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## Address

### THE BORDERLINE OF LARYNGOLOGY, RHINOLOGY AND OTOTOLOGY.

CHAIRMAN'S ADDRESS BEFORE THE SECTION ON LARYNGOLOGY AND OTOTOLOGY, AT THE FIFTY-NINTH ANNUAL SESSION, AMERICAN MEDICAL ASSOCIATION, 1908.

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In acknowledging my obligation to the Section which has honored me, I can not do better than to bring before you certain phases of the development of our specialty. While a tremendous advance has been made in every portion of our work, the most interesting of all lies on our borderline where we meet the work of others whose investigations reach or overlap our own.

The process of limitation which has been going on in every field of human activity has had two great functions. It has permitted a far more specialized and thorough study, and it has narrowed the field by concentrating the view.

That every division of science and art has thus been subjected to a rigid scrutiny and uncompromising investigation must be admitted, and that the total effect of this research has been productive of far-reaching results can be determined by even a casual observation. But what a sacrifice there has been to the understanding of the broader side of knowledge! We have rushed pell-mell to develop our own little sphere of activity. We have dissected it and probed it and turned it inside out; but we have forgotten that outside of it there is a world, a vast world, filled with others whose aims, like ours, are directed toward the advancement of a little corner of knowledge without the slightest reference to, or perhaps interest in, the greater domain of science and human activity.

This development of specialism which received its impetus with the dawn of nineteenth-century research is evolving its own remedy. For, ever and anon, do we see evidences of a growing disposition to look over the border into the adjoining fields and to associate the great truths of one department of knowledge with those of another or of many others with a view of correlating them for the greater truth. Not only this, but the confines of the various fields are being encroached on again and again, boundaries are modified, and the whole aspect is altered even in a few years. Compared to these the boundary changes which are effected among nations through the instrumentality of wars, revolutions and the greed of man are but insignificant and unimportant.

In no department of medicine has this been more manifest than in laryngology and otology. These certainly did not begin as surgical specialties, nor were they indeed associated together. The time is within the

memory almost of some of our youngest colleagues when the professor of internal medicine was the lecturer on laryngology. Even now the enforced association of the chest with the larynx in the last few decades has kept many a man so highly concerned in physical diagnosis that he has had no opportunity to enter the more logical field of associated surgical conditions. The combination of the eye with the ear, though illogical, remains still a factor largely in view of their accidental association years ago, and because the smaller size of many communities still forces such association as a means of livelihood. However much we may desire this association to continue, these specialties are surely drifting apart and soon will be free of one another.

By a process of natural evolution the ear, nose and throat have become affiliated. Thus laryngology, which was first a slight bud on the parent medical stalk, has joined with another—rhinology—and the two have grown steadily together. Long afterward, they have stolen bodily another offshoot from the parent body—otology—already well developed, and the three together have waxed in importance day by day. With the unfolding of time, who shall say what this association will bring forth, who shall say how it will change and what it will accumulate and what will be abstracted from it?

But the adjacent fields invite us, not only because we are to include some of theirs within our own possessions, but also because their very proximity renders them factors in our development. They modify our work, for as their investigators dig deep into the substratum they find veins of truth which lead them to claim a part of our own domain, or which bring them in closer touch with us.

As we look over the borderline and study our neighbor's work as it pertains to ours, we see the landmarks of the ever-changing limits of days gone by.

When the investigations and work of Garcia, Czermak, Turck and other pioneers opened up the larynx to study during life a tremendous advance was made, for the larynx came into view, though, of course, through the medium of a mirror. By this agency we have been able to cast our influence on the other fields of medical activity and to appropriate an ever-increasing portion for ourselves.

What was first simply a diagnostic aid became a means of surgical intervention, and a whole array of patients whose condition it was not possible previously to differentiate now became amenable to local treatment.

