	A. W. MacCoy	H. S. Birkett
1898.	J. W. Farlow	F. W. Hinkel
1899.	T. A. DeBlois	M. R. Brown
1900.	H. L. Wagner	A. A. Bliss
1901.	J. W. Gleitsmann	D. Braden Kyle
1902.	G. A. Leland	T. Melville Hardie
1903.	J. H. Lowman	W. Peyre Porcher
1904.	Thomas Hubbard	W. J. Freeman
1905.	J. L. Goodale	C. W. Richardson
1906.	G. H. Makuen	A. B. Thrasher
1907.	J. P. Clark	J. E. Rhodes
1908.	E. Mayer	F. R. Packard
1909.	C. G. Coakley	H. P. Mosher
1910.	Robert C. Myles	J. M. Ingersoll
1911.	F. C. Cobb	B. R. Shurly
1912.	A. W. Watson	W. Scott Renner
1913.	F. E. Hopkins	Geo. E. Shambaugh
1914.	Clement F. Thiesen	Lewis A. Coffin
1915.	J. Gordon Wilson	Christian R. Holmes
1916.	Thomas H. Halsted	Greenfield Sluder
1917.	John Edwin Rhodes	D. Crosby Greene
1918.	G. E. Shambaugh	John R. Winslow
1919.	Francis R. Packard	Harmon Smith
1920.	Harmon Smith	W. B. Chamberlin

Secretaries and Treasurers

1879.	G. M. Lefferts	1900.	J. E. Newcomb
1882.	D. B. Delavan	1911.	Harmon Smith
1889.	C. H. Knight	1918.	D. B. Delavan
1895.	H. L. Swain	1919.	J. M. Ingersoll
		1920.	George M. Coates

Treasurer

1912. J. Payson Clark

Librarians

1879.	F. H. Bosworth	1903.	J. H. Bryan
1883.	T. R. French		

PAST MEMBERS

**Deceased*

Honorary Fellows

*1893. de Roaldes, Arthur, New Orleans, La.
*1880. Garcia, Senor Manuel, London, England.
*1883. Mackenzie, Sir Morell, London, England.
*1910. Massei, Ferdinand, Naples, Italy.
*1887. Moure, E. J., Bordeaux, France.
*1879. Oliver, H. K., Boston, Mass.
*1914. Wagner, Clinton, New York City.

Corresponding Fellows

*1892. Browne, Lennox, London, England.
*1887. Gouguenheim, A., Paris, France.
*1894. Holden, Edgar, Newark, N. J.
*1881. Labus, Carlo, Milan, Italy.
*1880. Meyer, Wilhelm, Copenhagen, Denmark.
*1881. Thornton, Pugin, London, England.
*1880. Whistler, W. McNeil, London, England.

Emeritus Fellows

1914. Brown, J. Price, Cranbrook Lodge, Wycombe, Ontario, Canada.
*1914. DeBlois, Thomas Amory, Boston, Mass.
1892. Farlow, John W., Boston, Mass.
*1914. Gleitsmann, Joseph W., New York City.
1888. Hinkel, F. Whitehill, Buffalo, N. Y.
*1912. Knight, Charles H., New York City.
1912. Lincoln, William, Cleveland, Ohio.
1914. Porter, William, Ocean Springs, Miss.
1914. Robinson, Beverley, New York City.

Active Fellows

*1880. Allen, Harrison, Philadelphia, Pa.
*1878. Asch, Morris J., New York.
*1880. Bean, C. E., St. Paul, Minn.
*1893. Bliss, Arthur Ames, Philadelphia, Pa.
*1895. Boylan, J. E., Cincinnati, Ohio.
*1892. Brown, Moreau R., Chicago, Ill.
*1889. Casselberry, William E., Chicago, Ill.
*1883. Chamberlain, C. W., Hartford, Conn.
*1896. Chappell, W. F., New York.
*1882. Chapman, S. Hartwell, New Haven, Conn.
1880. Cushing, E. W., Boston, Mass.
*1878. Cutter, Ephraim, West Falmouth, Mass.
*1880. Daly, W. H., Pittsburgh, Pa.
*1878. Davis, F. H., Chicago, Ill.
*1901. Dickerman, E. T., Chicago, Ill.
*1878. Donaldson, Frank, Baltimore, Md.
*1917. Friedberg, Stanton A., Chicago, Ill.
1901. Getchell, Albert C., Worcester, Mass.
*1907. Gibb, Joseph S., Philadelphia, Pa.
*1878. Glasgow, William Carr, St. Louis, Mo.
*1878. Hartman, Jacob H., Baltimore, Md.
*1879. Holden, Edgar, Newark, N. J.
*1907. Holmes, Christian R., Cincinnati, Ohio.
*1882. Hooper, Franklin H., Boston, Mass.
*1901. Hyatt, Frank, Washington, D. C.
*1882. Ives, Frank L., New York City.
*1878. Ingals, E. Fletcher, Chicago, Ill.
*1880. Jarvis, William C., New York City.
*1878. Johnson, Hosmer A., Chicago, Ill.
*1879. Johnson, Woolsey, New York City.
*1879. Kealhofer, R. H., St. Louis, Mo.
*1901. King, Gordon, New Orleans, La.
*1885. Knight, Charles H., New York City.
*1878. Knight, Frederick Irving, Boston, Mass.
*1898. Kyle, D. Braden, Philadelphia, Pa.
*1880. Langmaid, Samuel W., Boston, Mass.
*1878. Lincoln, Rufus P., New York City.
*1888. Lowman, John H., Cleveland, Ohio.
*1898. Makuen, G. Hudson, Philadelphia, Pa.
*1881. Major, G. W., Montreal, Canada.

*1879. McBurney, Charles, New York City.
*1885. McSherry, H. Clinton, Baltimore, Md.
*1881. Morgan, E. C., Washington, D. C.
*1886. Mulhall, J. C., St. Louis, Mo.
1892. Murray, T. Morris, Washington, D. C.
*1881. Mynter, H., Buffalo, N. Y.
*1893. Newcomb, James E., New York City.
*1895. Nichols, J. E. H., New York City.
1894. Park, William H., New York City.
1892. Porcher, W. Peyre, Charleston, S. C.
*1880. Rankin, D. N., Allegheny, Pa.
*1879. Roe, John O., Rochester, N. Y.
1881. Robertson, J. M., Detroit, Mich.
*1878. Rumbold, T. F., St. Louis, Mo.
*1879. Seiler, Carl, Philadelphia, Pa.
*1893. Shields, Charles M., Richmond, Va.
*1878. Shurley, E. L., Detroit, Mich.
*1879. Smith, Andrew H., Geneva, N. Y.
*1892. Simpson, William Kelly, New York City.
*1879. Tauber, Bernhard, Cincinnati, Ohio.
*1899. Thorner, Max, Cincinnati, Ohio.
*1888. Van der Poel, S. O., New York City.
1896. Ward, Marshall R., Pittsburgh, Pa.
1879. Ward, Whitfield, New York City.
*1886. Westbrook, Benjamin F., Brooklyn, N. Y.
1896. Woolen, Green V., Indianapolis, Ind.