The surgical instinct was in this wise cultivated and laryngologists with greatly improved surgical technic and abundant facilities for local observation began to wander into more distinctly surgical fields. Removal of laryngeal growths, *per viam naturalem*, was soon followed by thyrotomy and more extensive operations, until now even the more radical operations like laryn-

gectomy are gradually being brought into the laryngologist's domain. The result of all this has been so to change the character of our work that we now have a specialty essentially surgical in place of the quasi-medical one which it was at its inception. How much more greatly has this been established since the path-finding work of Kirstein and Killian, and many of our own colleagues in America like Jackson, who have changed the mirror view of the larynx into a direct view, who have set the image right instead of reversed, and who have brought it within six or eight inches of our examining eye instead of twenty-four. Already the possibilities of this method have become manifest, and foreign bodies in the trachea, bronchi and esophagus have come more closely into our range of usefulness, while tumors, strictures and other conditions involving these structures are made susceptible of diagnosis and treatment. Jackson has shown how practically the whole gastric mucosa may be viewed *in situ*, and very properly maintains, at least for the present, that the work should be done by the laryngologist who is accustomed to identifying conditions in a small field.

Close to the borderline of the larynx lie the lungs, which very naturally are greatly concerned in whatever affects their port of entry. A great variety of conditions call for a correlated study of the lungs and the larynx as well as of the other organs of the upper respiratory tract.

Investigations directed toward the better understanding of tuberculosis show, in many ways, how much there is still to be learned of the relation which the laryngeal affection bears to the disease in the lungs.

The nervous system has been invaded pacifically by the laryngologist, as evidenced by a study of chorea, tabes and other nervous affections, not to speak of the value of laryngoscopic observations in pressure on the recurrent and other conditions involving the nerve supply of the laryngeal muscles. The examination of the larynx is of special value in tabes, particularly since laryngeal paralysis is one of the earliest symptoms, appearing often before others that are more classical. Bearing on this subject, Freudenthal, in his paper to be read at this meeting, takes issue with Harland and shows from examination of numerous cases that the conclusions of Semon, Kraus, Burger and others, as to the frequency of laryngeal paralysis in tabes, are justified.

Laryngeal manifestations of hysteria are too well known to require more than passing comment to show how we are developing along the borderline of neurology.

No more potent influence on the art of singing has been exerted of late years than that of laryngology. In fact, this is one of the most promising fields along our borderline. The keen interest manifested in the subject by our colleagues all over the world has been effective in cultivating a study of the vocal art along proper lines. Defects of speech, however, have not received the attention which they merit, except at the hands of a very few. When we consider how much good there is to be done in this regard and how clearly it falls within our province, it is most surprising that more interest is not taken in this subject. It is to be hoped that the persistent efforts of Gutzmann, Makuen and others will be rewarded by the more general acceptance of this line of activity as a part of our work.

The pharynx has also added to our field of work by encroachments along its borders. The investigations

with respect to the function of the tonsils have opened up a great storehouse of study. The throat is thus seen to be a factor in some of the most serious affections, among the most important of which are rheumatism, tuberculosis, meningitis and endocarditis. Although final evidence is wanting, it is within the range of positive probability that many of the more general conditions have their origin in a bacterial invasion through the tonsil. The investigations of Goodale go a great distance toward the confirmation of this assumption. Quite recently Wood was able, by rubbing a virulent culture of bovine tubercle bacilli on the surface of the tonsils of hogs, to inoculate the tonsils; and he succeeded in finding the tubercle bacillus in the regional lymph glands of the neck within five days after inoculation.

The influence of adenoids on the general system and on neighboring structures is so well known that comment is almost unnecessary. It would be very strange indeed, if the warm moist character of the adenoid mass did not provide a highly satisfactory medium for bacterial growth, whereas the more physical changes result from the decided nasal obstruction which it occasions. The far-reaching effects of adenoids have added school hygiene to our borderline branches; indeed, examination for adenoids constitutes the most important part of the medical inspection of schools. In addition to these we must cite more remote conditions, such as psychoses, dementia præcox, aprosexia, etc., all of which may result from the presence of adenoids.

Cleft palate has come within our range in consequence of the fact that our province has become extended on the surgical side. It is certainly just as logical for the laryngologist to close up the floor of the nose or to obliterate a congenital cleft in the soft palate as it is for him to remove an obstruction of the nose. In the early history of laryngology operations of such magnitude were not performed by the laryngologist, but now the situation has changed in that the radical mastoid and laryngectomy call for as much understanding of surgical technic as any other surgical undertaking. The methods used for relief of serious tonsillar hemorrhage, such as suturing the two pillars and ligation of the carotid, indicate how our surgical work is assuming higher technic.

Though a late addition to our specialty, the study of the nose has given evidence of tremendous activity. Until the advent of cocaine it was but a small factor. The anesthetic properties of cocaine made it possible to develop the surgery of the nose along its most progressive lines. Beginning with the cauterization of the nasal mucosa, we have run the gamut of operative procedures until now we have a most highly developed surgical character of work. Witness the saw operations for ridges and spurs, the punch, cutting and crushing operations for deflections with the various retention devices as pins, solid splints, hollow splints of Mayer, block tin splints of Braden Kyle, compressed cotton of Simpson, all largely replaced by the submucous operation, which has been developed among others by Boeninghaus, Krieg, Killian, Hajek, Freer and Ballenger.

The other wall of the nose has likewise been subjected to this process of surgical evolution, as shown in the greatly improved technic now used. As suggestive of future development in this particular we need only mention the highly ingenious method devised by Yankauer for suturing the nasal mucosa, and the submucous operation on the outer wall of the nose, to be presented by Canfield at this meeting.

All these are strictly within the limits of our work, but they are to be considered as evidence of study along our borderline in the field of surgery.

Sinus surgery, however, shows our encroachment on the field of surgery far more specifically, for we have appropriated the whole subject.

Radical operations on the accessory sinuses are far more frequently undertaken by the rhinologist now than the simple ones twenty-five years ago. It was culpable for him to venture into the antrum at that time and almost a crime for him to undertake a frontal sinus operation. But with our growing methods of diagnosis, impossible of performance without rhinologic technic and understanding, these operations are a part of our task and we do not shirk our responsibility.

The sinuses bring us back again to our old associate, ophthalmology, but not in the same way and for the same reasons as in the past. The more special relation which the eye bears to the sinus, not in any sense understood when they were associated, called for this study. As a more detailed investigation into this subject is being made it is remarkable how much influence we find the accessory sinuses to have on the eye. Numerous reports of blindness and other conditions have been made where the diseases of the sinus were the cause and where their cure was followed by relief from the ocular trouble. Among the many conditions coming within this range may be mentioned orbital abscess, orbital phlegmon and optic neuritis. A growing field for study and observation is thus being spread out before us and we find ourselves peacefully appropriating territory from our neighbor, who was formerly our medical sovereign.

The borderline between dentistry and laryngology has been invaded many times during the past twenty-five years. Beginning with the study of the antrum, it has extended so as to include many of the conditions with which the two branches of medicine are concerned. The maxillary sinus, which at first was considered as belonging exclusively to the domain of the dentist, or perhaps of the surgeon for the more radical work, has now been fully acknowledged as a part of our task. When alveolar puncture was practically the only remedy available besides the radical operation the dentist had full sway, but as the antrum has come to be recognized as an extension of the nose its therapeutics has been moulded accordingly. The intranasal operations are greatly to be preferred where anything short of a radical operation is possible. In addition, the more extensive operations fall naturally to the lot of the rhinologist, who from the nature of things must have these cases under investigation during the period of preliminary observation and treatment.

In malocclusion of the teeth those who practice the specialty of orthodontia have long ago recognized the almost universal etiologic influence of adenoids. Before undertaking the mechanical treatment necessary to correct the malocclusion and the irregularities in the growth of the teeth which so greatly mar the facial beauty, the almost invariable rule is to have the adenoid growths removed.

Otology has been long regarded as a specialty, first in association with the eye, then as an independent one, and later as an associate of laryngology. All the earlier writers on general diseases discussed ear affections, but little was known beyond what affected the external ear.

The first dispensary for ear diseases was founded by John Cunningham Saunders in 1805 under the name of the London Dispensary for Curing Diseases of the Eye

and Ear, but later the treatment of the ear was discontinued. However, John Harrison Curtis, a student of Saunders, established an institution for the treatment of ear diseases which was more permanent. One was established in New York in 1820 for the treatment of both eye and ear diseases.

In those early times the field of otology was necessarily limited and little was understood either of the pathology or treatment of middle-ear diseases. This was mainly due to the inefficiency of examination, which was made by allowing the sunlight to fall into the external auditory canal. With the advent of reflected light the surgical side of otology underwent rapid development. However, it has only been during the past twenty-five years that anything like a proper understanding of the surgical aspects has been possible. During that time our whole knowledge of mastoid diseases and their therapeutics has been developed.

It is through the agency of the mastoid that we again step over an important borderline and invade the field of cranial surgery, to such an extent that every otologist who does even an ordinary amount of aural surgery comes sooner or later into the domain of cranial surgery. And this tendency is growing—in fact, it is becoming recognized. As indicative of this, I need only call your attention to the joint session of our own section with that of surgery for the purpose of discussing cranial surgery, the first time, I believe, that such an association has been made. This correlation of work and study is bound to be productive of good results, for there is yet much to learn of intracranial surgery as it applies to otology, rhinology and other specialties as well.

The recent work of Barány in the differentiation of labyrinthine conditions adds not a little to the influence which we have on our neighbors over the border. The diagnosis of cerebellar tumors and other processes going on in that region is thereby greatly advanced.

Otologists have long been concerned in the deaf and dumb and in the methods by which their lot is made more bearable. In recent years, however, there has been far less interest manifested, perhaps on account of the overwhelming development of aural surgery. There is still much to be done in this beneficent field of work and it can be effected only by a cooperation of otologists with teachers of the deaf and with those whose philanthropic tendencies are directed toward this great work.

I have still to mention certain surgical procedures which several years ago were considered entirely outside of our range but which are being undertaken by an ever-increasing number of laryngologists and otologists. Chief among them are plastic operations on the external nose and ear, ligation of the jugular and carotid, removal of cervical glands, goiter and hare-lip operations and neuroplasties like facio-hypoglossal anastomosis which Joseph Beck has just brought into notice by his report of six cases.

Thus we see how our work has been broadened by the study of adjoining fields, how our neighbors have yielded to us possession of some of their choicest lands and how we have assimilated them so that our portion is now a well-outlined part of medicine, full of possibilities and encouragement for study. It is not hampered by narrow prejudice or intolerance to progress. On the contrary, we have invited the most serious investigation and we have appropriated the results of research from all departments of science.

The devotees of laryngology and otology have not been content to accept their life work as simply a means for earning a livelihood—they have not been willing to use it as a mere catch-penny device for the accumulation of wealth. They are found earnestly studying their special problems, even though they were required, in the hope of finding solution, to wander into the realms of all the pure and applied sciences. Witness what investigation has been made by Killian in embryology, Denker, Onodi, Cheatle and Turner in anatomy, Siebenmann and Wright in pathology, Wingrave in bacteriology, Fraenkel, Katz and Shambaugh in histology, Zwaardemaker and Bezold in physiology, Edelmann, Gradenigo, Hammerschlag and Kyle in chemistry and physics—research of the highest merit, accepted throughout the world.

From small beginnings, and without great encouragement, we have journeyed through the few years since our establishment and have reached a point in our activity where our work is recognized as one of the great component parts of medicine, respected, honored and commended for its progressive development, for its notable achievements and for the high position which it has attained.

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### Original Articles

#### MIDDLE-EAR SCLEROSIS, OR ATROPHIC MIDDLE-EAR CATARRH.\*

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This condition depends on trophic changes and, in contrast to a multitude of clinical forms that have been described under various names, it has a comparatively simple pathology. The clinical appearances vary with the location and degree of the pathologic change and with the structure and tissue affected. However, since the treatment is not dependent on these circumstances, it is only confusing to go into minute details in regard to the clinical pictures. Not only does the appearance change with every conceivable combination of the part affected but also with every stage of the pathologic change. The forms which the sclerosis may assume are as numerous as the combinations of stages and anatomic parts will allow. For instance, the sclerosis may be located in any part of the tympanum and the various pathologic changes may be going on at the same time. Formerly this great diversity caused considerable confusion in our understanding of the subject. In reality, however, the condition is exceedingly simple and includes not only the "dry catarrhal" but also the suppurative process. The symptomatic importance of the otosclerosis varies according to the location of the pathologic change. The most harmful location is that in the neighborhood of the foot plate of the stapes, while the most readily diagnosticated occurs in the drum membrane where the changes are in plain sight.

Otosclerosis begins with a general or localized disturbance of circulation of the mucous lining of the middle-ear tract. This disturbance is irregular in its course and is subject to marked intermissions and remissions,

especially at its inception. Anemia may be noticeable from the start or there may be initial hyperemia with fibrosis or hyperplasia of connective tissue. The connective tissue contracts and anemia follows the compression of the blood vessels. This anemia causes the sclerosis. The sclerotic mucous membrane appears stiffened, thickened and gray and sometimes contains macroscopic deposition of lime salts. The sclerotic process first affects the mucous membrane; next the submucous or periosteal layer is affected because the blood supply derived from the mucous layer has been partially cut off. The periosteal layer goes through the same degenerative change as the mucous layer, but with this difference, namely, that here the deposition of lime salts is more extensive and takes the form of hyperostosis.

In spite of the fact that the pathologic changes are identical and that their resultant effects on the function of the sound-conducting mechanism are the same, except for the sloughing and erosion of the suppuration, it is not customary to consider the results of suppuration under the head of otosclerosis. The chief cause of great loss of hearing after suppuration of the middle ear is sclerosis. This is not, however, the special result of suppuration; that is to say, the great impairment of hearing is due not to the loss of parts but to the fact that the functions of the remaining parts have been impaired. This impairment is brought about by contractions of the fibrous tissues consequent to the inflammation and stiffening of the mucous and submucous layers.

We shall only mention in passing the labyrinthine extension of otosclerosis in hyperostosis and rarifying osteitis of the labyrinth capsule. As a consequence of the altered nutrition of the periosteal layer of the tympanum, the adjacent bone suffers from malnutrition, so that vascularization sometimes results and hyperostosis may take place to such a degree that the fenestral and labyrinthine spaces are obliterated.

The etiology of these mucous membrane disturbances of the middle ear is varied. The most important cause is circulatory disturbances of the tympanum following reduced patency of the Eustachian tube. The next most important cause is the result of fibrosis from inflammatory processes of the tympanic mucosa, resulting in decreased blood supply due to fibrous contractions and the shutting off of the vessels. The least common cause is found illustrated in the so-called otitis media catarrhalis insidiosa. Here there is absence of primary middle-ear change other than the altered vasomotor action due to impaired function of the general or sympathetic nervous system consequent on general or nerve exhaustion chiefly occurring in menstrual or puerperal difficulties or in mental strain.

In most cases the diagnosis is readily made by inspecting the drum membrane. If the tissue of this membrane shows any changes other than those due to acute inflammation or loss of continuity, sclerosis is thereby indicated. These changes are increased or decreased transparency of long chronicity, and increased rigidity or relaxation of the membrane. Incipient sclerosis is indicated by subacute inflammatory conditions of the drum membrane with opacity and thickening due to the increase of fibrous tissue. Changes in the color of the drum membrane consequent on chronic congestion of the promontory are also indications of otosclerosis. When the so-called insidious form is present with a normal drum membrane the diagnosis is made by the functional tests which indicate an impairment

\* Read in the Section on Laryngology and Otology of the American Medical Association, at the Fifty-ninth Annual Session, held at Chicago, June, 1908.